

---

# Proceedings of the Sinn und Bedeutung 10

---

10<sup>th</sup> annual meeting of the Gesellschaft für Semantik  
October 13–15, 2005  
Zentrum für allgemeine Sprachwissenschaft, Berlin

Christian Ebert & Cornelia Endriss (eds.)



## PREFACE

These proceedings contain a collection of papers that have been presented at the 10<sup>th</sup> annual meeting of the Gesellschaft für Semantik – better known as the *Sinn und Bedeutung 10* – which took place October 13–15, 2005 at the Zentrum für allgemeine Sprachwissenschaft (ZAS), Berlin. Of the four invited and 51 contributed talks of the program, 34 have been elaborated into the papers of this collection, which appears as No. 44 in the *ZAS Papers in Linguistics* series in print (in two volumes) and online:

[http://www.zas.gwz-berlin.de/index.html?publications\\_zaspil](http://www.zas.gwz-berlin.de/index.html?publications_zaspil)

On behalf of the organizers (Christian Ebert, Regine Eckardt, Cornelia Endriss, Hans-Martin Gärtner, Manfred Krifka, Claudia Maienborn, and Uli Sauerland) we would like to thank the speakers, reviewers and student helpers for their contributions towards making the conference such an inspiring and pleasant event.

Christian Ebert  
Cornelia Endriss

# CONTENTS

VOLUME 1

(A–M)

---

<b>Stavros Assimakopoulos</b> Cognitive Representation and the Relevance of On-line Constructions.....	1
<b>Maria Averintseva-Klisch</b> The 'Separate Performative' Account of the German Right Dislocation .....	15
<b>Kata Balogh</b> Complex Focus Versus Double Focus .....	29
<b>Sigrid Beck &amp; Arnim von Stechow</b> Dog After Dog Revisited .....	43
<b>Adrian Brasoveanu</b> Temporal Propositional De Se: Evidence from Romanian Subjunctive Mood .....	55
<b>Ariel Cohen</b> Bare Nominals and Optimal Inference .....	71
<b>Paul Dekker</b> Mention Some of All .....	85
<b>Ljudmila Geist</b> Copular Sentences in Russian vs. Spanish at the Syntax-Semantics Interface.....	99
<b>Wilhelm Geuder</b> Manner Modification of States .....	111
<b>Wilhelm Geuder &amp; Matthias Weisgerber</b> Manner and Causation in Movement Verbs .....	125
<b>Elsi Kaiser</b> Effects of Topic and Focus on Salience.....	139

<b>Elsi Kaiser, Jeffrey T. Runner, Rachel S. Sussman and Michael K. Tanenhaus</b> What Influences the Referential Properties of Reflexives and Pronouns in Finnish? .....	155
<b>Dalina Kallulli</b> A Unified Analysis of Passives and Anticausatives .....	171
<b>Mana Kobuchi-Philip</b> A Unified Semantics Analysis of Floated and Binominal <i>Each</i> .....	183
<b>Sveta Krasikova &amp; Ventsislav Zhechev</b> You Only Need a Scalar <i>Only</i> .....	199
<b>Eric McCready</b> Functions of English <i>Man</i> .....	211
<b>Telmo Mória</b> On Temporally Bounded Quantification over Eventualities .....	225
<b>Karina Veronica Molsing</b> The Present Perfect at the Semantics/Pragmatics Interface: American English and Brazilian Portuguese .....	239

VOLUME 2

(N–Z)

---

<b>Fabrice Nauze</b> Multiple Modals Construction .....	251
<b>Francesca Panzeri</b> Forking Paths and Polarity Items Licensing .....	265
<b>Doris Penka</b> Almost There: The Meaning of <i>almost</i> .....	275
<b>Daniel Rothschild</b> The President and the Man on the Street: Definite Descriptions and Proper Names across Possible Situations .....	287

<b>Florian Schwarz</b> Presuppositions in Processing: A Case Study of German <i>auch</i> .....	301
<b>Torgrim Solstad</b> Word-Meaning and Sentence-Internal Presupposition .....	317
<b>Stephanie D. Solt</b> Why <i>A Few</i> ? And Why Not <i>*A Many</i> ?.....	333
<b>Tamina Stephenson</b> Quantificational Readings of Indefinites with Focused Creation Verbs .....	347
<b>Rachel Szekely</b> Feature-Placing, Localizability, and the Semantics of Existential Sentences .....	361
<b>Lucia M. Tovena</b> Dealing with Alternatives .....	373
<b>Anna Verbuk</b> Russian Predicate Clefts: Tensions Between Semantics and Pragmatics .....	389
<b>Matthias Weisgerber</b> Decomposing Path Shapes: About an Interplay of Manner of Motion and 'The Path' .....	405
<b>Hedde Zeijlstra</b> Don't Negate Imperatives! Imperatives and the Semantics of Negative Markers .....	421
<b>Hedde Zeijlstra</b> How Semantics Dictates the Syntactic Vocabulary.....	437
<b>Malte Zimmermann</b> Adverbial Quantification and Focus in Hausa .....	453
<b>Eytan Zweig</b> When the Donkey Lost its Fleas: Persistence, Contextual Restriction, and Minimal Situations .....	469

# COGNITIVE REPRESENTATION AND THE RELEVANCE OF ON-LINE CONSTRUCTIONS<sup>1</sup>

Stavros Assimakopoulos,  
University of Edinburgh

stavros@ling.ed.ac.uk

## Abstract

In this paper, focusing on the relevance-theoretic view of cognition, I discuss the idea that what is communicated through an utterance is not merely an explicature upon which implicature(s) are recovered, but rather a propositional complex that contains both explicit and implicit information. More specifically, I propose that this information is constructed on the fly as the interpreter processes every lexical item in its turn while parsing the utterance in real time, in this way creating a string of ad hoc concepts. While hearing an utterance and incrementally constructing a context, the propositional complex communicated by an utterance is pragmatically narrowed and simultaneously pragmatically broadened in order to incorporate only the set of optimally relevant propositions with respect to a specific point in the interpretation. The narrowing of propositions from the initial context at each stage allows relevant propositions to be carried on to the new level, while their broadening adds to the communicated propositional complex new propositions that are linked to the lexical item that is processed at every step of the interpretation process.

## 1 Introduction

In the tradition of linguistics, most investigations tend to equate an utterance's basic proposition with its semantic representation. This perspective although theoretically attractive, can prove to be problematic with respect to its psychological plausibility (Recanati 2004). At the same time, current research in pragmatics can help offer a more realistic alternative that would allow contextual intrusions to influence the basic proposition communicated by an utterance. A suitable pragmatic framework that could provide a rich background in which to investigate propositional content without compromising the account's psychological plausibility is Relevance Theory, which has already developed a realistic approach to cognition.

This paper sets out to examine propositional content as this is constructed during utterance interpretation and in accordance with the relevance-driven comprehension procedure. To begin with, I will present the basic assumptions of the relevance-theoretic framework and, then, move on to a relevance-theoretic description of the aspects of cognition that underline the context-dependent nature of knowledge representations in our cognitive environment when it comes to verbal communication. In this way, I will introduce the basic ideas that motivate the account proposed by this paper. After discussing the relevance-theoretic notion of context, I will present a scenario of how propositional content is derived directly from the cognitive and communicative approach proposed in *Relevance* itself. In conclusion, I will

---

<sup>1</sup> I am grateful to Ronnie Cann, Robyn Carston, Caroline Heycock, Ruth Kempson and Deirdre Wilson whose invaluable suggestions and extensive comments fine-tuned the contents of this paper and helped me clarify important details of the current account; yet, they are not to be taken responsible for any errors or misinterpretations present here. Many thanks also to the audience, and particularly Jim Hurford and Dan Wedgwood, who commented on a first version of this paper presented at the University of Edinburgh. Finally, I would like to thank the Sinn und Bedeutung 10 organizers and audience as well as the editors of the present volume.

discuss the implications the proposed account carries and suggest directions for future investigations

### 1.1 Relevance Theory

As a framework, Relevance Theory was received with great enthusiasm by researchers across a wide range of fields, since it provided a revolutionizing approach to cognitive pragmatics, by redefining it in terms of characterizations of relevance. In the mid 80s, Sperber and Wilson developed a framework that addresses communication as a process that involves inference in the recovery of meaning to as great a degree as encoding and decoding.

The motivation behind Relevance Theory (Sperber and Wilson 1986, 1987, 1995, Wilson and Sperber 2004) lies in the ground-breaking work of Grice in the field of pragmatics (1957, 1975, 1989). Sperber and Wilson took up Grice's central idea that communication involves not only a single level of coding and decoding – in the Saussurean meaning of *semiology* (1974), but also an inferential level that is essential in providing the hearer with the speaker's meaning. Grice had laid down a model of utterance comprehension that described the social norms that apply to communication in the shape of a Cooperative Principle and a set of maxims that people attend to when engaging in it: two maxims of truthfulness, two of informativeness, one of relevance and four of clarity.

Relevance Theory, even though highly influenced by Grice's pioneering work, redefines communication as a cognitive exercise. Sperber and Wilson hold that when we engage in communication we do not merely follow social norms that tell us how to communicate, but rather follow a specific cognitive path that makes us communicate efficiently. This path is prescribed solely on the grounds of our expectations of relevance which are "precise and predictable enough to guide the hearer toward the speaker's meaning" (Wilson and Sperber 2004:607).

Now, what makes an utterance or a general input to our cognitive environment relevant depends on a balance of cognitive effects and processing effort. Other things being equal, the more this stimulus changes our cognitive environment in a positive way the more relevant it is, and the less processing effort it demands in doing so the more relevant it is. Sperber and Wilson support the idea that relevance considerations play a central role in the way our whole cognitive system works. This is spelled out in the Cognitive Principle of Relevance they put forward:

Human cognition tends to be geared to the maximization of relevance.

In the same spirit, they also address communication and, especially, a particular form of it, ostensive-inferential communication. As opposed to other forms of communication, ostensive-inferential communication involves two layers of intentionality from the communicator's point of view. In engaging in this sort of communication, she does not only intend to make manifest to her audience some information (*informative intention*), but she also intends to make it mutually manifest to both her and her audience that she has this informative intention (*communicative intention*). In other words, the cognitive task of pursuing ostensive communication means that the communicator does not only communicate a set of assumptions, but also her intention to share this information with her audience.

Against this background, Sperber and Wilson propose a second principle of relevance, the Communicative one, which links ostensive communication to expectations of relevance:

Every act of ostensive communication communicates a presumption of its own optimal relevance.

According to this principle, the audience of ostensive-inferential communication always has a right to presume the optimal relevance of the input given to it. This means that it always has a



right to presume that the stimulus provided is relevant enough to be worth its processing effort, in the sense that it should provide large positive cognitive effects with minimal effort expenditure, and it is the most relevant one compatible with its communicator's abilities and preferences. On the grounds of the definition of relevance and optimal relevance, relevance theorists also suggest that the comprehension procedure follows a prescribed path:

Check interpretive hypotheses in order of their accessibility, that is, follow a path of least effort, until an interpretation which satisfies the expectation of relevance (i.e. yields enough cognitive effects etc.) is found; then stop.

Coming back to Grice with a view to addressing utterance interpretation, another pioneering assumption of his that is important to relevance-theorists is his notion of *implicatures*. In Grice's work, the explicit meaning of an utterance is basically decoded via a code (i.e. the language system) while what an utterance implies is derived inferentially from the exact decoded content (i.e. literally what is said), after this has been retrieved, in the form of implicatures. In Relevance Theory, decoded and inferred information are not distinguished in this absolute way, since inferential pragmatic enrichment takes place also in the recovery of an utterance's explicit content, that is its explicature(s), like in the case of reference resolution. In instances of verbal communication, the interpreter of an utterance relies on inference to complete all three subtasks that will guide him to recognizing the intended meaning of the speaker's utterance. As Wilson and Sperber suggest, these subtasks involve three levels of construction (2004:615):

- a. Constructing an appropriate hypothesis about explicit content (*explicatures*) via decoding, disambiguation, reference resolution, and other pragmatic enrichment processes.
- b. Constructing an appropriate hypothesis about the intended contextual assumptions (*implicated premises*).
- c. Constructing an appropriate hypothesis about the intended contextual implications (*implicated conclusions*).

All these subtasks involve inferential processing to a great extent, while an important feature of them is that they are not "sequentially ordered: the hearer does not FIRST decode the logical form, THEN construct an explicature and select an appropriate context, and THEN derive a range of implicated conclusions" (ibid.).

This brief introduction to Relevance Theory is by no means exhaustive. Its applications are numerous and further ideas it puts forward will be discussed in the parts to come. What needs to be addressed at this point is what the relevance-theoretic framework has to say about the way mental content is organized and accessed during utterance interpretation.

## 2 On the human cognitive system

This part of the paper addresses the way in which Relevance Theory assumes knowledge is represented in the human cognitive system. In their framework, Sperber and Wilson have sustained a modified Fodorian view of a modular mind (Fodor 1983)<sup>2</sup> along with his view that our cognitive environment consists of propositions (Fodor 1975); yet, they have, on several

---

<sup>2</sup> Even though this is of little interest for the purposes of this paper, Sperber and Wilson have since 2000 departed quite substantially from Fodor's view of central processes opting for a more modular approach to what Fodor would traditionally treat as central processes (Sperber and Wilson 2002, Wilson 2005). On other occasions, Sperber (1994, 2002) has suggested a model of massive modularity that views the mind as modular through and through with modules coming in all sizes and formats, even in the size of a concept.

occasions, criticised Fodor's views on specific cognitive issues, namely his interpretation of the frame problem<sup>3</sup>, something I will come back to later on.

According to Sperber and Wilson, the total of the knowledge represented in our minds partially constitutes our *cognitive environment*. More specifically, they define an individual's cognitive environment as "the set of all the facts that he can perceive or infer: all the facts that are manifest to him" (Sperber and Wilson 1995:39), in the shape of assumptions that might be either true or false. More specifically, they suggest that "an individual's total cognitive environment is a function of his physical environment and his cognitive abilities. It consists not only of the facts that he is aware of, but also all the facts that he is capable of becoming aware of, in his physical environment". (ibid.)

In this way, Sperber and Wilson manage to capture the idea that our system of thoughts, i.e. mental representations, contains not only the new information we acquire through the processing of a stimulus – might that be anything from a perceivable object in our visual or acoustic environment to an utterance that we are called to interpret, but also the information that we can acquire through the additional processing of a processed stimulus. These extra representations that are derived from originally perceived ones are as important as the latter in mental processing and can potentially be stored in our knowledge database in very much the same way as perceptually-acquired information is<sup>4</sup>. This view of a cognitive environment respects individuality and gives a psychologically indispensable level of subjectivity to the set of *assumptions* and *thoughts* that are represented in our mind<sup>5</sup>.

As already mentioned before, Relevance Theory sustains the Fodorian view that our cognitive environment consists of a propositional repertoire. Thoughts, i.e. "conceptual representations", and assumptions, i.e. subjective "thoughts treated by the individual as representations of the actual world" (Sperber and Wilson 1995:2) are logical forms that have an internal structure, in the form of systematically combined conceptual meanings.

### 2.1 Concepts

Right from its emergence, Relevance Theory has taken up a point that is generally undisputable within cognitive science. According to Sperber and Wilson (1995:85), "it seems reasonable to regard logical forms, and in particular the propositional forms of assumptions, as composed of smaller constituents to whose presence and structural arrangements the deductive rules are sensitive. These constituents we will call *concepts*".

Sperber and Wilson treat concepts as "triples of entries, logical, lexical and encyclopaedic, filed at an address" (1995:92). A concept has a logical entry in the sense of a set of formal deductive rules that apply to logical forms containing the concept at hand and that produce conclusions from a set of premises. The lexical entry of a concept contains "information about the natural-language lexical item used to represent it" (Sperber and Wilson 1995:90). This information is both phonological and grammatical. Finally, the encyclopaedic entry of a

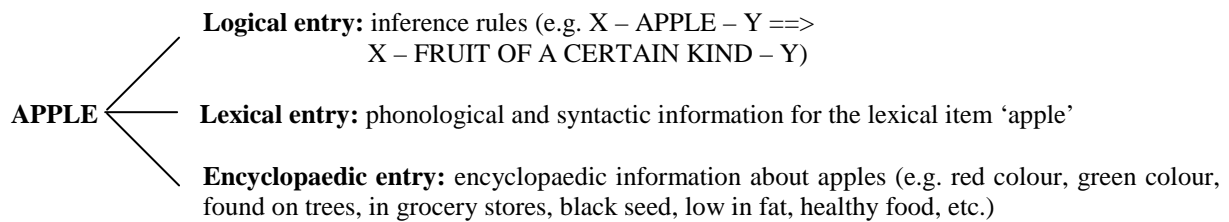
---

<sup>3</sup> Sperber and Wilson (1996) address the Fodorian Frame Problem as wrongly formulated to begin with by claiming that rational central processes would not consider all information provided as modular input, but rather a selected relevant set of them.

<sup>4</sup> A very good example of information that is provided on such grounds is metarepresentational information, information that maps representations over representations in the way discussed by Sperber (2000) and Wilson (2000).

<sup>5</sup> Subjectivity in mental representations is deemed indispensable in a psychologically realistic account of cognition because different individuals might store in their minds different assumptions for the same stimuli. As Penco argues (1999) cognitive science seems to favour "the subjective, cognitive representation of the world" (after McCarthy 1993) over "an objective, metaphysical state of affair" (after Kaplan 1989).

concept is the set of extra information that is linked to its denotation. So, for example, if you have the concept APPLE under scrutiny you can schematically represent its entries as follows<sup>6</sup>:



Against this background, most concepts can be represented through their triple entries. Of course, “occasionally, an entry for a particular concept may be empty or lacking” (Sperber and Wilson 1995:92). For example, a concept like BUT would not have an encyclopaedic entry, since it has no extension. Similarly, proper names may lack logical entries. Many concepts even lack lexical entries, like the concept that has UNCLE and AUNT as its subcategories and contains information that is common to both concepts (after Sperber and Wilson 1998).

Relevance Theory distinguishes between the concepts that are stored in our cognitive system and the ones that are communicated through an act of ostensive communication. The former are stable, containing all information linked to the concept in a single conceptual space. However, the concepts that are communicated as parts of, say, the propositional form of an utterance, are rather *ad hoc* concepts that are constructed on-line during the interpretation process.

The notion of *ad hoc* conceptual entities was first introduced by Barsalou (1987, 1992) in the domain of cognitive science. In his paper ‘On the instability of graded structure’ (1987), he suggests that individuals tend to produce different sorts of typicality rankings among the same conceptual category members when these are processed in context. Individuals will give different rankings of the same concepts when asked to do so in different situations, like in the case of their own point of view or when judging from the point of view of others. In the same way, people can construct typicality rankings for *ad hoc* categories (e.g. THINGS THAT CAN FALL ON YOUR HEAD). Through his examples, Barsalou shows that people can easily produce varying representations of the world reflecting context-dependent information they might even have never been processed beforehand in a fast and creative way (Barsalou 1983, 1987, 1993).

Following the experimental research of Barsalou, relevance-theorists suggested that the content of a concept as communicated within a context is constructed *ad hoc* out of the combination of different parts of encyclopaedic information we have stored in our cognitive system. In other words, relevance-theorists have employed Barsalou’s terminology and experiments<sup>7</sup> to describe the end-product of a process of on-line concept construction during the interpretation process (Carston 2002, 2004, Wilson 2004, Wilson and Sperber 2004). The relevance-theoretic account of lexical meaning suggests that a lexical form maps to a conceptual address in memory, the address that links to the lexical, logical and encyclopaedic entries of a concept, and the context provides the relevant encyclopaedic information that is used with the communicated *ad hoc* concept in a selective manner. For example, let us consider the following utterance:

<sup>6</sup> After Wilson 2002

<sup>7</sup> Barsalou’s work has provided evidence mainly for the relevance-theoretic claims of conceptual narrowing that have been present since the beginning of the framework. Later, these claims were generalised to apply to broadening as well (Carston 1996).

(1) Mary wants to meet some bachelors.

The standard relevance-theoretic account would suggest that what is communicated in this utterance is a set of concepts, including an *ad hoc* concept BACHELOR\*. This move is justifiable by certain assumptions communicated along with the utterance in the context of situation. From the point of view of Mary and our knowledge about her the *ad hoc* concept BACHELOR\* refers to unmarried men who are eligible for marriage. In this way, the Pope would not qualify as a bachelor that Mary wants to meet. Similarly, in the situation where Mary is thinking about becoming a nun and is, thus, considering ‘unweddedness’, she might want to meet bachelors that have also selected to remain unwedded, by becoming God’s servants of some sort, and are, therefore, not eligible to marriage.

Relevance Theory makes a clear distinction between already stored concepts that are holistic and contain specific information within interconnected conceptual spaces and concepts that are constructed on-line. What relevance theorists are now dealing with in their work in lexical pragmatics is the way in which these two ‘types’ of concepts are linked (Wilson 2004). In a nutshell, Relevance Theory suggests that ‘the stored lexical concept provides the starting point for the on-line construction of the *ad hoc* concept which proceeds as part of the utterance comprehension process and so is constrained, as ever, by the search for an optimally relevant interpretation’.

The view that I will be employing in this paper is that all communicated concepts are in effect *ad hoc* concepts. This move should be justified within the general picture of the relevance-theoretic framework. The linguistically encoded stored concept that is triggered by the utterance of a lexical item points to some space in memory within which the interpreter needs to look for relevant information against the context in which he is processing the utterance. The relevance heuristic should lead him to select the most easily accessible part of this information that will provide adequate cognitive effects. In this way, the information communicated by each lexical item in an utterance does not correspond to the whole of the stored concept’s information but is constructed *ad hoc* by the interpreter in the manner prescribed by the relevance-theoretic comprehension procedure.

## 2.2 Propositions

Having addressed conceptual content, a discussion of propositional content seems indispensable at this point. As already noted above, against the background of Relevance Theory, propositions are logical forms that constitute structured sets of concepts. In light of the previous treatment of concepts, it is clear that when it comes to utterance interpretation, propositional content comprises structured *ad hoc* concepts<sup>8</sup>.

An important aspect of utterance interpretation that was underlined by Sperber and Wilson in *Relevance* is that the recovery of explicatures and implicatures occur on the fly. As put forth in the identification of the subtasks involved in the utterance comprehension process, interpretation takes place in a time-linear manner. This should have direct implications for the examination of an utterance’s communicated propositional content.

Firstly, the proposition communicated by an utterance is constructed on-line by the hearer. This challenges the traditional view that equates the basic proposition communicated by an utterance with its semantic representation. Taking up the relevance-theoretic account of

---

<sup>8</sup> A point that needs to be put forth here is that there is a distinction between what a proposition is with respect to cognition and what a proposition is with respect to communication. The latter, which is in the centre of attention in this paper, is an outcome of the interpretation process that is constructed on-line, while the former is stored in our cognitive system and has a relatively stable content.

meaning construction makes this basic semantic representation of a given utterance a mere template upon which pragmatic enrichment takes place. In a psychologically plausible account of utterance interpretation, the hearer parses and interprets an utterance in a left-to-right time linear way. While the hearer processes the utterance one step at a time, lexical item by lexical item, he is enriching the semantic content of each communicated concept against a context. This occurs dynamically and the hearer would not necessarily wait up to the end of the utterance to engage in any processing. Sperber and Wilson assume that “logical forms, like syntactic forms are trees of labeled nodes” (Sperber and Wilson 1995:205). By parallel arguments to the ones that want syntactic labels to generalize over grammatical categories, logical labels categorise conceptual representations of different types. As Sperber and Wilson argue (1995:206), by association to syntactic anticipatory hypotheses the hearer may make, he can easily make anticipatory hypotheses for the logical categories that are to appear before they do<sup>9</sup>. Consequently, at any point during interpretation the hearer both entertains specific expectations about what is to follow and can amend his previous choices in constructing the propositional content of an utterance.

Accordingly, in utterance interpretation, explicatures and implicatures are constructed on the fly as well. Inferential processing occurring to this effect takes place at the same time as the decoding of the utterance’s content. What is suggested again by this view is that what an utterance communicates is constructed dynamically. Essentially, what a hearer constructs successively in interpreting an utterance is not a basic proposition upon which further conclusions (in the shape of higher-order explicatures or implicatures) are inferred, but rather a propositional complex that contains both explicit and implicit propositions.

In this sense, an utterance’s basic proposition is redefined to its pragmatically enriched semantic content. This would ultimately mean that what the hearer has at the end of an utterance’s interpretation is a structured set of *ad hoc* concepts, i.e. an *ad hoc* basic proposition, which communicates a certain set of additional propositions (thoughts) about the explicit and implicit information conveyed by the utterance.

### 3 Communicated propositional content

Having established the aspects that a psychologically plausible account of communicated propositional content needs to respect, a rather straightforward picture of the way in which propositional content is constructed in utterance interpretation presents itself. A final point that needs to be noted is that the construction of an utterance’s propositional content always occurs against a context. So, before moving on to the account of how an utterance’s enriched basic proposition is constructed, it is important to introduce the notion of context in Relevance Theory.

#### 3.1 Context in Relevance Theory

In *Relevance*, Sperber and Wilson provide an insightful definition of context that respects its subjective nature and is general enough to accommodate the variety of information context contains in every situation (1995:15-16):

---

<sup>9</sup> Relevance Theory has little to say about this, but a formal account that incorporates relevance-theoretic assumptions in its theoretical premises, Dynamic Syntax (Kempson et.al. 2001), makes extensive use of this idea. Dynamic Syntax holds that when a hearer interprets an utterance, parsing it one lexical item at a time, he entertains specific expectations about what is to follow in the utterance. This is clearly illustrated in cases of routinisation (Purver et.al. to appear):

(e.g.) Ruth: What did Alex give to  
Hugh: Eliot? A teddy-bear.

A context is a psychological construct, a subset of the hearer's assumptions about the world. It is these assumptions, of course, rather than the actual state of the world, that affect the interpretation of an utterance. A context in this sense is not limited to information about the immediate physical environment or the immediately preceding utterances: expectations about the future, scientific hypotheses or religious beliefs, anecdotal memories, general cultural assumptions, beliefs about the mental state of the speaker, may all play a role in interpretation.

It is clear from this description that, in the relevance-theoretic framework, context is not a metaphysical concept, since it does not contain information about 'the actual state of the world', but rather information about an individual's representation of the world in the sense of a 'private logbook' or 'an ego-centred map'. In *Relevance*, Sperber and Wilson discuss context to a considerable extent (1995:132-142). In their discussion, they discard the classical view that in the interpretation of the utterance the context is given and predetermined. In a luminous discussion of what this case would entail, they reach the conclusion that such a view of context would ultimately require the whole volume of our cognitive environment to be the context of the interpretation of a single utterance. Resolving this impossibility they suggest that "the context used to process new assumptions is, essentially, a subset of the individual's old assumptions, with which the new assumptions combine to yield a variety of contextual effects" (1995:132). And this subset is selected on-line while the interpretation takes place. However, even though they have been criticised for not doing so (Chiappe and Kukla 1996), Sperber and Wilson never explicitly discussed the way in which we selectively construct a context when interpreting an utterance.

Against this background, in previous work on context selection (Assimakopoulos 2003), I have entertained the idea that an utterance's context is selected automatically by the same heuristic that mediates the construction of its explicature(s) and implicatures, the relevance-driven comprehension procedure. Within the spirit of the Cognitive Principle of Relevance, I have proposed that relevance considerations mediate the process of selecting a set of assumptions against which an utterance is to be processed and comprehended, a line that will be maintained for the purposes of this paper too.

### **3.2 Constructing an utterance's propositional complex**

At this point and in the dynamics discussed in the previous parts, it would be interesting to see how an utterance's basic proposition in the sense endorsed by this paper is constructed on-line as each lexical item<sup>10</sup> of the utterance is interpreted in turn.

At the outset of the interpretation process there is always an initial context present to the hearer before the utterance is produced. This is a set of propositions that are not tested for cognitive effects with respect to this utterance up to the point when the first lexical item is uttered. In a dialogue this context would minimally be the propositional complex expressed by the previous utterance.

With the utterance of the first lexical item a subset of propositions is selected in a relevance-driven manner from the initial context. Along with this set, more propositions are triggered by the new concept that is introduced and added to the context in which the hearer interprets the utterance. All these propositions will be again tested for relevance as more lexical items are

---

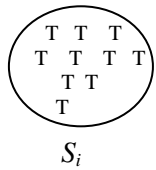
<sup>10</sup> I will assume that a lexical item is a lexical chunk (either a word, an idiom etc) that carries a homogeneous meaning in its premises. "It is clear that we can use and understand far more words (in the morphological sense) than we have learned. As soon as one learns the word *stay*, the words *stayed*, *staying* and *stays* all come for free" (Bloom 2000:16). For the purposes of this paper I will take up a rather simplistic notion that connects conceptual information with the meaning of a word as a whole. I believe that morphology would have more to say about this, but will not attend to it as of now.

processed in turn. Again, some of these propositions will be abandoned and new ones will be tested for relevance against the context of the utterance up to the point where the utterance ends.

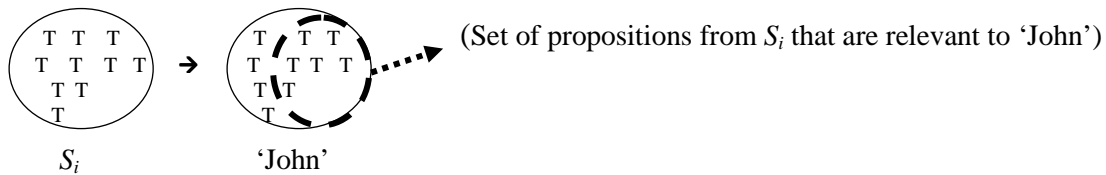
I will try to illuminate what is still a quite blurry picture by use of an example utterance and the propositional complex its production makes the hearer to construct:

(2) John loved the smell of Mary.

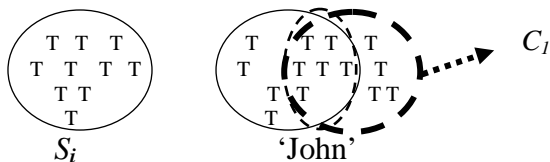
To begin with, there is an initial context  $S_i$  present before the uttering of the first word. This context consists of propositions  $T^{11}$  that are linked to whatever provided cognitive effects prior to the hearing of this utterance – that is something in the physical environment or even a previous utterance the hearer just processed.



Upon hearing the first word, *John*, the hearer begins his interpretation. The conceptual address for JOHN is, thus, triggered in his mind. The whole set of this concept's information is activated but not yet tested for cognitive effects. The hearer selects the relevant propositions from  $S_i$  that are likely to be included in the final propositional complex ( $C_n$ ) denoting the meaning of this utterance. These propositions are relevant since they should provide large cognitive effects with respect to  $S_i$ .



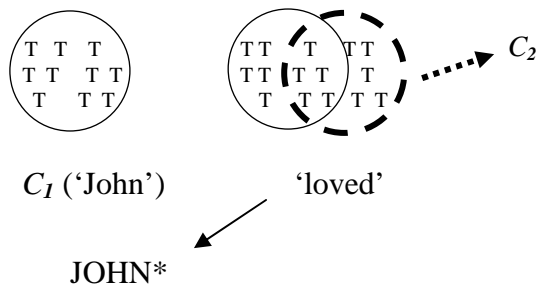
Accordingly, at the same time, new propositions about JOHN that are not included in  $S_i$ , namely contextual information about John that is readily available in the hearer's cognitive environment and can provide rich cognitive effects, get added to the list of propositions that might be intended to get communicated by this utterance ( $C_1$ ). At the same time, the context in which the utterance is processed is augmented to include these propositions as well. Discarded propositions from  $S_i$  would be kept in a buffer that would allow their easy re-activation.



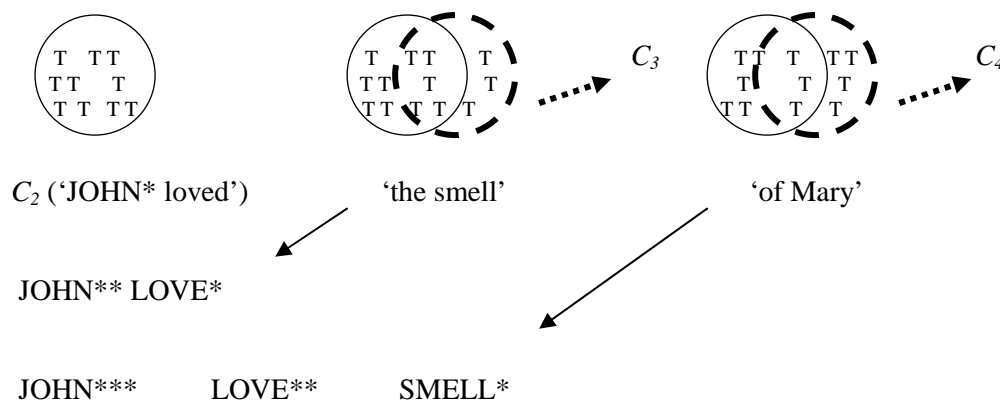
On the hearing of the second word another conceptual address is activated and propositions linked to its content are constructed. In a manner similar to the way  $C_1$  has been selected, a new complex of relevant propositions  $C_2$  is constructed. Relevant propositions from the previous context are carried over to  $C_2$ , while new ones triggered by LOVE in the now accordingly augmented context that are deemed relevant are added up to it. In this way an *ad hoc* concept JOHN\* is constructed. This concept is *ad hoc* because it contains only the information about John that is relevant to this utterance's interpretation and potentially

<sup>11</sup> T is used conveniently to represent thoughts, since these are logical trees in light of Sperber and Wilson's suggestion that Dynamic Syntax developed formally.

information that will be included in the final propositional complex that will denote the utterance's meaning.



The same scenario applies for all words with conceptual content in the utterance up to the point where the interpretation of the final lexical item occurs and the utterance's explicature(s) and implicatures are fully constructed.



At the end of processing the whole utterance, the concept MARY will again be adjusted to the ad-hoc concept MARY\* that communicates the specific property of having a smell that is loved by John. The propositional complex  $C_5$  ultimately contains the total of the explicature(s) and implicatures the hearer has constructed with respect to utterance (2). In effect, the basic proposition of the utterance is this complex that is communicated by it, which is pragmatically derived.

### 3.3 Propositional content adjustment: narrowing and broadening

It is obvious in this treatment of propositional content that at every stage of its adjustment there are two processes that go on; one of narrowing and one of broadening. After discussing each one, I will entertain the possibility of symmetrifying both of them, by proposing that both processes are processes of narrowing.

As already discussed above, at the beginning of the interpretation and upon hearing the first lexical item of the utterance, the hearer begins his interpretation by selecting from an initial context the propositions that are relevant to the concept communicated by the item just uttered. This selection is the result of narrowing the initial contextual space in the search for relevance. At the same time this selection takes place, another set of propositions appears to the foreground of the processing. This is the set of propositions the utterance of the lexical item introduces. Again these propositions are tested for cognitive effects in search of relevance against the initial context augmenting it. A relevant set of them is again added up to the initial propositional complex that comprises candidates for the utterance's meaning. In



this way, the potential propositional complex is broadened to accommodate more propositions introduced by the new lexical concept that is communicated.

In the tradition of Carston on concept narrowing (Carston 1996, 2002), I will too suggest that this broadening and narrowing of propositional content illustrates essentially a case of pragmatic narrowing. It is obvious that the heuristic that causes contextual adjustment is relevance. In a way, even if the propositional space in which cognitive effects are searched is large there is always a need to make it as small as possible in order to save effort. So, even when the propositional complex is augmented, the relevance heuristic imposes that not an exceedingly large number of new propositions will be added up to it, which in a sense narrows down the number of potential candidates for inclusion in the complex.

#### 4 Conclusion

Any realistic account of communicated meaning is required to take into account the fact that interpretation is a dynamic process that enables pragmatic enrichment to occur automatically along with linguistic decoding. This paper has put forward a cognitive account of the way knowledge is accessed when context-dependent processing of an utterance takes place. The dynamic characteristic of this approach is that it rejects the semantic view of propositional content. Pragmatic enrichment occurs at most levels of cognitive processing and evidence from cases of on-line meaning construction places context-dependency and especially, as expected through the first principle of relevance, relevance considerations to the centre of cognition. While engaging in utterance comprehension, the hearer interprets each lexical item in turn constructing an enriched basic proposition on-line. At the end of an utterance's processing, this basic proposition is a structured set of *ad hoc* concepts that also contains all the information (thoughts, in the shape of explicatures and implicatures) that is deemed relevant at that stage against the context of the utterance.

No matter how speculative the nature of this system might seem at this point, it manages, along with all the other tenets of Relevance Theory, to provide the starting point for a potential outline of a generative system for pragmatic competence. Contrary to Chomsky's reservations that an attempt to build a theory of pragmatic competence "yields computational systems of hopeless scope, compelling us to try to formulate what amount to 'theories of everything' that cannot possibly be the topic of rational inquiry" (Stemmer 1999:399-400), the relevance-theoretic approach to the way contextual constraints mediate cognitive computation seems to succeed in capturing the way mental processing occurs providing the foundations for a generative system of communicative competence.

#### References

- Assimakopoulos, S.: 2003, Context selection and relevance, paper delivered at the 2003 *Theoretical & Applied Linguistics Postgraduate Conference*, University of Edinburgh.
- Barsalou, L.: 1983, Ad hoc categories, *Memory & Cognition* **11**: 211-227.
- Barsalou, L.: 1987, The instability of graded structure: Implications for the nature of Concepts, in U. Neisser (ed), *Concepts and conceptual development: Ecological and intellectual factors in categorization*, Cambridge University Press, pp. 101-140.
- Barsalou, L.; 1992, Frames, concepts, and conceptual fields, in E. Kittay and A. Lehrer, (eds), *Frames, fields, and contrasts: New essays in semantic and lexical organization*, Lawrence Erlbaum, pp. 21-74.

- Barsalou, L.: 1993, Flexibility, structure, and linguistic vagary in concepts: Manifestations of a compositional system of perceptual symbols, in A.C. Collins, S.E., Gathercole and M.A. Conway (eds), *Theories of Memory*, Lawrence Erlbaum, pp. 29-101.
- Bloom, P.: 2000, *How children learn the meanings of words*. Cambridge, MA: MIT Press.
- Carston, R.: 1996, Enrichment and loosening: Complementary processes in deriving the proposition expressed?, *UCL Working Papers in Linguistics* **8**: 205-232.
- Carston, R.: 2002, *Thoughts and utterances: The pragmatics of explicit communication*. Oxford: Blackwell.
- Carston, R.: 2004, Relevance theory and the saying/implicating distinction, in L. Horn and G. Ward (eds) *Handbook of Pragmatics*, Blackwell, pp. 633-656.
- Chiappe, D.L. and Kukla, A.: 1996, Context selection and the frame problem, *Behavioral and Brain Sciences* **19**: 529-530.
- Fodor, J.: 1975, *The language of thought*. New York: Thomas Crowell.
- Fodor, J.: 1983, *Modularity of mind*. Cambridge, MA: MIT Press.
- Grice, P.: 1957, Meaning, *Philosophical Review* **66**: 377-388
- Grice, P.: 1975, Logic and Conversation, in P. Cole and J.L Morgan (eds) *Syntax and semantics volume 3: Speech acts*, Academic Press, pp. 41-58.
- Grice, P.: 1989, *Studies in the way of words*. Cambridge, MA: Harvard University Press.
- Kaplan, D.: 1989, Afterthoughts, in J. Almog, J. Perry and H. Wettstein (eds), *Themes from Kaplan*, Oxford University Press, pp. 565-614.
- Kempson, R., Meyer-Viol, W. and Gabbay, D.: 2001, *Dynamic Syntax: The Flow of Language Understanding*. Oxford: Blackwell.
- McCarthy, J.: 1993, Notes on formalizing context, in *IJCAI '93 – Proceedings of the thirteenth international joint conference on Artificial Intelligence*. Morgan Kaufman 555-560.
- Penco, C.: 1999, Objective and cognitive context, in P. Bouquet, L. Serafini, P. Brézillon, M. Benerecetti, and F. Castellani (eds), *Modeling and using context: Second international and interdisciplinary conference, CONTEXT'99, Trento, Italy, September 1999, Proceedings*, Springer-Verlag, pp. 270-283.
- Purver, M., Cann, R. and Kempson, R.: to appear, Grammars as parsers: meeting the dialogue challenge, *Research on Language and Computation*.
- Recanati, F.: 2004 *Literal Meaning*. Cambridge: Cambridge University Press.
- Saussure, F. de: 1974, *Course in general linguistics*. London: Peter Owen.
- Sperber, D.: 1994, The modularity of thought and the epidemiology of representations, in L. Hirschfeld and S. Gelman (eds), *Mapping the mind: Domain specificity in cognition and culture*, Cambridge University Press, pp. 47-57.

- Sperber, D.: 2000, Metarepresentations in an evolutionary perspective, in D. Sperber (ed), *Metarepresentations: A Multidisciplinary Perspective*, Oxford University Press, pp. 117-137.
- Sperber, D.: 2002, In defense of massive modularity, in E. Dupoux (ed), *Language, brain and cognitive development: Essays in honor of Jacques Mehler*, MIT Press, pp. 47-57.
- Sperber, D. and Wilson, D.: 1986, *Relevance: Communication and cognition*. Oxford: Blackwell.
- Sperber, D. and Wilson, D.: 1987, Précis of *Relevance: Communication and cognition, Behavioral and Brain Sciences* **10**: 697-710.
- Sperber, D. and Wilson, D.: 1995, *Relevance: Communication and cognition* (2<sup>nd</sup> edition with postface). Oxford: Blackwell.
- Sperber, D. and Wilson, D.: 1996, Fodor's frame problem and relevance theory, *Behavioral and Brain Sciences* **19**: 530-532.
- Sperber, D. and Wilson, D.: 1998, The mapping between the mental and the public lexicon, in P. Carruthers and J. Boucher (eds) *Thought and language*, Cambridge University Press, pp. 184-200.
- Sperber, D. and Wilson, D.: 2002, Pragmatics, modularity and mindreading, *Mind and Language* **17**: 3-23.
- Stemmer, B.: 1999, An on-line interview with Noam Chomsky: On the nature of pragmatics and related issues, *Brain and Language* **68**: 393-401.
- Wilson, D.: 2000, Metarepresentation in linguistic communication, in D. Sperber (ed), *Metarepresentations*, Oxford University Press, pp. 411-448.
- Wilson, D.: 2002, Issues in pragmatics, UCL lecture notes.
- Wilson, D.: 2004, Relevance and lexical pragmatics, *UCL Working Papers in Linguistics* **16**: 343-360.
- Wilson, D.: 2005, New directions for research on pragmatics and modularity, *Lingua* **115**: 1129-1146.
- Wilson, D. and Sperber, D.: 2004, Relevance Theory, in L. Horn and G. Ward (eds), *Handbook of Pragmatics*, Blackwell, pp.607-632.



# THE ‘SEPARATE PERFORMATIVE’ ACCOUNT OF THE GERMAN RIGHT DISLOCATION\*

Maria Averintseva-Klisch,  
HU Berlin

maria.averintseva@rz.hu-berlin.de

## Abstract

In my paper, I show that the so-called German right dislocation actually comprises two distinct constructions, which I label 'right dislocation proper' and 'afterthought'. These differ in their prosodic and syntactic properties, as well as in their discourse functions. The paper is primarily concerned with the right dislocation proper (RD). I present a semantic analysis of RD based on the 'separate performative' account of Potts (2004, 2005) and Portner (forthc.). This analysis allows a description of the semantic contribution of RD to its host sentence, as well as explaining certain semantic constraints on the kind of NP in the RD construction.

## 1 Introduction

In this paper I discuss the construction that is traditionally called 'German right dislocation' (cf. Altmann (1981)). This is a structure consisting of an NP at the end of the clause and a coreferent proform inside the clause, as in (1):

- (1) a. Ich mag sie<sub>i</sub> nicht, (ich meine) die Serena<sub>i</sub>.  
*I like her<sub>i</sub> not (I mean) the Serena<sub>i</sub>.*
- b. Und dann passierte das Unglück<sub>i</sub>, (ich meine) dieser schreckliche Autounfall<sub>i</sub>.  
*And then happened the misfortune<sub>i</sub> (I mean) this terrible traffic-accident<sub>i</sub>.*

Traditional analyses of German right dislocation (Altmann (1981), Auer (1991), Selting (1994), Uhmann (1993, 1997), Zifonun et al. (1997)) assume that right dislocation is a strategy of spoken German, which enables the speaker to resolve a (pro)nominal reference that might be unclear to the hearer. This analysis accounts for (1), but is problematic for (2), where pronominal reference is undoubtedly clear:

- (2) a. "Ein Taifun!" rief Lukas dem Kapitän zu. "Da ist er!" Ja, da  
*"A typhoon!" called Lukas the captain to. "Here is he!" Yes there*  
*war er, der Taifun.*  
*was he<sub>i</sub> the typhoon<sub>MASKi</sub>.*

[M. Ende, *Jim Knopf und die Wilde 13*: 190]

- b. [...] wenn ihnen das Glück nicht den Karpfen Cyprinus zur Hilfe geschickt  
*[...] if them the fortune not the carp Cyprinus for help sent*  
*hätte! Ahnungslos kam er dahergeschwommen, der Karpfen Cyprinus.*  
*had! suspecting-not came he<sub>i</sub> swimming-along the carp<sub>MASK</sub> Cyprinus<sub>i</sub>.*  
[O. Preussler, *Der kleine Wassermann*: 28]

---

\* The research for this paper has been conducted as part of my Ph.D. project, which is financed by the DFG within the graduate school "Ecomony and Complexity in Language" (HU Berlin / Potsdam Univ.). I wish to thank my supervisor Claudia Maienborn for her constant support, Manfred Consten, Mareile Knees and Barbara Schlücker for helpful comments on this paper, as well as the audience of *Sinn und Bedeutung 10* for stimulating feedback.

In (2), the function of the right dislocation is not to disambiguate a pronominal reference, as it is not ambiguous at all, but to mark the referent of the right-peripheral NP as being especially important for the succeeding discourse. In other words, the typhoon (2a) and, respectively, the carp (2b) are set as what the following discourse segment is about. In fact, in (2a) the following segment offers a detailed description of the typhoon, and (2b) continues describing the carp, its appearance and habits<sup>1</sup>.

It has already been noticed in the literature that right dislocation might have an additional function of “attracting the attention of the addressee” to the right-peripheral NP (Zifonun et al. (1997:548), transl. mine: MA). I argue that disambiguation of a pronominal reference and marking the importance of the discourse referent are not two functions of one construction, but that there are in fact two constructions subsumed under the label of German right dislocation: *right dislocation proper* (further right dislocation, RD) and *afterthought* (AT). In the following I will show that RD and AT differ not only with respect to their discourse functions, but also in their prosodic and syntactic features.

The paper is organized as follows: in section 2 the prosodic, syntactic and discourse-functional properties of RD and AT are briefly introduced. I show that RD is prosodically and syntactically part of its host sentence, whereas AT is an ‘orphan’ that gets integrated into its host sentence only at the level of the discourse. Then I turn to the main subject of the paper, i.e. to the semantics of RD, or, more precisely, the semantic contribution of RD to its host sentence. In section 3 I introduce the ‘separate performative account’ (Potts (2004, 2005), Portner (forthc.)). I will show how Portner’s account of English topics can be applied to the analysis of RD. Section 4 then discusses how the semantics of RD determines its discourse function of marking the discourse topic referent for the discourse segment following RD. Certain peculiarities of RD concerning the semantic status of the RD-NP are dwelt upon in this context. Finally, in section 5 the results are summed up and some conclusions are drawn.

## 2 RD vs. AT: prosodic, syntactic and discourse-functional differences

In order to concentrate on the semantics of RD I first have to clearly distinguish between RD and AT. Therefore, in this section I will introduce the prosodic and syntactic differences between RD and AT. They all suggest that RD is prosodically and syntactically part of its host sentence, while AT is not. Many of these differences have been already pointed out in Altmann (1981). However, as Altmann does not make any differentiations within right dislocation constructions, his approach is to state a certain prosodic and syntactic pattern for German right dislocation, whereupon he has to allow for numerous exceptions from this pattern. Distinguishing between RD and AT allows us to dispense with most exceptions, and to describe distinct patterns for RD and AT instead. In section 2.2. I will then specify the discourse functions of RD and AT which have been mentioned above.

### 2.1 RD vs. AT: prosodic and syntactic differences

RD is prosodically integrated into its host sentence (3a), i.e. it continues the tone movement of the host sentence and thus does not build a prosodic unit of its own, whereas AT builds a prosodic unit (optionally divided by a pause from the clause) with a tone movement and a clause-like accent of its own, (3b):<sup>2</sup>

<sup>1</sup> Moreover, (2) shows that right dislocation is used also in written, and not only in spoken, discourse.

<sup>2</sup> Altmann (1981) observes two distinct prosodic patterns by what he calls “German right dislocation”, but does not explain this observation. Selting (1994) differentiates two kinds of “right dislocation” on the basis of their

- (3) a. [Ich MAG sie<sub>i</sub> nicht, die Brigitte<sub>i</sub>]. **RD**  
 b. [Ich MAG sie<sub>i</sub> nicht], | [die BriGITte<sub>i</sub>]. **AT**  
*I like her not the Brigitte.*  
 (: pause; [ ]: prosodic unit; CAPITALS: main accent)

Prosodic differences go along with syntactic differences: RD is also syntactically part of its host sentence, whereas AT is an independent unit. The syntactic differences are listed below<sup>3</sup>.

• Strict morphological agreement (in case, gender and number) between the clause-internal pro-form and the NP is obligatory for RD and optional for AT, cf. (4) vs. (5):

- (4) ("Der Taifun!" rief Lukas dem Kapitän zu. "Da ist er!") Ja, da war  
 ("The typhoon<sub>MASK</sub>!" called Lukas the captain to. "Here is he!") Yes, there was  
 er<sub>i</sub>, der Taifun<sub>i</sub> / \*das Unwetter<sub>i</sub> / \*den Taifun<sub>i</sub>. **RD**  
*he<sub>NOM\_MASK</sub> the typhoon<sub>NOM\_MASK</sub> / \*the storm<sub>NOM\_MASK</sub> / \*the typhoon<sub>ACC\_MASK</sub>*

- (5) a. Der Zwiespalt [...] zerriss ihn<sub>i</sub> fast: [Fürst Georg III., der Reformator  
 The dichotomy [...] tore-apart him<sub>ACC</sub> nearly: prince Georg III [the reformer  
 von Anhalt-Dessau]<sub>i</sub>. **AT**  
*of Anhalt-Dessau]<sub>NOM</sub>* [Chrismon 05/2004]

- b. Und dann passierte das Unglück<sub>i</sub>, (ich meine) dieser schreckliche  
 And then happened the misfortune<sub>NEUTR</sub> (I mean) [this terrible  
 Autounfall<sub>i</sub>. **AT**  
*traffic-accident]<sub>MASK</sub>*

• A subordinate clause between the clause-internal pro-form and the NP is impossible for RD and possible for AT, cf. (6):

- (6) a. „Der Taifun“, rief Lukas dem Kapitän zu. „Da ist er!“ Ja, da war  
 "The typhoon!" called Lukas the captain to. "Here is he!" Yes, here was  
 er, \*den sie alle gefürchtet haben, der Taifun. **RD**  
*he<sub>i</sub> \*whom they all afraid-of were the typhoon<sub>i</sub>*

- b. So ereilte den TV-Western das, wovor sich der Filmwestern durch  
 So overtook the TV-western<sub>ACC</sub> this<sub>i</sub> what-of refl the cinema-western through  
 einen stilvollen Selbstmord entzog, der schleichende Tod. **AT**  
*a classy suicide escaped [the sneaky death]<sub>i</sub>*

[Konkret-Korpus: 289311]

• Optional additions (*ich meine* ('I mean'), *also* ('that is'), *tatsächlich* ('really') etc.) between the clause-internal pro-form and the NP are possible for AT but not for RD,<sup>4</sup> cf. (7):

prosodic difference. In her account, however, prosodic difference is the only important one; functionally, both kinds of "right dislocation" are analysed as a repair strategy. As I show above, RD and AT do not only differ with regard to prosody, but also syntactically as well as in their discourse functions. In a similar way, Fretheim (1995) shows that in Norwegian prosody also helps to distinguish between RD and AT; as in German, prosodically integrated structures are RDs, and prosodically non-integrated ones ATs.

<sup>3</sup> Here I only give a brief listing of syntactic differences, since they are not the main subject of this paper. See Averintseva-Klisch (forthc. a & b) for more details.

<sup>4</sup> As the examples show, the (im)possibility of additions with RD and AT is not due to the meaning and function of the addition, as one might be tempted to believe in the case of *ich meine* / *also* ('I mean' / 'that is'), which are additions explicitly assisting the reference clarifying function of AT. Also additions like *natürlich* ('of course'), *tatsächlich* ('really') etc., which are insensitive to the functional difference between RD and AT, are bad with RD and perfectly acceptable with AT. Thus, this difference seems to be a syntactic one.

- (7) a. „Der Taifun“, rief Lukas dem Kapitän zu. „Da ist er!“ Ja, da war  
*“The typhoon!” called Lukas the captain to. “Here is he!” Yes, here was*  
 er, (\*ich meine / \*also / \*tatsächlich) der Taifun.  
*he (\*I mean / \*that-is/ \*really) the typhoon. **RD***
- b. (Lisa und Melanie haben sich gestritten.)  
*(Lisa and Melanie quarrelled.)*  
 Dann ist sie weggelaufen, | (ich meine / also) Lisa.  
*Then is she run-away (I mean / that-is) Lisa. **AT***
- The NP is not bound at the right-peripheral position in the case of AT, but can have a fairly free position in its host sentence, while RD is only possible at the right periphery, cf. (8) vs. (9):
- (8) a. Ich habe ihn gestern nur mit Mühe wiedererkannt, | ich meine den Peter.  
*I have him yesterday only with effort recognized I mean the Peter.*
- b. Ich habe ihn, | ich meine den Peter, | gestern nur mit Mühe wiedererkannt.  
*I have him I mean the Peter yesterday only with effort recognized.*
- c. Ich habe ihn gestern, | ich meine den Peter, | nur mit Mühe wiedererkannt.  
*I have him yesterday I mean the Peter only with effort recognized.*  
*I hardly recognized him yesterday, I mean Peter. **AT***
- (9) a. (Dieser Peter!) Ich kann ihn<sub>i</sub> nicht leiden, den Peter<sub>i</sub>. **RD**  
*(This Peter!) I can him not suffer the Peter*
- b. (Dieser Peter!) \*Ich kann ihn<sub>i</sub>, den Peter<sub>i</sub>, nicht leiden<sup>5</sup>.  
*(This Peter!) I can him the Peter not suffer*  
*This Peter! I don't like him<sub>i</sub> at all, Peter<sub>i</sub>.*

To summarize: there is ample evidence that RD belongs prosodically and syntactically to its host sentence in a much more straightforward way than AT. Prosodically, RD is a part of its host sentence's tone contour. Morphological agreement of the RD-NP with the clause-internal pro-form suggests that NP is part of the clause, as morphological agreement is a sentence-bound phenomenon. Moreover, RD occupies a fixed position in the host sentence at its right periphery, and does not allow subordinate clause insertion nor optional additions of any kind between the host sentence and the RD-NP. This leads to the assumption that RD is part of its host sentence, presumably the right adjunct to the IP. An ultimate syntactic analysis of RD would exceed the limits of this paper.

AT, on the contrary, can vary its position in its host sentence. Furthermore, AT does not strictly require morphological agreement between the NP and the clause-internal pronoun, and it allows various insertions between the host sentence and AT-NP. All in all, AT appears to be syntactically fairly free. In this paper I consider AT only as far as it is necessary for delimiting RD as a separate construction. More details about AT are given in Averintseva-Klisch (forthc. a & b). I propose to analyze AT as an ‘orphan’ in terms of Haegeman (1991). An orphan is a unit that is syntactically independent of its host sentence, but gets integrated into it only at the level of the discourse via some discourse relation.

The topic of this paper is the semantics of RD and how it determines the function RD has in the discourse. I first point to the discourse-functional differences between RD and AT. Then I concentrate on RD and its semantics.

<sup>5</sup> Here I use the prosodic structure as a diagnostics to distinguish between RD and AT. This means that for cases marked as RD I assume prosodic integration. In other words, (9b) is bad with the RD prosody. It would, however, be perfectly well-formed as an AT construction if the NP builds a prosodic unit of its own.



## 2.2 RD vs. AT: discourse-functional differences

As shown above, RD marks a discourse referent as being the 'theme' for the following discourse segment.<sup>6</sup> In the following, I name the discourse referent about which a certain discourse segment is 'discourse topic referent'.<sup>7</sup> RD thus marks a discourse referent<sup>8</sup> as the discourse topic referent for the segment following the RD, cf. (10):

- (10) (Und als der König seine Frau verloren hatte, bedauerte ihn die Dutitre: "Ach ja, für Ihnen is et ooch nich so leicht [...].")  
*(And when the king lost his wife, Dutitre pitied him: "Dear me, I should say, for you things aren't that easy either [...]).*  
 Sie war ein Original, die Madame Dutitre.  
*She<sub>i</sub> was an original the Madame Dutitre<sub>i</sub>.*  
*(She was somewhat special, that Madame Dutitre.)*  
 (Sie verstand nie, warum man über ihre Aussprüche lachte. Sie war eben echt und lebte, wie alle wirklich originalen Menschen, aus dem Unbewussten. Kein falscher Ton kam deshalb bei ihr auf.)  
*(She never understood why everybody always laughed at her remarks. She was genuine and lived unconsciously, as all unique people do. She never came across as being artificial.)*  
 [Fischer-Fabian, S. (1959): *Berlin-Evergreen*: 125]

In (10), RD marks that the following is about Madame Dutitre. Madame Dutitre is thus explicitly set as the discourse topic referent for the segment following the right dislocation. A reference clarification would not be plausible here, as Madame Dutitre is clearly available (and most salient) as the referent for the pronoun *sie* ('she').

As for AT, its discourse function is to clarify a potentially unclear reference, as in (11):

- (11) (Sie [Die Mutter] hat den Wohnzimmerschrank aber auch nicht leiden können,[...], aber mein Vater hat sich auf keine billigen Sachen mehr eingelassen.)  
*(Mother hated the wardrobe<sub>MASC</sub>, [...], but my father didn't want to have any more cheap things around).*

<sup>6</sup> I understand discourse segment intuitively as a relatively small span of a discourse (minimally one utterance) that is characterized through a fairly tight thematic contiguity. In written language a discourse segment mostly corresponds to a paragraph (cf. also Goutsos (1997)).

<sup>7</sup> I do not attempt a theoretical solution to the problem of the status of discourse topic, which has been extensively discussed in literature. See e.g. Brown & Yule (1983/2004), Goutsos (1997) and, more recently, Büring (2003), Asher (2004a & b), Kehler (2004), Oberlander (2004), Stede (2004) and Zeevat (2004), to name just a few, for the questions of what a discourse topic is (possible answers are: a proposition, a question the discourse answers, an entity etc.) and whether modeling of the discourse needs this concept in the first place. However, the existence of some kind of entity that is most salient at a given stage of the discourse and that is relevant for establishing coherence seems to be uncontroversial; it is for example the common point of the papers in the recent issue of *Theoretical Linguistics* dedicated to discourse topics. The authors use different terms for the same intuition of "the thing" that "cohesive chunks of text are about" (Asher (2004b: 255)): 'recurring sentence topic' in Oberlander (2004), 'local topics within discourse segments' in Kehler (2004), 'protagonist' in Zeevat (2004) and 'Discourse topic 1' in Stede (2004).

<sup>8</sup> There are certain conditions on the discourse referent here, e.g. it has to be discourse-old in the sense of Prince (1992); see Averintseva-Klisch (forthc. a).

er ist ihr auch zu dunkel gewesen, der Wohnzimmerschrank, meiner Mutter  
*He<sub>i</sub> is for-her<sub>j</sub> also too dark been the wardrobe<sub>i</sub> for-my mother<sub>j</sub>*  
 [Birgit Vanderbeke, *Das Muschelessen*]<sup>9</sup>

Here the context suggests that the most plausible referent for the pronoun *er* ('he') is the father, and the reference to the wardrobe is explicitly resolved with the help of AT.

To sum up: there is ample prosodic, syntactic and discourse-functional evidence that RD and AT are two different constructions. RD is prosodically and syntactically part of its host sentence, presumably a right IP-adjunct. Its role in the discourse is to mark the discourse topic referent for the following segment. AT is an 'orphan', i.e. it is prosodically and syntactically free. It is used as an explicit clarification of an unclear or ambiguous reference.

In the following I am exclusively concerned with RD. Being a part of its host sentence it is expected to contribute to its semantics. I will investigate the semantic fundamentals of discourse topic referent marking and show how the contribution of the right dislocation to the semantics of the whole sentence arises.

### 3 RD as separate performative

In this section, I first introduce the theoretical framework I use, the 'separate performative account' developed by Potts (2004, 2005) and Portner (forthc.), thereafter adapting it to account for the meaning contribution of RD to its host sentence.

#### 3.1 'Separate performative account': Potts (2004, 2005), Portner (forthc.)

Potts (2004, 2005) and Portner (forthc.) observe that different constructions such as for example vocatives, NP appositions or topic constructions introduce a special kind of meaning, which they call 'separate performative' or 'expressive content'.<sup>10</sup> So, besides stating that Amir is from Israel, which is the regular, 'at-issue', meaning of the sentence in (12), a separate performative is introduced: "I assert that Amir is my new neighbour":

(12) Amir, my new neighbour, is from Israel.

at-issue meaning: Amir is from Israel (in a given world *w*)

separate performative: I thereby assert that Amir is my new neighbour (in *w*)

This additional content, introduced through the NP apposition, is a separate performative speech act, with which the speaker instructs the addressee as to how the at-issue-meaning has to be integrated in the discourse model. Being a performative, this 'expressive' meaning does not influence the truth conditions of the sentence as it is automatically true when understood. Expressive meaning is non-compositional in its character; this means, it does not contribute in a regular compositional way to the semantics of the sentence, nor is there a complex compositionality of expressive meaning. That is, a sentence might have several expressive meanings, which are then non-compositionally, in a purely additive way "gathered together" to the overall expressive meaning of the sentence. Therefore according to Potts (2004, 2005) and Portner (forthc.) expressive meaning constitutes a separate "dimension of meaning" (cf. Portner (2005: 2)). A final meaning of a given sentence *S* is then a set of two meaning dimensions, cf. (13):

<sup>9</sup> I owe this example to H el ene Vinckel, p.c.

<sup>10</sup> A working definition of expressive content is: "Expressive content is non-displaceable, speaker-oriented meaning that is independent of the main semantic content of the sentence in question." [Potts (2003:8)]. Following Potts and Portner, I use the terms "expressive content" and "separate performative" synonymously in my paper.

- (13) for a sentence S: final meanings:  $\langle A_S, C_S \rangle$   
 $A_S$ : at-issue meaning of S  
 $C_S$ : set of expressive meanings of S ( $C_S: \langle C_{1S}, C_{2S} \dots \rangle$ )

Whereas  $A_S$  is constituted compositionally,  $C_S$  is a simple sum of expressive meanings.

Thus, expressive meaning percolates up the tree as a separate set of meanings, cf. (14) (see also Portner (2005: 9)):

- (14) Amir, my new neighbour, is from Israel.

$$\begin{aligned} &[[\text{my new neighbour}_{\text{appos}}]]_c = \emptyset \\ &[[\text{my new neighbour}_{\text{appos}}]]_c^c = [\lambda x \lambda w. x \text{ is my new neighbour in } w] \\ &[[\text{Amir my new neighbour}_{\text{appos}}]]_c = \text{Amir} \\ &[[\text{Amir my new neighbour}_{\text{appos}}]]_c^c = \{[\lambda w. \text{Amir is my new neighbour in } w]\} \\ &[[\text{Amir my new neighbour}_{\text{appos}} \text{ is from Israel}]]_c = [\lambda w. \text{Amir is from Israel in } w] \\ &[[\text{Amir my new neighbour}_{\text{appos}} \text{ is from Israel}]]_c^c = \{[\lambda w. \text{Amir is my new neighbour in } w]\} \end{aligned}$$

interpretation functions:  $[[ \ ]_c$ : regular content;  $[[ \ ]_c^c$ : expressive content

Semantic embedding constitutes strong evidence for separate performatives being a meaning dimension of their own. Potts (2004) argues that expressive meanings are semantically non-embeddable. So, in (15), the expressive meaning introduced by the apposition *my new neighbour* cannot be contributed to Felix, but only to the speaker of the matrix sentence (see also Potts (2004, 24)):

- (14) As Felix said, Amir, my new neighbour, is from Israel.  
 a. = Felix said that Amir is from Israel.  
 b.  $\neq$  Felix said that Amir is my new neighbour.  
 c.  $\neq$  Felix said that Amir is my new neighbour and that he is from Israel.

Portner (forthc.) proposes an analysis of English left dislocation (E-LD; ‘topic’ in Portner’s terminology), according to which its expressive meaning is “*speaker’s mental representation of X is active (in a given world w)*”, as in (16):

- (16) Mary, I like her a lot.  
 at-issue meaning:  $[\lambda w. \text{speaker likes Mary in } w]$   
 expressive meaning:  $\{[\lambda w. \text{speaker's mental representation of Mary is active in } w]\}$   
[cf. Portner (2005: 12)]

Portner (forthc.) argues against his own earlier proposal (Portner (2004)), that the expressive meaning of E-LD cannot be an addressee-oriented request “*I thereby request that you activate your mental representation of X*” (Portner (2004: 9)). He shows that there are theoretical problems with this expressive meaning variant if one takes embedded topics (E-LDs) like (17) into account. These have two possible variants of expressive meaning, the regular one (1) and the embedded one (2):

- (17) John said that, as for Maria, she is nice.  
 at-issue meaning:  $[\lambda w. \text{John said that Maria is nice in } w]$   
 expressive meaning (informal):  
 1. The speaker says something about Maria in w  
 2. John says something about Maria in w’ (world of the reported speech act)

[Portner (2005, (29))]

In the embedded variant the addressee cannot be defined. That is why Portner (forthc.) dispenses with the addressee-oriented version of the expressive meaning for E-LD, and proposes the version introduced in (16) without explicitly mentioning the addressee.

As Frey (2004a) shows, E-LD formally and functionally corresponds in German to a construction called Hanging Topic (HT<sup>11</sup>), as in (18):

- (18) a. Mary, I like her a lot. E-LD  
 b. Mary, ich mag sie wirklich sehr. HT  
*Mary I like her really very-much.*

This suggests that HT has the same expressive meaning as E-LD, cf. (19):

- (19) Mary, I like her a lot. / Mary, ich mag sie wirklich sehr.  
 at-issue meaning:  $[\lambda w. \text{ speaker likes Mary in } w]$   
 expressive meaning:  $\{[\lambda w. \text{ speaker's mental representation of Mary is active in } w]\}$   
 $[[\text{NP}_{\text{HT}}]]_c^c = \{[\lambda w. \text{ speaker's mental representation of the referent of the NP is active in } w]\}$

Frey (2004b) argues that the discourse function of HT in German is to mark the introduction of a new discourse topic referent,<sup>12</sup> as in (20):

- (20) (Hans ist ein richtiger Fan der Berliner U-Bahn. Deshalb reist er oft nach Berlin.)  
*(Hans is a real fan of the Berlin underground. That's why he rather often goes to Berlin.)*  
 Die Berliner U-Bahn, sie nahm 1902 ihren Betrieb auf. Sie<sub>i</sub> [...]  
*The Berlin underground<sub>FEMi</sub> she<sub>i</sub> took 1902 her operating on. She<sub>i</sub> [...]*  
*The Berlin underground, it started operating in 1902. It [...]*  
[Frey (2004b, (57))]

In (20), the discourse topic referent of the first two utterances is Hans, and then it changes to the Berlin underground; this change is explicitly signalled through HT. However, expressive meaning in (19) does not capture this signalling of a change of the discourse topic referent<sup>13</sup>.

<sup>11</sup> Altmann (1981) and the following tradition distinguishes between two left dislocation constructions in German, Left dislocation (LD) and Hanging Topic (or ‘free theme’, HT), cf. (a) and (b):

- (a) Den Hans<sub>i</sub>, den<sub>i</sub> mag jeder.  
*the<sub>AKK</sub> Hans D-PRON<sub>AKK</sub> likes everyone*  
 (b) Der / Den Hans, jeder mag ihn.  
*the<sub>NOM</sub> / the<sub>AKK</sub> Hans everyone likes him<sub>AKK</sub>* [Frey (2004 a: 205)]

As shown in Frey (2004 a), LD is prosodically and syntactically integrated into its host sentence; it allows only weak d-pronouns (*der, die, das*) as clause-internal resumptive forms. The LD-NP resp. the resumptive form is the sentence topic of its host sentence. HT is prosodically and syntactically independent; it allows various resumptive forms, and, being independent, it does not play any syntactic role in its host sentence, but serves to mark the change of the discourse topic.

<sup>12</sup> Frey (2004) uses the term ‘discourse topic’; however, his understanding of discourse topic as the “main theme of a Section of a text” (Frey (2004: 217)) corresponds to what I call the ‘discourse topic referent’ in this paper.

<sup>13</sup> Frey (2004b) argues that HT is not suitable with maintained discourse topic referents, cf. (a):

- (a) (A propos Maria: Weißt Du, wen sie in Berlin getroffen hat?)  
*(As for Maria, do you know whom she met in Berlin?)*  
 #Maria, sie hat in Berlin Hans getroffen.  
*Maria she has in Berlin Hans met. (Maria, she met Hans in Berlin.)*  
[modified after Frey (2004b: 108)]

Thus, the expressive meaning “speaker’s mental representation of X is active” is too weak for HT (and presumably also E-LD). Besides, one might argue that every mentioning of X irrespective of a particular construction used signals that the speaker’s mental representation of X is active (see also criticism in Potts et al. (2004)).

Thus it seems to be too weak for HT. Taking the discourse topic change function of HT into account, the expressive meaning of HT is revised in (21):

- (21) Maria, ich mag sie wirklich sehr.  
 $[[\text{Maria}_{\text{HT}}]]_c^C$  { $[\lambda w$ . speaker signals that he is starting to talk about Maria in  $w$ ]}  
 $[[\text{NP}_{\text{HT}}]]_c^C =$  { $[\lambda w$ . speaker signals that he is starting to talk about the referent of the NP in  $w$ ]}

### 3.2 Expressive meaning of German RD

As I argue in Averintseva-Klisch (forthc. b), German RD and HT share one feature in that they both mark the referent of the NP as the discourse topic referent for the following discourse segment. This suggests that RD (as well as HT) introduces the expressive meaning “the speaker signals that he is starting to talk about  $X$ ”, where  $X$  is the referent of the RD-NP, cf. (22) (that is a part of the discourse in (10) above):

- (22) Sie war ein Original, die Madame Dutitre.  
*She was an original the Madame Dutitre*  
*(She was somewhat special, that Madame D.)*  
 at-issue meaning:  $[\lambda w$ . Madame Dutitre was somewhat special in  $w$ ]  
 expressive meaning:  $[[\text{Madame Dutitre}_{\text{RD}}]]_c^C =$  { $[\lambda w$ . speaker signals that he is starting to talk about Madame Dutitre in  $w$ ]}

The at-issue-meaning of (22) does not differ from that of (23):

- (23) Madame Dutitre war ein Original.  
*Madame Dutitre was an original* (*Madame D. was somewhat special.*)  
 at-issue meaning:  $[\lambda w$ . Madame Dutitre was somewhat special in  $w$ ]

(22), as well as (23), is true iff Madame Dutitre is somewhat special<sup>14</sup> in  $w$ . The difference between (22) and the unmarked form in (23) is that in (22) Madame Dutitre is explicitly marked as the discourse topic referent for the following segment, whereas in (23) this stays implicit.

However, RD differs from HT in a crucial way: HT always signals a change of the discourse topic referent. For RD, there are two possibilities: one is that the speaker signals the introduction of a new discourse topic referent, as is the case with the discourse-initial RD. As shown in Averintseva-Klisch (forthc. a), RD may be used discourse-initially if the referent in question is presented as being discourse-old, cf. (23):<sup>15</sup>

- (23) Es gibt sie noch, die guten Nachrichten aus der deutschen Universität.  
*it gives them yet the good news from the german university*  
[ZEIT 21, 13.5.04]  
*You can still find some – good news coming from German universities.* (beginning of a lead)

Otherwise the speaker signals the maintenance of the old discourse topic referent. This is most often the case when the discourse topic referent is maintained in spite of the beginning

<sup>14</sup> In this case, a property which has to be defined in the context. I ignore the semantic contribution of the tense for the moment.

<sup>15</sup> I argue that in such cases RD implicitly embeds the beginning discourse into some larger, thematically contiguous setting that is familiar to the author and the recipient of the discourse. In (23) such ‘meta-discourse’ is a series of articles about the German university system and its future in the weekly German periodical *Die ZEIT*. The use of a RD is a most economic means of simultaneously introducing a referent, presenting it as being discourse-old and marking it as the discourse topic referent for the following discourse segment (see Averintseva-Klisch (forthc. a) for details).

of a new segment, as in (22) resp. (10). Here the new discourse segment (corresponding to the new paragraph<sup>16</sup>) begins, but Madame Dutitre remains the discourse topic referent.

To get to the point: HT always signals the change of the discourse topic referent (cf. Frey (2004a&b)), whereas RD allows both change and maintenance. Thus, the expressive meaning of (22) should be changed in the following way: “*the speaker signals that he is (further on) going to talk about Madame Dutitre*”:

(24) Sie war ein Original, die Madame Dutitre.

expressive meaning:  $[[\text{Madame Dutitre}_{\text{RD}}]]^{\text{C}} = \{[\lambda w. \text{ speaker signals that he is (further on) going to talk about Madame Dutitre in } w]\}$

The expressive meaning of RD is thus restated in (25):

(25)  $[[\text{NP}_{\text{RD}}]]^{\text{C}} = \{[\lambda w. \text{ speaker signals that he is (further on) going to talk about the referent of the NP in } w]\}$

Now, let us have a look at embedded RD, cf. (26):

(26) Hans sagte, dass sie richtig nett ist, die Grete.

*Hans said that she really nice is the Grete.*

at-issue meaning:  $[\lambda w. \text{ Hans said that Grete is nice in } w]$

expressive meaning: 1.  $\{[\lambda w. \text{ speaker of the main clause signals that he is (further on) going to talk about Grete in } w]\}$   
2.  $*\{[\lambda w. \text{ Hans signals that he is (further on) going to talk about Grete in } w']\}$

In contrast to embedded topics in English (E-LD), there is no embedded reading for RD.<sup>17</sup> This means, that a slight modification of the expressive meaning of RD is needed. (25) is thus restated as (27):

(27)  $[[\text{NP}_{\text{RD}}]]^{\text{C}} = \{[\lambda w. \text{ speaker (of the host sentence) signals that he is (further on) going to talk about the referent of the NP in } w]\}$ <sup>18</sup>

In other words, RD adds to the semantics of its host sentence a separate performative explicitly signalling that the speaker is going to talk about the referent of the RD-NP, while it is left open whether he was already talking about this referent or just changed to a new topic.

In the next section I will show how certain semantic peculiarities of RD may be accounted for with the separate performative analysis proposed in (27).

<sup>16</sup> The preceding segment gives an example of Madame Dutitre’s original sayings; the beginning segment is giving some general information about Madame Dutitre, for which the preceding segment may serve as an illustration.

<sup>17</sup> This means that for RD, contrary to E-LD, it would be possible to have an explicit reference to the addressee. However, this does not seem necessary: intuitively, RD is a strategy that serves to mark the information status of a certain NP that is used by the speaker, and the reference to the speaker making a signal with the RD seems to me to capture this intuition in the best way.

<sup>18</sup> In my paper I consider only NP-RD. Altmann (1981) describes also briefly PP- and CP-‘right dislocation’ (which he distinguishes from extraposition). It requires further analysis to find out whether these constructions are really RDs or ATs. That is why I state (24) explicitly for NP-RD. However, when needed, (27) can be generalized to  $[[\text{XP}_{\text{RD}}]]^{\text{C}} = \{[\lambda w. \text{ speaker signals that he is (further on) going to speak about the referent of X in } w]\}$ .

#### 4 Consequences of the separate performative account of RD

The semantic analysis of RD proposed in the previous section accounts for certain restrictions concerning the semantic status of the NP in the RD. Thus, quantificational NPs in general seem not to be possible with RD. Besides, the separate performative account of RD explains the discourse function of the RD in a most straightforward way.

##### 4.1 Explaining certain semantic constraints on the RD-NP

It has been noticed that quantified NPs are in general bad with RD, as in (28)<sup>19</sup> (see also Averintseva-Klisch (forthc. b)):

- (28) Peter liebt sie,            \*jede Frau / \*keine Brünetten / \*zwei Frauen.  
*Peter loves her / them    \*every woman / \*no brunettes / \*two women*<sup>20</sup>.

This can be accounted for if one assumes that the contribution RD makes to the semantics of its host sentence is an expressive meaning. To show this I first refer to Portner’s (forthc.) analysis of vocatives.

Portner (forthc.) notices that quantifiers are in general unable to function as vocatives, cf. (29):

- (29) Anna / \*Some woman, please, hurry up!

The semantics of vocatives is assumed to be (30) (cf. Portner (forthc.: 9)):

- (30) at-issue meaning:  $[\lambda x \lambda w. \text{ speaker urges } x \text{ to hurry up in } w]$   
 expressive meaning:  $\{[\lambda x \lambda w. \text{ speaker requests the attention of } x \text{ in } w]\}$

In the expressive meaning formula in (30),  $x$  can be only of type  $e$ . Thus, to be able to function as an argument at the level of the expressive meaning, the quantifier *some* has to raise from the type  $\langle e, \langle e, t \rangle \rangle$ <sup>21</sup> to the type  $e$ . In raising to type  $e$ , the quantifier changes to the at-issue meaning level, leaving a trace behind at the expressive meaning level. This trace has to be semantically bound by the quantifier (see Heim (1982)). This is, however, not possible. Portner (forthc.) argues that it is impossible to bind “across dimensions of meaning”: a quantifier which contributes to at-issue meaning cannot bind a variable which contributes to expressive meaning (see Portner (forthc.) for details).

In a similar way, the impossibility of semantic binding across dimensions accounts for the ill-formedness of quantificational NPs in RD constructions in (28). The quantifier *jede / keine / zwei* has to raise to type  $e$  to be able to function as an argument of the expressive meaning  $\{[\lambda x \lambda w. \text{ speaker (of the host sentence) signals that he is (further on) going to talk about } x \text{ in } w]\}$ ; thus it moves to at-issue meaning and cannot bind its trace at the expressive level any more.

##### 4.2 The semantics of RD and discourse topic referent

Besides explaining the impossibility of certain kinds of NPs in RD, the separate performative account provides a straightforward explanation for the contrast in (31):

<sup>19</sup> Grewendorf (2002) notices the same for LD. I do not attempt any explanation of this fact here.

<sup>20</sup> Note that these sentences are well-formed without RD:

- (b) Peter liebt jede Frau / keine Brünetten / zwei Frauen.  
*Peter loves every woman / no brunettes / two women*

<sup>21</sup> This being the semantic type of this kind of quantifier, cf. Heim and Kratzer (1997).

- (31) a. "Ein Taifun!" rief Lukas dem Kapitän zu. "Da ist er!" Ja, da war  
 "A typhoon!" called Lukas the captain to. "Here is he!" Yes, here was  
 er, der Taifun. Ein hellblauer Blitz fuhr zischend vom  
*he the typhoon<sub>MASK</sub>. A light-blue lightning went whizzing from-the*  
 Himmel nieder [...]  
*sky downwards [...]* [M. Ende, *Jim Knopf und die Wilde 13*: 190]
- b. "Ein Taifun!" rief Lukas dem Kapitän zu. "Da ist er!" #Er lief zum  
 "A typhoon!" called Lukas the captain to. "Here is he!" He ran to-the  
 Steuer, der Lukas. Ein hellblauer Blitz fuhr zischend vom  
*steering-wheel the Lukas. A light-blue lightning went whizzing from-the*  
 Himmel nieder [...]  
*sky downwards [...]*<sup>22</sup>

Here, RD is only possible with the NP *der Taifun*; no other NP, as *der Lukas* as in (31b) might be right-dislocated, even if the corresponding referent is discourse-old and also otherwise complies with the requirements on the RD-NP. This changes, however, as soon as the following discourse segment is adapted so that its discourse topic referent corresponds to the referent of the RD-NP: RD is perfectly well-formed, cf. (32):

- (32) "Ein Taifun!" rief Lukas dem Kapitän zu. "Da ist er!" Er lief zum  
 "A typhoon!" called Lukas the captain to. "Here is he!" He ran to-the  
 Steuer, der Lukas. Dort angekommen, riss er sein Hemd runter und band  
*steering-wheel the Lukas. There arrived tore he his shirt down and bound*  
 damit das Steuerrad fest.  
*with-it the steering-wheel firmly.*

That means that RD is suitable with a NP referring to the discourse topic referent; otherwise only AT is possible. This follows directly from the expressive meaning that RD contributes to the semantics of its host sentence: with a RD the speaker signals that he is going to talk about the referent of the RD-NP. And it is pragmatically unsound first to mark a referent as being what one is going to talk about, and then to change the subject.

## 5 Summary and conclusions

In my paper, I have shown that what is traditionally subsumed under the label of German right dislocation are in fact two different constructions: right dislocation proper and afterthought. RD and AT differ in their formal and functional properties. AT is an 'orphan' that gets integrated into its host sentence only at the discourse level. Its discourse function is to resolve a potentially unclear (pro)nominal reference. RD is prosodically and syntactically a part of its host sentence. Its function is to mark the discourse topic referent for the following discourse segment.

The main goal of this paper was to show that RD adds a separate performative (an 'expressive meaning') to the semantics of the sentence. This performative is "*the speaker (of the host sentence) signals that he is (further on) going to talk about X*", with X being the referent of the RD-NP. This account of the RD explains certain constraints on the semantic status of the RD-NP: only NPs of the type e are possible here. This corresponds to ontological constraints on the discourse topic referent: only definite individual nominal referents are possible.

Furthermore, I argue that the discourse function of RD is to mark the discourse topic referent, as follows directly from the semantics of RD. I believe that for an approach to the otherwise highly elusive pragmatic category of the discourse topic it is a prerequisite to have a look at

<sup>22</sup> (33b) is thoroughly acceptable as AT, with the corresponding prosody, but not as RD.



explicit linguistic means of referring to it. In this sense RD in its function of marking the discourse topic referent is an explicit means revealing something of how the discourse model is built up.

## References

- Altmann, H.: 1981, *Formen der 'Herausstellung' im Deutschen: Rechtsversetzung, Linksversetzung, Freies Thema und verwandte Konstruktionen*. Tübingen: Niemeyer.
- Asher, N. and Lascarides, A.: 2003, *Logics of Conversation*. Cambridge: CUP.
- Asher, N.: 2004 a, Discourse topic, *Theoretical Linguistics* **30**, 163-201.
- Asher, N.: 2004 b, Troubles with topics: comments on Kehler, Oberlander, Stede and Zeevat, *Theoretical Linguistics* **30**, 255-262.
- Auer, P.: 1991, Vom Ende deutscher Sätze, *Zeitschrift für Germanistische Linguistik* **19**, 139-157.
- Averintseva-Klisch, M.: forthc. a, Anaphoric properties of the German right dislocation, in M. Schwarz-Friesel, M. Consten and M. Knees (eds.), *Anaphors in Text*.
- Averintseva-Klisch, M.: forthc. b, German Right Dislocation and Afterthought in Discourse, in C. Sassen, A. Benz and P. Kühnlein (eds.), *Constraints in Discourse*.
- Brown, G. and Yule, G.: 2004, *Discourse analysis*. Cambridge: CUP [reprinted from original of 1983].
- Fretheim, T.: 1995, Why Norwegian Right-Dislocated Phrases are not Afterthoughts, *Nordic Journal of Linguistics* **18**, 31-54.
- Frey, W.: 2004a, Notes on the syntax and pragmatics of the German Left Dislocation, in H. Lohnstein and S. Trissler (eds.), *The Syntax and Semantics of the Left Periphery*, Mouton de Gruyter, pp. 203-233.
- Frey, W.: 2004b, Pragmatic properties of certain German and English left peripheral constructions. *Linguistics* **43/1**, 89-129.
- Goutsos D.: 1997, *Modeling Discourse Topic: Sequential Relations and Strategies in Expository Text*. Norwood: Ablex (= Advances in Discourse Processes LIX).
- Grewendorf, G.: 2002, *Minimalistische Syntax*. Tübingen / Basel: A. Francke (= UTB 2313).
- Haegeman, L.: 1991, Parenthetical adverbials: The radical orphan approach, in S. Chiba et al. (eds), *Aspects of modern English linguistics: Papers presented to Masatomo Ukaji on his 60th birthday*. Kaitakusha, pp. 232-254.
- Heim, I.: 1982, *The Semantics of Definite and Indefinite Noun Phrases*. Ph.D. Thesis, MIT.
- Heim, I. and Kratzer, A.: 1997, *Semantics in Generative Grammar*. Oxford: Blackwell.
- Kehler, A.: 2004, Discourse topics, sentence topics, and coherence, *Theoretical Linguistics* **30**, 227-240.

- Oberlander, J.: 2004, On the reduction of discourse topic, *Theoretical Linguistics* **30**, 213-225.
- Portner, P.: 2004, Vocatives, Topics and Imperatives, handout for IMS Workshop on Information Structure, Bad Teinach, URL: [http://www.georgetown.edu/faculty/portnerp/Stuttgart\\_handout.pdf](http://www.georgetown.edu/faculty/portnerp/Stuttgart_handout.pdf).
- Portner, P.: forthcoming, Instructions for Interpretation as Separate Performatives, in K. Schwabe and S. Winkler (eds.), *On Information Structure, Meaning and Form*. Amsterdam: Benjamins.
- Potts, Ch.: 2003, The performative nature of expressive content, handout, URL <http://www-unix.oit.umass.edu/~potts/potts-expressives-uconn-rochester.pdf>.
- Potts, Ch.: 2004, Conventional implicatures, a distinguished class of meanings, in G. Ramchand and Ch. Reiss (eds.), *The Oxford Handbook of Linguistic Interfaces*. OUP, pp. 187-198.
- Potts, Ch., Schwarz, F. and Kawahara, Sh.: 2004, Comments on Paul Portner's 'Instructions for Interpretation as Separate Performatives', handout for Harvard-MIT-UConn Indexicality Workshop Nov. 20, 2004, URL <http://www-unix.oit.umass.edu/~potts/talks/pottsschwarz-kawahara-cmts-on-portner.pdf>.
- Potts, Ch.: 2005, *The Logic of Conventional Implicature*. Oxford: OUP.
- Prince, E.: 1992, The ZPG Letter: Subjects, Definiteness, and Information-Status, in W. Mann and S. Thompson (eds.), *Discourse Description. Diverse linguistic analyses of a fundraising text*. Amsterdam: Benjamins, pp. 295-325.
- Selting, M.: 1994, Konstruktionen am Satzrand als interaktive Ressource in natürlichen Gesprächen, in B. Haftka (ed.), *Was determiniert Wortstellungsvariation?*, Westdeutscher Verlag, pp. 299-318.
- Shaer, B. and Frey, W.: 2004, 'Integrated' and 'Non-integrated' Left-Peripheral Elements in German and English, in B. Shaer, W. Frey and C. Maienborn (eds.), *Proceedings of the Dislocated Elements Workshop, ZAS Berlin, November 2003. ZAS Papers in Linguistics* **35**, 465-502.
- Stede, M.: 2004, Does discourse processing need discourse topics?, *Theoretical Linguistics* **30**, 241-253.
- Uhmann, S.: 1997, *Grammatische Regeln und konversationelle Strategien. Fallstudien aus Syntax und Phonologie*. Tübingen: Niemeyer.
- Ward, G. and Birner, B.: 1996, On the Discourse Function of Rightward Movement in English, in A. Goldberg (ed.), *Conceptual Structure, Discourse and Language*. Stanford Center for the Study of Language and Information Publications, pp. 463-479.
- Zeevat, H.: 2004, Asher on discourse topic, *Theoretical Linguistics* **30**, 203-211.

# COMPLEX FOCUS VERSUS DOUBLE FOCUS

## INVESTIGATIONS OF MULTIPLE FOCUS INTERPRETATIONS IN HUNGARIAN

Kata Balogh

Universiteit van Amsterdam

k.balogh@uva.nl

### Abstract

The main aim of this paper is to point out several problems with the semantic analysis of Hungarian focus interpretation and ‘only’. For current semantic analyses the interpretation of Hungarian identificational/exhaustive focus and ‘only’ is problematic, since in classical semantic analyses ‘only’ is identified with an exhaustivity operator. In this paper I will discuss multiple focus constructions and question-answer pairs in Hungarian to show that such a view cannot be applied to Hungarian exhaustive focus. Next to this I will discuss possible interpretations of Hungarian sentences containing multiple prosodic foci: *complex focus* versus *double focus*. My claim is that in order to interpret multiple focus (in Hungarian) we have to take into consideration the different intonation patterns, the occurrence of ‘only’, and the syntactic structure as well.

In my paper I discuss multiple focus constructions and their interpretations based on Hungarian data. Sentences containing two prosodical foci have two possible interpretations. First, the *complex focus* meaning (Krifka 1991), where we have semantically one focus: an ordered pair; and second, the *double focus* meaning, where the first focus takes scope over the second one. The paper investigates three main topics: (1) the multiple focus interpretations, (2) complex focus vs. double focus disambiguation and (3) the interpretation of ‘only’ in Hungarian. My main claims are the following:

- (a) ‘only’ is not responsible for exhaustive meaning and ‘only’ and exhaustification are distinct in Hungarian contrary to the analysis of the classical theories (Groenendijk and Stokhof 1984, Groenendijk and Stokhof 1991, Krifka 1991);
- (b) in order to interpret multiple focus constructions we have to take into consideration the occurrence of ‘only’, the intonation pattern and the syntactic structure as well.

The paper is organized as follows. As an introduction, in section 1.1 we will see the main attributes of Hungarian focus and in 1.2 we briefly discuss the classical semantic analyses of focus and exhaustivity. In section 2 we investigate the problem of ‘only’ and exhaustivity in multiple focus constructions and I propose a pragmatic analysis of ‘only’. Section 3 provides further evidence of a pragmatic analysis of ‘only’ via Hungarian question-answer pairs. Section 4 deals with the disambiguation between complex focus and double focus interpretations and the role of intonation, syntax and the appearance of ‘only’. Section 5 gives the conclusions and introduces some further work on scalar readings and scope relations.

## 1 Introduction

### 1.1 Focus in Hungarian

Hungarian – like Basque, Catalan, Greek, Finnish and many other languages – belongs to the family of discourse-configurational languages (É. Kiss 1995). A main property of these languages is that some discourse-semantic information is mapped into the syntactic structure of the

sentences as well. Hungarian has special structural positions for *topics*, *quantifiers* and *focus*. The special structural position for focused elements in Hungarian is the immediate pre-verbal position. The constituent in this position is assigned a pitch accent and receives an *exhaustive* interpretation.

In “neutral sentences” like (1a) the immediate pre-verbal position is occupied by the verbal modifier (VM) whereas in focused sentences like (1b)<sup>1</sup> this position is occupied by the focused element, and the verbal modifier is behind the finite verb.

- (1) a. Anna felhívta Emil.  
(Anna VM-called Emil.acc)  
'Anna called Emil.'
- b. Anna EMILT hívta fel.  
(Anna Emil.acc called VM)  
'It was Emil whom Anna called.'

É. Kiss (1998) distinguishes two types of focus: *identificational focus* and *information focus*. Her main claims are that these two types are different both in syntax and semantics, and that identificational focus is not uniform across languages. The main differences in Hungarian according to É. Kiss are the following: a) *identificational focus*: expresses exhaustive identification, certain constituents are out, it takes scope, involves movement and can be iterated; b) *information focus*: merely marks the un presupposed nature, is nonrestricted, does not take scope, does not involve movement and can project. For example, we can answer the question ‘Where were you last summer?’ with (2a), which has identificational focus, or with (2b), which has information focus. From these two answers only (2a) gets exhaustive interpretation.

- (2) a. ANGLIÁBAN voltam.  
(England.loc was.1sg)  
'It is England where I went.' [and nowhere else]
- b. Voltam ANGLIÁBAN.  
(was.1sg England.loc)  
'I went to England.' [among other places]

The pre-verbal focus in Hungarian falls under the category of identificational focus, whereas the status of the information focus in Hungarian is rather questionable (see e.g. Szendrői 2003). In the following we will concentrate on the pre-verbal (identificational) focus to point out several problems with the exhaustive meaning and ‘only’. In Hungarian ‘only’ (*csak*) is always associated with identificational focus, see (3).

- (3) a. Csak ANGLIÁBAN voltam.  
(only England.loc was.1sg)  
'I went only to England.'
- b. \*Voltam csak ANGLIÁBAN.  
(was.1sg only England.loc)

Since in Hungarian both ‘only’ (*csak*) and identificational focus indicate exhaustivity, the question arises whether both contribute to semantics or one has only pragmatic function. English data suggest that the interpretation of ‘only’ is on the semantic part and the interpretation of focus is pragmatics. The Hungarian data I will discuss in the following sections will lead us to a different view.

<sup>1</sup>Here and further on small capitals indicate pitch accent.

## 1.2 Classical analyses of focus and exhaustivity

In this section I will briefly introduce two classical semantic analyses of focus and exhaustivity: the *Partition Semantics* (Groenendijk and Stokhof 1984, 1991) and the *Structured Meaning Account* (Krifka 1991, among others). In both theories, ‘only’ is identified with an exhaustivity operator. Later on in the paper we will see that this view cannot be applied to some multiple focus constructions and the exhaustive focus in answers in Hungarian.

Krifka proposes a structured meanings account of questions and the focusation of answers. This theory is also called a functional approach, because the basic idea is that the meaning of a question is a function, which when applied to the meaning of a congruent answer, yields a proposition. Next to the function, its domain is given and together they form an ordered pair.

$$(4) \quad \llbracket \text{Who called Emil?} \rrbracket = \langle \lambda x[\text{called}(x, \text{Emil})], \text{PERSON} \rangle$$

Correspondingly, a sentence with focus is represented as a focus–background pair  $\langle F, B \rangle$  where if we apply the background to the focus  $B(F)$  we get the ordinary interpretation.

$$(5) \quad \llbracket \text{ANNA}_F \text{ called Emil.} \rrbracket = \langle \text{Anna}, \lambda x[\text{called}(x, \text{Emil})] \rangle \\ \lambda x[\text{called}(x, \text{Emil})](\text{Anna}) = \text{called}(\text{Anna}, \text{Emil})$$

In this theory the focus sensitive particle ‘only’ is analysed as an operator which takes a focus–background structure. The meaning rule for ‘only’ (simple version) is the following:

$$(6) \quad \llbracket \text{only} \rrbracket(\langle F, B \rangle) = B(F) \wedge \forall X \in \text{Alt}(F)[B(X) \rightarrow X = F]^2$$

In order to get the right interpretation for Hungarian exhaustive focus in this framework we have to introduce an *exhaustivity operator* that applies to the focus–background structure and has the same interpretation as ‘only’:

$$(7) \quad \text{EXH}(\langle F, B \rangle) = B(F) \wedge \forall X \in \text{Alt}(F)[B(X) \rightarrow X = F]$$

With this exhaustivity operator we get the right interpretation for sentences like (1b) or (2a). In this way sentences with identificational focus and sentences with ‘only’ will get the same interpretation, since the interpretation of ‘only’ and the exhaustivity operator are the same. We will see in section 3 that this view can be problematic for Hungarian.

Similar facts hold for the question analysis of (Groenendijk and Stokhof 1984, 1991). For the semantics of linguistic answers they define an answer formation rule introducing an exhaustivity operator, which gives the minimal elements from a set of sets.

- (8) a. *the rule of answer formation*: if  $\alpha'$  is the interpretation of an n-place term, and  $\beta'$  is the relational interpretation of an n-constituent interrogative, the interpretation of the linguistic answer based on  $\alpha$  in the context of the interrogative  $\beta$  is  $(\text{EXH}^n(\alpha'))(\beta')$ , where  $\text{EXH}^n$  is defined as follows (generalized rule):
- b.  $\text{EXH}^n = \lambda \mathcal{R}^n \lambda R^n [\mathcal{R}^n(R^n) \wedge \neg \exists S^n [\mathcal{R}^n(S^n) \wedge R^n \neq S^n \wedge \forall \vec{x} [S^n(\vec{x}) \rightarrow R^n(\vec{x})]]]$

In this model, if we give the answer ‘Anna.’ to the question ‘Who called Emil?’, then it is interpreted as ‘Only Anna called Emil.’:

$$(9) \quad (\text{EXH}(\lambda P.P(\text{Anna}))) (\lambda x.\text{called}(x, \text{Emil})) = \\ \lambda P \forall x [P(x) \leftrightarrow [x = \text{Anna}]] (\lambda x.\text{called}(x, \text{Emil})) = \\ \forall x [\text{called}(x, \text{Emil}) \leftrightarrow [x = \text{Anna}]]$$

<sup>2</sup> $\text{Alt}(F)$  is the set of the natural alternatives of the focused element.

So the interpretation is that Anna called Emil and nobody else (from the relevant) domain called Emil.

## 2 Multiple focus interpretations

### 2.1 Two readings

This section focuses on two readings of multiple focus constructions. In case of sentences containing two (or more) prosodic foci there are two possible interpretations. The two foci can form an ordered pair like in (10). Here semantically *a pair of constituents* is in focus. Krifka (1991) calls this type *complex focus* to distinguish it from other multiple focus constructions.

- (10) (Csak) ANNA hívta fel EMILT.  
 ((only) Anna called VM Emil.acc)  
 ‘It is the Anna, Emil pair of whom the first called the second.’
- (11) John only introduced BILL to SUE. (from Krifka 1991)  
 reading: the only pair of persons such that John introduced the first to the second is  
 ⟨Bill, Sue⟩

The other type is one involving *real multiple foci* (Krifka 1991). In this case there are two focus operators and the first focus takes scope over the second one. See the following examples:

- (12) Csak ANNA hívta fel csak EMILT.  
 (only Anna called VM only Emil.acc)  
 ‘Only Mary called only Peter.’ [the others nobody or more persons]
- (13) Even<sub>1</sub> JOHN<sub>1</sub> drank only<sub>2</sub> WATER<sub>2</sub>. (from Krifka 1991)

A similar distinction can be found in Hungarian multiple constituent questions. In multiple wh-questions there are two possible word orders that lead to two different meanings.

- (14) a. Ki kit hívott fel?  
 (who whom called VM)  
 ‘Who called whom?’ (pair-list)
- b. Ki hívott fel kit?  
 (who called VM whom)  
 ‘Who called whom?’ (complex)

(14a) requires a pair-list answer, while (14b) is a restricted question where both the questioner and the answerer already know that there is only one pair of whom the “call-relation” holds. The question can have a *strict* and a *loose* meanings (Lipták 2000). In the case of the strict meaning there are two specific individuals – e.g. Anna and Bea – under discussion, and the question is just about the theta-roles of the individuals: ⟨*a, b*⟩ or ⟨*b, a*⟩. In the case of the loose meaning there is a specific set of pairs of individuals, and the questions wants one element from this set. In our examples the interpretation of question (14b) corresponds to the complex focus reading in (10), in both cases there is one *pair of individuals* of whom the “call-relation” holds.

In the following I will use a bit more informative terminology for these two types: *pair-reading* for the complex focus and *scope-reading* for the double focus/real multiple foci.

The above examples show that these two different readings are present in Hungarian. However, interestingly, example (15) can have both readings: the scope-reading (15a) and the pair-reading (15b).

- (15) Csak ANNA hívta fel csak EMILT. (=12)  
 (only Anna called VM only Emil.acc)  
 a. ‘Only Mary called only Peter.’ [the others nobody or more persons]  
 b. ‘It is the Mary, Peter pair of whom the first called the second.’

One of the main questions of this paper is to find out how to analyze example (15b), where a pair of constituents is in focus but there are two ‘only’s. This case is rather problematic for the classical theories, since they analyze ‘only’ as an exhaustivity operator but here we have only one operator applied to the pair of constituents.

## 2.2 Analyses

In example (10) exhaustivity applies to pairs, which is exactly what Groenendijk and Stokhof’s (1984, 1991) generalized definition of exhaustivity (8b) gives us. In our examples there are two terms, so the interpretation runs as follows:

$$(16) \quad (EXH^2(\lambda R[R(a, e)]))(\lambda x \lambda y.called(x, y)) = \\ \lambda R \forall x \forall y [R(x, y) \leftrightarrow [x = a \wedge y = e]] (\lambda x \lambda y.called(x, y)) = \\ \forall x \forall y [called(x, y) \leftrightarrow [x = a \wedge y = e]]$$

Krifka (1991) also gives an elegant analysis of multiple focus constructions in a compositional way. He gives a recursive definition of extended application for Focus-Background structures (17)<sup>3</sup> and defines the syntactic-semantic rules as follows (we give here only the relevant ones for our examples).

- (17)  $\alpha(\beta)$  functional application  
 $\langle \alpha, \beta \rangle (\gamma) = \langle \lambda X. [\alpha(X)(\gamma)], \beta \rangle$   
 $\gamma(\langle \alpha, \beta \rangle) = \langle \lambda X. \gamma(\alpha(X)), \beta \rangle$   
 $\langle \alpha, \beta \rangle (\langle \gamma, \delta \rangle) = \langle \lambda X \bullet Y. [\alpha(X)(\gamma(Y))], \beta \bullet \delta \rangle$
- (18)  $S \rightarrow NP VP$ ;  $[[S NP VP]] = [NP]([VP])$   
 $VP_{tr} \rightarrow V NP$ ;  $[[VP_{tr} V NP]] = \lambda S \lambda T \lambda x. T(\lambda y. S(x, y))([V])([NP])$   
 $C \rightarrow C_F$ ;  $[C_F] = \langle \lambda X. X, [C] \rangle$   
 $C \rightarrow FO C$ ;  $[[C FO C]] = \lambda \langle X, Y \rangle \lambda O [\lambda Z. O(\langle X, Z \rangle)(Y)]([C])([FO])$

$X \bullet Y$  is defined by Krifka as a list, but practically it is an ordered tuple (in our case here: a pair).  $FO$  stands for the focus sensitive operator (‘only’). According to this system the interpretation of (10) is as follows:

- (19)  $Emil_F: \langle \lambda T. T, e \rangle$   
 $called Emil_F: \langle \lambda T \lambda x. T(\lambda y. called(x, y)), e \rangle$   
 $Anna_F: \langle \lambda T. T, a \rangle$   
 $Anna_F called Emil_F: \langle \lambda X \bullet Y [X(\lambda x. Y(\lambda y. called(x, y)))] , a \bullet e \rangle$   
 $only Anna_F called Emil_F:$   
 $called(a, e) \wedge \forall x \bullet y [[x \bullet y \in Alt(a \bullet e) \wedge called(x, y)] \rightarrow (x \bullet y = a \bullet e)]$

These examples (16, 19) show us that both theories can easily deal with prosodically multiple foci that express semantically one focus, a pair. Both theories take an operator (*exh*/‘only’) that applies to an ordered pair. This way we get the intended meaning that it was the Anna, Emil

<sup>3</sup>To make it simpler we give the rules without types. For more details see (Krifka 1991).

pair of whom the first called the second and there are no other pairs in the domain of which the call-relation holds. The problem of identifying ‘only’ with the exhaustivity operator is not yet visible here, because the interpretation results are correctly the same for (20a) and (20b), both have a pair-reading.

- (20) a. ANNA hívta fel EMILT.  
(Anna called VM Emil.acc)  
b. Csak ANNA hívta fel EMILT.  
(only Anna called VM Emil.acc)

for both: ‘It is the Anna, Emil pair of whom the first called the second.’

The problem arises if we try to get the interpretation (15b) according to the classical theories. In Groenendijk and Stokhof’s (1984, 1991) framework the two ‘only’s are the operators that exhaustify the phrases <sup>4</sup>. Following this the interpretation of (15) goes as follows:

$$(21) \quad (EXH(\lambda P.P(a)))(EXH(\lambda P.P(e)))(\lambda x\lambda y.called(x,y))= \\ (\lambda P\forall y[P(y) \leftrightarrow y = a])(\lambda P\forall x[P(x) \leftrightarrow x = e])(\lambda x\lambda y.called(x,y))= \\ \forall y[\forall x[\lambda y.called(x,y) \leftrightarrow x = a] \leftrightarrow y = e]$$

It says that only Anna is such that she called only Emil, so we get the ‘scope-reading’ (15a). Exhaustifying the terms separately we cannot get the complex focus interpretation (15b).

The same problem arises for the interpretation in Krifka’s (1991) analysis, where the two ‘only’s are applied to the two focused constituents respectively. In this framework as well, for (15) we get the ‘scope-reading’ (15a) but not the ‘pair-reading’ (15b).

$$(22) \quad \text{only Emil}_F: \lambda P[P(e) \wedge \forall y[(y \in Alt(e) \wedge P(y)) \rightarrow y = e]] \\ \text{called only Emil}_F: \lambda x[called(x,e) \wedge \forall y[y \in Alt(e) \wedge called(x,y) \rightarrow y = e]] \\ \text{only Anna}_F: \lambda P[P(a) \wedge \forall x[(x \in Alt(a) \wedge P(x)) \rightarrow x = a]] \\ \text{only Anna}_F \text{ called only Emil}_F: \\ \lambda P[P(a) \wedge \forall x[x \in Alt(a) \wedge P(x) \rightarrow x = a]](\lambda x[call'(x,e) \wedge \\ \forall y[y \in Alt(e) \wedge call'(x,y) \rightarrow y = e]])= \\ called(a,e) \wedge \forall y[y \in Alt(e) \wedge call'(a,y) \rightarrow y = e] \wedge \forall x[x \in Alt(a) \wedge (call'(x,e) \wedge \\ \forall y[y \in Alt(e) \wedge call'(x,y) \rightarrow y = e]) \rightarrow x = a]$$

### 2.3 Proposal

A possible solution to solve the above problem is to suppose that in the case of the complex focus meaning of (12b) semantically there is only one operator. This can give rise to a suggestion that ‘only’ here is a resumptive operator and we have a kind of concord. However, I want to avoid this idea because of the fact that dropping the second ‘only’ from the sentence does not lead to ungrammaticality but gives the same meaning, see example (20a) and (20b).

Rather we suppose that ‘only’ and the exhaustivity operator are different, and in this case there is one exhaustivity operator that applies to the pair of the arguments, and the two ‘only’s work pragmatically saying that only Anna calling somebody and that only Emil being called by somebody were both unlikely or against the expectations.

<sup>4</sup>An alternative might be that next to the exhaustification of the ‘only’s the exhaustification of the identificational focus comes on the top of it. It might be the case that exhaustification of the pair of exhaustified terms does not lead to scopal meaning. The question if this alternative might be correct is left for further research.



As for the double focus meaning where the first focus takes scope over the second one we suppose two separate exhaustivity operators, but on different points of the discourse. At the point of the discourse when the sentence is uttered the second focused expression comes as *old information* and happens to be in the scope of the first focus, which constitutes *new information*. This way the two focused expressions are apart and there is no way for them to form a pair.

- (23) Q: Ki hívta fel csak EMILT?  
 (who called VM only Emil.acc)  
 ‘Who called only Emil?’
- A: Csak ANNA hívta fel csak EMILT.  
 (only Anna called VM only Emil.acc)  
 ‘Only Anna called only Emil.’ (scope-reading)  
 #‘It is the Anna, Emil pair of whom the first called the second.’ (pair-reading)

### 3 A pragmatic analysis of ‘only’

As we saw in section 1.2 the Structured Meaning Account and the Partition Semantics both treat ‘only’ and exhaustivity as identical. In this way we cannot account for examples of constituent questions and answers in Hungarian where the occurrence of ‘only’ makes a significant difference, as in example (25).

In section 2 I suggested a pragmatic account of ‘only’ in multiple focus constructions where a pair-reading comes together with two ‘only’s. With the following examples we obtain another argument for a pragmatic analysis of ‘only’ in Hungarian. Consider the following examples:

- (24) a. Ki hívta fel Emilt?  
 (who called VM Emil.acc)  
 ‘Who called Emil?’
- b. ANNA hívta fel Emilt.  
 (Anna called VM Emil.acc)  
 ‘It is Anna who called Emil.’
- c. Csak ANNA hívta fel Emilt.  
 (only Anna called VM Emil.acc)  
 ‘Only Anna called Emil.’
- (25) a. Kik hívták fel Emilt?  
 (who.pl called.pl VM Emil.acc)  
 ‘Who called Emil?’
- b. #ANNA hívta fel Emilt.  
 (Anna called VM Emil.acc)  
 ‘It is Anna who called Emil.’
- c. Csak ANNA hívta fel Emilt.  
 (only Anna called VM Emil.acc)  
 ‘Only Anna called Emil.’

For the question in (24a) the answers with or without ‘only’ (24b and 24c) are semantically equivalent, saying that Anna and nobody else called Emil. The focus in (24b) expresses exhaustive identification, thus the interpretation is as follows:

$$(26) \quad called(a, e) \wedge \forall x \in Alt(a)[called(x, e) \rightarrow x = a]$$

Therefore it seems that the appearance of *csak* ‘only’ in (24c) does not make any difference, since it is interpreted as (26), too. But consider example (25) where we pose the same question in plural, so we make an expectation explicit of more persons calling Emil. Question (25a) cannot be answered with a simple identificational focus, but (25c) – with ‘only’ – is felicitous. Considering the above example I propose that it is not the ‘only’ that is responsible for the exhaustive meaning. What ‘only’ does here is simply cancelling the expectation, and therefore I claim, that ‘only’ in answers has a pragmatic rather than a semantic function. This idea is similar to Zeevat’s (to appear) proposal about ‘only’. In his examples ‘only’ seems to be superfluous and he concludes that the function of ‘only’ is less semantic and more pragmatic than was assumed before. He suggests two possible ways to solve this problem. The first one is that ‘only’ has a pragmatic function to cancel the expectation of the questioner, and the second one is that ‘only’ makes exhaustivity stronger in the sense that it expands the extension of the restriction on the hidden *wh*-phrase in the topic. Considering the Hungarian data I prefer the first solution. In the following I will discuss some examples of Hungarian focus and ‘only’-sentences and present my proposal to try and solve the above problems.

To explain what is going on in (24) and (25) I use Groenendijk and Stokhof’s (1984, 1991) theory of questions and answers. In this theory the meaning of an interrogative determines what its possible complete semantic answers are. The semantic interpretation of an interrogative is an equivalence relation over the set of possible worlds, thus an interrogative sentence denotes a partition of logical space. Every block of the partition induced by  $?\phi$  contains the possible worlds where the extension of  $\phi$  is the same, thus the meaning of a question is a set of propositions, the set of complete semantic answers to the question.

$$(27) \quad [[?x\phi]] = \{(w, v) \in W^2 \mid [[\lambda\vec{x}\phi]]^w = [[\lambda\vec{x}\phi]]^v\}$$

For example, if we have a relevant domain  $D = \{Anna, Rena, Tomi\}$  who might have called Emil then the question ‘*Who called Emil?*’ (=24a) expresses an eight-block partition:

(28)	$\lambda w. \neg \exists x. called(x, e)(w)$	<i>nobody</i>
	$\lambda w. \forall x. called(x, e)(w) \leftrightarrow x = a$	<i>anna</i>
	$\lambda w. \forall x. called(x, e)(w) \leftrightarrow x = r$	<i>rena</i>
	$\lambda w. \forall x. called(x, e)(w) \leftrightarrow x = t$	<i>tomi</i>
	$\lambda w. \forall x. called(x, e)(w) \leftrightarrow [x = a \vee x = r]$	<i>anna and rena</i>
	$\lambda w. \forall x. called(x, e)(w) \leftrightarrow [x = a \vee x = t]$	<i>anna and tomi</i>
	$\lambda w. \forall x. called(x, e)(w) \leftrightarrow [x = r \vee x = t]$	<i>rena and tomi</i>
	$\lambda w. \forall x. called(x, e)(w)$	<i>everybody</i>

The question in example (24) is equated with the partition in (28). The focus expresses exhaustive identification, thus it contains an implicit exhaustivity (*EXH*) operator (along Groenendijk & Stokhof, 1984, 1991). Consequently, the proposition that a sentence with identificational focus denotes is one of the propositions in the partition induced by the underlying question; the answer with identificational focus is a complete semantic answer<sup>5</sup>. Thus identificational focus selects one block from the partition, or equivalently, it eliminates all blocks but one from the partition. In case of (24b) the focus selects the block containing the proposition *only Anna called Emil*.

<sup>5</sup>For the simple cases.

(29)

$P \rightarrow$	<i>nobody</i>	<i>anna and rena</i>
	<i>anna</i>	<i>anna and tomi</i>
	<i>rena</i>	<i>rena and tomi</i>
	<i>tomi</i>	<i>everybody</i>

Question (25) has an explicit expectation from the questioner's side: (s)he thinks that there was more than one person (from the relevant domain) who came. This expectation should be interpreted as a *restriction* on the partition:

(30)

$P \not\rightarrow$	<i>nobody</i>	<i>anna and rena</i>	
	<i>anna</i>	<i>anna and tomi</i>	$\leftarrow P'$
	<i>rena</i>	<i>rena and tomi</i>	
	<i>tomi</i>	<i>everybody</i>	

For the identificational focus only the restricted area (dashed lines) is accessible to select a block. Therefore we cannot reply to (25a) with (25c), because the block where the proposition is *only Anna called Emil* is not among the available ones, but we can reply with (31). It follows from this that it is not the case that the exhaustive focus is out as an answer for plural questions.

- (31) ANNA és TOMI hívta fel Emilt.  
 (Anna and Tomi called.3sg VM Emil.acc)  
 'It is Anna and Tomi who called Emil.'

Thus the answer with an identificational focus is a complete semantic answer and also a complete pragmatic answer.

In fact, for question (25a) it is not excluded to give an answer that expresses that Anna and nobody else called Emil, but in case of (25a) we need *csak* 'only' to go explicitly against the previous expectation of the questioner. Thus *csak* 'only' cancels the restriction, whereby the blocks which were excluded before "pop-up" again, so they become accessible for the identificational focus to select one of them. It follows that the exhaustive identification – namely selecting a block from the partition – is the function of the identificational focus, and *csak* 'only' has a pragmatic effect on the domain restriction.

Given these observations we may wonder 'What is happening in (24c)?' In question (24a) the questioner does not have any expectation about how many people came, but we can answer with an 'only'-sentence. I claim that in this case the use of 'only' in the answer gives information about the answerer's previous expectations, namely the answerer expected more people to come. But according to the questioner's information state this additional information is irrelevant. Nevertheless, it shows, too, that (24b) and (24c) are slightly different and the use of 'only' in (24c) is not redundant.

The main idea outlined above can also be applied to multiple constituent questions and their answers with multiple foci. As we saw in example (14), in Hungarian there are two possible structures for questions containing two wh-phrases, and these two different structures have a different meaning.

- (32) a. Ki kit hívott fel? (=14a; pair-list)  
 (who whom called VM)  
 'Who called whom?'

- b. #ANNA hívta fel EMILT.  
(Anna called VM Emil.acc)  
'It is the Anna, Emil pair of whom the first called the second.'
- c. Csak ANNA hívta fel EMILT.  
(only Anna called VM Emil.acc)  
'It is the Anna, Emil pair of whom the first called the second.'
- (33) a. Ki hívott fel kit? (=14b; complex)  
(who called VM whom)  
'Who called whom?'  
b. ANNA hívta fel EMILT.  
(Anna called VM Emil.acc)  
'It is the Anna, Emil pair of whom the first called the second.'  
c. #Csak ANNA hívta fel EMILT.  
(only Anna called VM Emil.acc)  
'It is the Anna, Emil pair of whom the first called the second.'

Example (32) perfectly fits in the previous picture; the explanation is the same as it was for (24). Over a domain of three persons  $D = \{Anna, Emil, Tomi\}$  the partition determined by (32a) has 512 blocks<sup>6</sup>, and since (32a) is a pair-list question, we have an expectation that there were more calls, that restricts us to the blocks containing more than one pair.

(34)

$P \not\rightarrow$	<i>nobody called nobody</i>
	$\langle anna, emil \rangle$
	⋮
	$\langle tomi, rena \rangle$
	⋮
	$\langle anna, emil \rangle$ and $\langle rena, tomi \rangle$
	⋮
<i>everybody called everybody</i>	

For (32a) the answer (32b) is infelicitous, we cannot simply select the block where there is only the  $\langle Anna, Emil \rangle$  pair. It is not accessible because of the expectation (restriction) of the questioner, we need 'only' again to go against the expectation. (32c) is felicitous, because the restriction is cancelled, so the identificational focus can select the block where there is only one pair: Anna and Emil.

Example (33) is a bit different, since here both the questioner and answerer already know that there is only one pair of persons of whom the call-relation holds. The question in (33a) denotes a partition where the blocks contain one pair.

<sup>6</sup>Assuming that people can call themselves.

(35)	Loose meaning:		Strict meaning:
	$\langle \text{anna, emil} \rangle$		$\langle \text{anna, emil} \rangle$
	$\langle \text{anna, tomi} \rangle$		$\langle \text{emil, anna} \rangle$
	⋮		
	$\langle \text{tomi, anna} \rangle$		
	$\langle \text{tomi, emil} \rangle$		

The complex focus can select one of the blocks, but (33c) is out. The explanation is that in this case both the questioner and answerer know that there is one pair, thus there is no expectation from both sides, so for ‘only’ there is nothing to cancel, therefore the use of ‘only’ in this context is out.

#### 4 Multiple focus readings

Example (12) raises the question what linguistic factors play a role to disambiguate between the two meanings. In this section we will discuss these factors: intonation, syntactic structure, appearance of ‘only’ and information structure. Our claim is that in order to interpret multiple foci we have to take into consideration all these factors. First of all we discuss intonation, which seems to have a very important role here. For sentence (12) two different intonation patterns lead to two meanings.

- (36) Csak ANNA hívta fel csak EMILT. (=12)
- a. Csak Anna hívta fel csak Emilt.  
 $H^* \text{-} L \quad L \quad L \text{-} H\% \quad H^* \text{-} L \implies \text{pair-reading} / * \text{scope-reading}$   
 ‘It is the Anna, Emil pair of whom the first called the second.’
- b. Csak Anna hívta fel csak Emilt.  $\implies * \text{pair-reading} / \text{scope-reading}$   
 $H^* \text{-} L \quad L \quad L \quad H^* \text{-} L$   
 ‘Only Anna called only Emil. [the others more or nobody]’

In (36a) both focussed constituents get pitch accent, before the second focused element there is a little stop (end of an intonation phrase) and just before this break there is a rising intonation. This intonation pattern gives us the complex focus (pair) reading. In (36b) all words between the focussed constituents are deaccented and there is no break<sup>7</sup>. This pattern gives the double focus (scope) reading. Intonation has the role to yield the intended meaning, however, there is no one-to-one correspondence between intonation patterns and meanings, since for (10) and (20b) the pair-intonation leads to the pair-reading, but the scope-intonation leads either to the pair-reading again or ungrammaticality. Interestingly only for structure (12) we can get the scope-reading, for structures (10) and (20b) the scope-reading is out.

- (37) Csak ANNA hívta fel EMILT. (=20b)
- a. Csak Anna hívta fel Emilt.  
 $H^* \text{-} L \quad L \quad L \text{-} H\% \quad H^* \text{-} L \implies \text{pair-reading} / * \text{scope-reading}$
- b. Csak Anna hívta fel Emilt.  
 $H^* \text{-} L \quad L \quad L \quad H^* \text{-} L \implies * \text{pair-reading} / * \text{scope-reading}$

- (38) ANNA hívta fel EMILT. (=10)

<sup>7</sup>I will not discuss here the question whether the second focused phrase here is deaccented as well or gets pitch accent. There are different opinions on this topic, according to my intuitions the second focus is not deaccented.

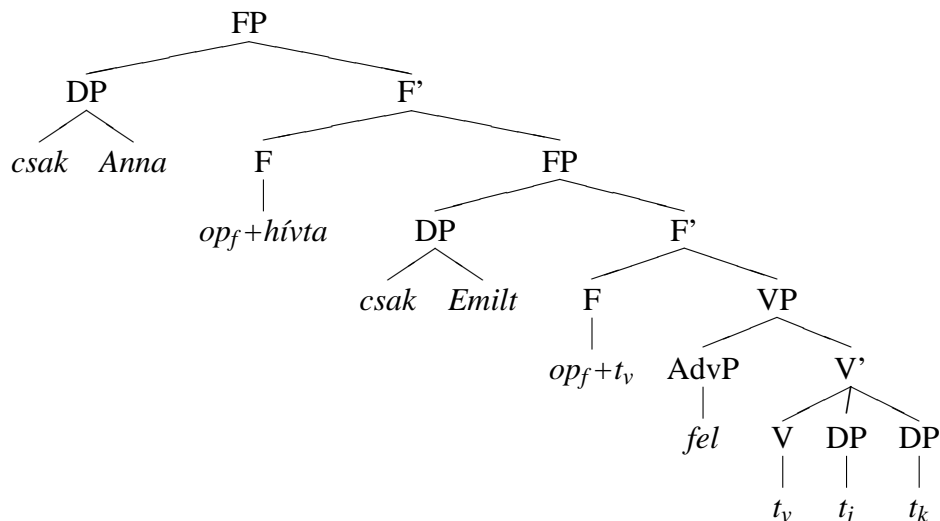
- a. Anna hívta fel Emilt.  
 H\*-L L L-H% H\*-L  $\implies$  pair-reading / \*scope-reading
- b. Anna hívta fel Emilt.  
 H\*-L L L H\*-L  $\implies$  \*pair-reading / \*scope-reading

This suggests that the scope-reading is only possible with ‘only’-phrases. We cannot even ask *Who is that, who called Emil and nobody else?* by using (39a), but we can by using (39b). Thus it seems that to express scope-meaning without ‘only’ we need a special syntactic structure.

- (39) a. \*Ki hívta fel EMILT?  
 (who called VM Emil.acc)  
 ‘Who called Emil (and nb. else)?’
- b. Ki hívta EMILT fel?  
 (who called Emil.acc VM)  
 ‘Who called Emil (and nb. else)?’

É. Kiss (1998) proposes an elegant syntactic analysis of multiple focus constructions. She claims that F(ocus)P(hrase) (Bródy 1990) iteration is possible. According to this analysis, the second focused constituent also moves to an FP position, while the verb moves to the first F-head going through the second one. This syntactic analysis supports the cases where we have semantically two focused elements, hence two focus/exhaustivity operator where the first takes scope over the second one.

- (40) Csak ANNA hívta csak EMILT meg.  
 (only Anna called only Emil.acc VM)  
 ‘Only Anna called only Emil. [the others more or nobody]’



Alberti and Medve (2000) gives a different syntactic structure for the pair-reading which they call “mirror focus” (41) construction versus the “double focus” construction from É. Kiss.

- (41) (Csak) ANNA hívta fel (csak) EMILT.  
 ((only) Anna called VM (only) Emil.acc)  
 ‘It is the Anna, Emil pair of whom the first called the second.’  
 ... [FP [VP ... t<sub>k</sub> t<sub>u</sub> XP t<sub>l</sub> ...]<sub>i</sub> [F' F+(V+V<sub>k</sub>)<sub>s</sub> [VP t<sub>s</sub> t<sub>i</sub> t<sub>u</sub> XP<sub>l</sub> ...] t<sub>i</sub>]]

The advantage of this analysis is that it assigns a different syntactic structure for the complex focus, where there is only one focus phrase and consequently only one focus/exhaustivity operator which is applied to an ordered pair of arguments. The disadvantage is that these analyses

suggest a correspondence between the readings and the structures respectively. However, the picture is not as simple as that, since it can be the case that structure (40) gets the pair reading or structure (41) gets the scope reading. Consider, for example, the following example with the same word order as in (40), but with the strong intonation pattern we can get the complex focus reading.

- (42) ANNA hívta EMILT fel.  
(Anna rescued Emil.acc VM)
- a. Anna hívta Emilt fel.  
H\*-L L-H% H\*-L L%  $\implies$  pair-reading
- b. Anna hívta Emilt fel.  
H\*-L L H\*-L L%  $\implies$  scope-reading

There are at least three factors that play a role in the interpretation of multiple focus constructions: the use of different intonation patterns, different word order and the occurrence of ‘only’.

## 5 Conclusion and further issues

The paper presented some investigations on Hungarian focus interpretation concentrating on the multiple (double) focus constructions. We saw that the interpretation of Hungarian exhaustive focus and ‘only’ is problematic for the current semantic analyses in several cases like (12b) where we have two ‘only’s but a complex focus reading; and also in the answers of singular and multiple wh-questions. On the basis of these examples we claim that exhaustivity operators and ‘only’ are distinct (in Hungarian) and ‘only’ in Hungarian has a strong pragmatic nature which goes against expectation. In section 4 we saw several linguistic considerations that give the “complex focus” or double/real multiple focus reading of multiple focus constructions. On the one hand there is a strong intonation pattern which gives the complex focus reading, but there is no one-to-one correspondence between intonation and interpretation<sup>8</sup>, since word order or the appearance of ‘only’ can modify it. Thus, the main claim is here that for the disambiguation between these two readings, intonation, syntactic structure and ‘only’ work together.

In the research on exhaustivity, ‘only’ and multiple foci, there is another important issue: the scalar reading. According to Hungarian data scalar ‘only’ and non-scalar ‘only’ behave differently in scope-relations.

- (43) Csak HÁROM FIÚ tud befogni csak ÖT CSIKÓT.  
(only three boys can hitch only five foals.acc)  
‘Only three boys can hitch only five foals.’

Example (43) allows for four possible readings in principle: 1) the first ‘only’-phrase (OP) is scalar and the second OP is non-scalar/exhaustive, 2) the first OP is scalar and the second OP scalar, 3) the first OP is exhaustive and the second OP is scalar, and 4) the first OP is exhaustive and the second OP is exhaustive. However, from these four possible readings the ones where the first ‘only’-phrase gets a scalar interpretation are ungrammatical. This suggests the following generalization: if we have two only-phrases where the first takes scope over the second one, then the first one cannot be scalar, but has to be exhaustive and distributive. However, this does not mean that scalar ‘only’-phrase cannot take wide scope. There are examples where the second focus phrase is without ‘only’, and the first focus phrase with ‘only’ can have both a scalar and non-scalar reading (with different underlying questions).

<sup>8</sup>The same conclusion is drawn by Šafářová’s (to appear) work.

**References**

- Bródy, M.: 1990, Some remarks on the focus field in hungarian, *UCL Working Papers in Linguistics* **2**.
- É. Kiss, K.: 1998, Identificational focus versus information focus, *Language* **74:2**.
- É. Kiss, K. (ed.): 1995, *Discourse Configurational Languages*, Oxford University Press, New York/Oxford.
- Groenendijk, J. and Stokhof, M.: 1984, *Studies on the Semantics of Questions and the Pragmatics of Answers*, PhD thesis, University of Amsterdam, Amsterdam.
- Groenendijk, J. and Stokhof, M.: 1991, *Partitioning Logical Space*, Annotated handout at the 2nd ESSLLI, Leuven.
- Krifka, M.: 1991, A compositional semantics for multiple focus constructions, in J. Jacobs (ed.), *Informationsstruktur und Grammatik, Sonderheft der Linguistische Berichte*.
- Lipták, A.: 2000, Multiple relatives as relatives of questions, in I. Kenesei and G. Alberti (eds), *Approaches to Hungarian 7.*, JATEPress, Szeged.
- Šafářová, M.: to appear, Nuclear rises in update semantics, in M. Aloni, A. Butler and P. Dekker (eds), *Questions in Dynamic Semantics. CRiSPI Series*, Elsevier, Amsterdam.
- Szendrői, K.: 2003, A stress-based approach to the syntax of hungarian focus, *The Linguistic Review* **20:1**.
- Zeevat, H.: to appear, Exhaustivity, questions and plurals in update semantics, in M. Aloni, A. Butler and P. Dekker (eds), *Question in Dynamic Semantics. CRiSPI Series*, Elsevier, Amsterdam.



# DOG AFTER DOG REVISITED

Sigrid Beck & Arnim von Stechow,  
Universität Tübingen

sigrid.beck@uni-tuebingen.de, arnim.stechow@uni-tuebingen.de

## Abstract

This paper presents a compositional semantic analysis of pluractional adverbial modifiers like 'dog after dog' and 'one dog after the other'. We propose a division of labour according to which much of the semantics is carried by a family of plural operators. The adverbial itself contributes a semantics that we call pseudoreciprocal.

## 1 Introduction

The topic of this paper is the semantic analysis of the sentences in (1). (1a,b) contain the adverbial modifiers 'one after the other' and 'dog after dog', respectively, which add to the simple (1') information on how the overall event of the dogs entering the room is to be divided into subevents based on a division of the group of dogs into individual dogs. We call these adverbials pluractional adverbials, following e.g. Lasersohn's (1995) use of the term pluractionality for the division of larger eventualities into subeventualities.

- (1) a. These three dogs entered the room **one after the other**.  
b. They entered the room **dog after dog**.

(1') These three dogs entered the room.

The type of situation described by (1a) (and also by (1b) if the referent of 'they' is the same as the referent of 'the three dogs') is depicted informally in (2). We will aim to derive this fact by associating with (1a,b) (roughly) the truth conditions in (3); that is, we will propose a compositional semantics for (1a,b) that derives approximately the truth conditions in (3), and (3) serves to capture our intuitions about the situations in which (1a,b) would be considered true.

- (2) a. These three dogs entered the room one after the other.  
b. D3 -> D2 -> D1  
"x -> y" = x enters the room after y

- (3) These three dogs entered the room, and the entering can be divided into a sequence of subevents in each of which one of the dogs enters, and the dogs can be divided into a sequence of individual dogs each of which entered in one of the subevents.

While we largely concentrate on the particular examples in (1), the phenomenon as such is of course more general. Other examples of reduplicative adverbials like 'dog after dog' are given in (4), and other examples of the 'one ... the other' type are provided in (5). These data were collected informally from the web.

- (4) a. This mystery offers **puzzle within puzzle**.  
b. She laid **book upon book** and built a staircase long enough to climb up and look over the wall.  
c. The Wall of Tears is a very big wall that was built, **stone over stone** by the prisoners when Isabela was a penal colony back in 1946.

- (5) a. Because life's interaction is like a series of boxes **one within the other**, ecological studies are organized in hierarchical levels  
 b. In storing textiles, rugs, or other large-sized weavings, these should never be folded and piled **one upon the other** .  
 c. My grandmother had on not just one skirt, but four, **one over the other**.

There have of course been earlier approaches to these or related phenomena. The most relevant ones to our knowledge are the following: Moltmann (1995), who proposes an analysis of 'piece by piece' adverbials; Stockall (2001), who analyses 'dog after dog' type adverbials; and Zimmermann (2002), who proposes a refinement of Stockall's analysis. Our goal in this paper is not so much to develop a compositional semantics of (1), but rather to develop such an analysis in the framework of plural predication developed in Beck (2001). The earlier proposals just mentioned do not have that aim.

We will first introduce the background on plural predication that we assume, in section 2. In section 3 we analyse the 'one ... the other' type of adverbial in this system. We take a closer look at the internal make-up of the modifier in section 4 and propose a semantics we call pseudoreciprocal. We go on to suggest that a certain kind of apparent reciprocal had better receive an analysis in terms of pseudoreciprocity. Section 5 concludes the paper.

## 2 Background

Besides individuals (type  $\langle e \rangle$ ) we use eventualities (type  $\langle v \rangle$ ). We assume that both  $D_e$  (the denotation domain of individuals - count and mass) and  $D_v$  (the denotation domain of eventualities) have a mereological structure:

- (6) For any set  $M \subseteq D_\sigma$ ,  $\Sigma M \in D_\sigma$  (Lewis, 1991)  
 where  $\sigma = e$  or  $\sigma = v$  and  $\Sigma M$  is the mereological fusion of the elements of  $M$ .
- (7)  $x+y = \Sigma\{x,y\}$   
 the fusion of those individuals that are parts of  $x$  or  $y$  or overlap with  $x$  and  $y$
- (8) a. part of relation  $\leq$ :  
 a primitive relation between individuals: antisymmetric, reflexive, transitive  
 b. overlap relation  $o$ :  
 $x o y$  iff  $\exists z[z \leq x \ \& \ z \leq y]$

We assume that basic predicates can be pluralized in order to apply to groups (or generally entities with a part-whole structure). For this purpose we use a family of operators of various types, beginning with Link's (1983) \* operator for the pluralization of  $\langle e,t \rangle$  predicates, and moving on to operators pluralizing relations (compare in particular Sternefeld (1998), also Beck (2001)). The relevant case for our present purposes is an operator \*\* that pluralizes predicates of type  $\langle e,\langle v,t \rangle \rangle$ . The pluralized relation is true of all the things that the original relation was true of, plus all the part-whole structures that can be built from them.

- (9) Cumulation operator \*\*  
 Let  $R$  be a relation of type  $\langle e,\langle v,t \rangle \rangle$ . Then  $[** R]$  is the smallest relation  $R'$  such that the conditions in (a) and (b) are satisfied.  
 (a)  $R \subseteq R'$   
 (b) for all  $\langle x,e \rangle$  and  $\langle y,e' \rangle$ :  
 If  $\langle x,e \rangle \in R'$  and  $\langle y,e' \rangle \in R'$ , then  $\langle x+y,e+e' \rangle \in R'$

We further assume that all such pluralization is sensitive to a contextually given division of entities into subparts. We concretely follow Schwarzschild (1996) who suggests that the context provides a cover of the universe of discourse (compare also once more Moltmann (1995)). The covers relevant for our purposes will all be partitions (defined in (11a). (11b,c)

define two useful bits of notation: the constraint that the cover be a partition of an entity  $x$  in (11b), and in (11c) the part of the cover that pertains to an entity  $x$ .

(10) **Cover (mereological version)**

$C$  is a cover of  $x$  iff  $C$  is a set such that  $\Sigma C = x$ .

- (11) a. A cover  $C$  is a partition iff for any  $x, y \in C$ :  $x$  and  $y$  don't overlap.  
 b. **PART(C,x)** := 1 iff  $C$  is a partition (and a cover) of  $x$ .  
 c.  $\text{Cov}[x] = \{y: y \in \text{Cov} \ \& \ \Sigma y \leq x\}$

We implement these suggestions through syntactic pluralization operations such as (12) for pluralization of type  $\langle e, \langle v, t \rangle \rangle$  predicates; (12) combines the **\*\*** operator with the requirement that the division into subparts be into the contextually relevant ones, plus the presupposition that the contextually provided cover be a partition of the entities considered.

- (12) **[[PL]]** =  $\lambda \text{Cov} . \lambda R_{\langle e, \langle v, t \rangle \rangle} . \lambda x . \lambda e : \text{PART}(\text{Cov}, e+x)$ .  
 $**[\lambda x' . \lambda e' . \text{Cov}(e') \ \& \ \text{Cov}(x') \ \& \ R(x')(e')](x)(e)$

The use of PL is illustrated in the example in (13). A predicate of type  $\langle e, \langle v, t \rangle \rangle$  is created through movement of the object NP. The PL operator together with its cover restriction is adjoined to that predicate. If the presupposition triggered by PL is met, the result will be the predicate of events in (13c). (13c) is true of an event  $e$  iff  $e$  and the cake can be divided into relevant parts  $x$  and  $e'$  that stand in the relation 'John ate  $x$  in  $e'$ '. The cake and the big event  $e$  can be divided in this way just in case (13d) is true: each relevant part of the cake was eaten by John in a relevant subevent, and each relevant subevent has John eating a relevant part of the cake in it. Thus (13a) is true of an event that can be divided into smaller events of eating parts of the cake; a sample situation would be (14).

- (13) a. John ate the cake.  
 b.  $[[\text{the cake}] [\text{PLCov} [\langle e, \langle v, t \rangle \rangle \lambda 1 [\text{John ate } t1 ]]]]$   
 c.  $\lambda e . \langle e, C \rangle \in **[\lambda x . \lambda e' . \text{Cov}(x) \ \& \ \text{Cov}(e') \ \& \ \text{J eat } x \text{ in } e']$   
 d.  $\forall x [x \leq C \ \& \ \text{Cov}(x) \rightarrow \exists e' [e' \leq e \ \& \ \text{Cov}(e') \ \& \ \text{J eat } x \text{ in } e']] \ \& \ \forall e' [e' \leq e \ \& \ \text{Cov}(e') \rightarrow \exists x [x \leq C \ \& \ \text{Cov}(x) \ \& \ \text{J eat } x \text{ in } e']]$
- (14) a.  $g(\text{Cov})[C+e] = \{c1, c2, e1, e2\}$  with  $e=e1+e2$  and  $C = c1+c2$   
 b.  $[[\text{eat}]] = \{\langle J, c1, e1 \rangle, \langle J, c2, e2 \rangle\}$

It is not obvious that such an analysis in terms of pluractionality is needed for (13). In (15), however, with the adverbial 'piece by piece', it is clear that the truth conditions of the sentence imply a division of the overall event of eating the cake into subevents depending on a division of the cake into pieces. This is reflected in the truth conditions described in (15'). The adverbial 'piece by piece' seems to be an instantiation of a version of the PL operator with a cover of the cake into pieces. We will not worry here too much about how to implement this idea; one possibility is given in (16). The resulting truth conditions (16c) correspond closely to the ones in (13c,d): (16c) is true of an event  $e$  iff  $e$  and the cake can be divided into relevant parts  $y'$  and  $e'$  such that  $y'$  is a piece and John are  $y'$  in  $e'$ . That is, each piece of the cake was eaten by John in some relevant subevent, and each relevant subevent was John eating a piece of the cake.

(15) John ate the cake piece by piece.

- (15') (15) is true of an event  $e$  iff the relevant division of the cake is into pieces, and each piece was eaten by John in a relevant subevent of  $e$ , and each relevant subevent of  $e$  is an eating of one of the pieces by John.

- (16) a. [ [the cake] [ piece by piece<sub>Cov</sub> [<sub><e,<v,t>></sub> λ2[ John ate t2 ]]] ]  
 b. [[ piece by piece<sub>Cov</sub> ] ] = λR<e,<v,t>>.λy.λe: PART(Cov,e+y).  
     \*\*[λy'.λe'.Cov(y') & Cov(e') & y' is a piece & R(y')(e')](y)(e)  
 c. λe. <e,C> ∈ \*\*[λy'.λe'.Cov(y') & Cov(e') & y' is a piece & John ate y' in e']

### 3 One after the Other

We can now return to the problem that interests us, repeated below. We approach it by first considering more standard occurrences of the modifier 'after NP' and extending their analysis to 'after the other'.

- (2) These three dogs entered the room one after the other.  
 D3 -> D2 -> D1
- (3) These three dogs entered the room, and the entering can be divided into a sequence of subevents in each of which one of the dogs enters, and the dogs can be divided into a sequence of individual dogs each of which entered in one of the subevents.

#### 3.1 The Modifier 'after NP'

Our baseline will be the contribution of 'after NP' suggested in (17') for (17). This leads to the semantics in (17'') for 'after Katie': it modifies a relation of type <e,<v,t>> and adds the information that the relation held between Katie and the immediately preceding event. We rely on the notion of the relevant predecessor of an event, which is the event whose running time is immediately before the running time of the event considered.

- (17) Min entered the room (immediately) after Katie.  
 (17') λe. Min enters the room in e & Katie enters the room in pred(e)  
 pred(e): the immediate predecessor of e  
 (17'') [[after Katie]] = λR<e,<v,t>>.λx.λe.R(x)(e) & R(Katie)(pred(e))

- (18) pred(e) = 1e': τ(e') < τ(e) & ∀e''[τ(e'') < τ(e) -> e'' = e' or τ(e'') < τ(e')]

A generalized version of this idea is given in (19) and (20). There is an ordering relation on events based on temporal precedence. We can identify the predecessor according to that order.

- (19) **ordering relation on events:**  
 e is before e': e < e' iff τ(e) < τ(e')
- (20) **the immediate predecessor of e:**  
 pred(e) = 1e': e' < e & ∀e''[e'' < e -> e'' = e' or e'' < e']

#### 3.2 The 'Other' Dog

The instance of the 'after'-modifier that we are confronted with is 'after the other'. The key to our analysis of pluractional 'one after the other' lies in our understanding of the meaning of 'the other' in this construction. We suggest that for each dog, the relevant other dog is always the immediately preceding one. That is, we propose that there is an ordering on the individuals that is derived from the ordering of events, as in (21). The predecessor of an individual can be defined on the basis of that derived order.

- (21) **ordering relation on individuals:**  
 $x \angle y$  iff  $\exists e[x \text{ is in } e \text{ and } \forall e'[y \text{ is in } e' \rightarrow e \angle e']]$   
 $x$  is before  $y$  iff  $x$  occurs in a relevant event before  $y$  does

- (22) **the immediate predecessor of  $x$ :**  
 $\text{pred}(x) = \iota y: y \angle x \ \& \ \forall z [z \angle x \rightarrow z = y \text{ or } z \angle y]$

Finding the predecessor for each dog requires that the dogs can successfully be ordered into a sequence. (23) defines the notion of sequence: the cover has to have this property so that its members can be ordered. In our example, we would have (24).

- (23) **Cov[x] is a sequence** iff  
 $\text{Cov}[x] = \{x_1, \dots, x_n\}$  and for any  $x_i, x_{i+1}: x_i \angle x_{i+1}$
- (24)  $\text{Cov}[e] = \{e_1, \dots, e_n\}$  such that for any  $e_i, e_{i+1}: e_i \angle e_{i+1}$   
 $\text{Cov}[\text{these 3 dogs}] = \{x_1, \dots, x_n\}$  such that for any  $x_i, x_{i+1} x_i \angle x_{i+1} := \{D1, D2, D3\}$

If the appropriate sequence is given, then the truth conditions of our example (1) can be stated as in (25) below. From (25a) we get (25b). The overall truth conditions we propose are paraphrased in (26).

- (25) a.  $\langle 3D, e \rangle \in **[\lambda x. \lambda e'. \text{Cov}(x) \ \& \ \text{Cov}(e') \ \& \ x \text{ enters the room in } e' \ \& \ \text{pred}(x) \text{ enters the room in } \text{pred}(e')]$   
b.  $\forall x [x \leq 3D \ \& \ \text{Cov}(x) \rightarrow \exists e' [e' \leq e \ \& \ \text{Cov}(e') \ \& \ x \text{ enters the room in } e' \ \& \ \text{pred}(x) \text{ enters the room in } \text{pred}(e')]] \ \& \ \forall e' [e' \leq e \ \& \ \text{Cov}(e') \rightarrow \exists x [x \leq 3D \ \& \ \text{Cov}(x) \ \& \ x \text{ enters the room in } e' \ \& \ \text{pred}(x) \text{ enters the room in } \text{pred}(e')]]]$
- (26)  $e$  can be divided into a sequence of subevents, and the three dogs can be divided into a sequence of individual dogs, such that each dog entered the room in a relevant subevent, and its predecessor entered in the preceding subevent, and each subevent was one of one of the dogs entering, and the preceding event was one of the predecessor of that dog entering.

These truth conditions can be derived straightforwardly from the Logical Form in (27). The subject is raised, with the movement binding an anaphor contained in the NP 'the other'; the relevant pluralization operator is attached to the modified relation (the predicate created by the movement). We propose a version of our PL operator that incorporates the constraint on the cover that the cover of the relevant entity and event be a sequence. And we suggest a semantics for the modifier 'one after the other' that is essentially a combination of what we found out about 'after NP' in (17") and the idea that the NP here contributes, for each dog, the predecessor of that dog. With this, (27) will give rise to the truth conditions in (26).

- (27) these 3 dogs [ $\text{PL}^{\text{seq}}\text{Cov} \ \lambda x [\langle v, t \rangle x [\langle e, \langle v, t \rangle \rangle \text{ entered the room}] [\text{one after the other } x]]]$   
|\_\_\_\_\_ QR \_\_\_\_\_| anaphor

- (28)  $[[\text{one after the other } x]]g = \lambda R. \lambda y. \lambda e. R(y)(e) \ \& \ R(\text{pred}(g(x)))(\text{pred}(e))$

- (29)  $[[\text{PL}^{\text{seq}}\text{Cov}]] = \lambda R. \lambda z. \lambda e. \text{Cov}[e] \text{ is a sequence and } \text{Cov}[z] \text{ is a sequence} \ \& \ **[\lambda z'. \lambda e'. \text{Cov}(z') \ \& \ \text{Cov}(e') \ \& \ R(z')(e')](z)(e)$

### 3.3 The First Dog

The observant reader will no doubt have noticed that the truth conditions in (26) suffer from a problem: We require that for each dog, that dog enter after its predecessor. But the first dog in the sequence does not have a predecessor. So (26) as such could never be true.

We propose to embrace this prediction - so our compositional semantics will derive these truth conditions. There must then be a pragmatic process that allows us to ignore the first dog, and thus makes it possible for (26) to be true. We suggest that essentially the same process is at work in (30) and (31) below. In (31) for instance, we must subtract Arnim from the domain of quantification and understand 'everyone' to mean here 'everyone but Arnim'; else the sentence could never be true. Likewise we subtract the first sentry in the row from the domain that 'each' quantifies over.

- (30) 20 Wachposten sind so in einer Reihe aufgestellt, dass jeder den vorherigen sehen kann.  
20 sentries are standing in a row such that each can see the one before him.

- (31) Everyone has a faster computer than Arnim.

Thus we think that it is generally possible to reinterpret a quantificational statement that could not come out true by subtracting the problematic individual from the domain of quantification. This process will also have to apply to our examples in (1).

### 3.4 Similar Cases: One above/within the Other

In this subsection, we indicate how the analysis proposed for 'one after the other' extends to similar instances of pluractional adverbials with different prepositions. Some examples are given below. We will focus on (32a) with 'above'.

- (32) a. These three children sleep one above/ next to the other.  
b. She laid the books bundle beside/ upon bundle on the porch.

Our starting point is once more a regular occurrence of the modifier, (33a). The semantics in (33b) leads to the meaning in (34) for the modifier. Like our earlier example 'after NP', the PP modifies a relation. In this case, this is a relation between an individual and a place. It adds to the original relation the information that the relation also holds between the referent of the NP and the relevant preceding place, which is the place immediately below.

- (33) a. Hans sleeps above Fritz.  
b.  $\lambda p$ . Hans sleeps at p & Fritz sleeps at bel(p)  
bel(p) = the place immediately below p
- (34)  $[[\text{above Fritz}]] = \lambda R. \lambda x. \lambda p. R(x)(p) \ \& \ R(\text{Fritz})(\text{bel}(p))$

Once more, then, we have an ordering relation, this time based on the meaning of the preposition 'above'. A place is smaller than another one according to that ordering if it is below it. We then also have the notion of the immediately preceding place.

- (35) **ordering relation on places:**

$p \angle p'$  iff p is below p'

- (36) **the immediate predecessor of p:**

$\text{bel}(p) = \iota p': p \angle p \ \& \ \forall p'' [p'' \angle p \rightarrow p'' = p' \ \text{or} \ p'' \angle p']$

In order to find a denotation for the NP 'the other' in the pluractional adverbial 'one above the other', we again suppose that there is a derived ordering of individuals based on the one of places (as defined in (37)), which will permit us to define the predecessor of an individual according to the scale introduced by 'above' (cf. (38)).

(37) **ordering relation on individuals:**

$$x \angle y \text{ iff } \exists p[x \text{ is in } p \text{ and } \forall p''[y \text{ is in } p'' \rightarrow p \angle p'']]$$

$x$  is below  $y$  iff  $x$  is in a place that is below any place that  $y$  is in.

(38) **the immediate predecessor of  $x$** 

$$\text{bel}(x) = \iota y: y \angle x \ \& \ \forall z [z \angle x \rightarrow z=y \text{ or } z \angle y]$$

The rest of the analysis is quite parallel to the analysis of the 'after' example. We must be able to divide both the place and the plural individual into a sequence. Given that, we propose the analysis in terms of the \*\* in (40) which amounts to the truth conditions in (41). The resulting truth conditions are described roughly in (42).

(39)  $\text{Cov}[p] = \{p_1, \dots, p_n\}$  such that for any  $p_i, p_{i+1}: p_i \angle p_{i+1}$

$\text{Cov}[\text{these 3 children}] = \{x_1, \dots, x_n\}$  such that for any  $x_i, x_{i+1}: x_i \angle x_{i+1}$

(40)  $\langle 3C, p \rangle \in **[\lambda x. \lambda p'. \text{Cov}(x) \ \& \ \text{Cov}(p') \ \& \ x \text{ sleeps in } p' \ \& \ \text{bel}(x) \text{ sleeps in } \text{bel}(p')]$

(41)  $\forall x [x \leq 3C \ \& \ \text{Cov}(x) \rightarrow$

$$\exists p' [p' \leq p \ \& \ \text{Cov}(p') \ \& \ x \text{ sleeps in } p' \ \& \ \text{bel}(x) \text{ sleeps in } \text{bel}(p')]] \ \&$$

$$\forall p' [p' \leq p \ \& \ \text{Cov}(p') \rightarrow$$

$$\exists x [x \leq 3C \ \& \ \text{Cov}(x) \ \& \ x \text{ sleeps in } p' \ \& \ \text{bel}(x) \text{ sleeps in } \text{bel}(p')]]$$

(42) The place  $p$  can be divided into a sequence of subplaces,  
and the three children can be divided into a sequence of individual children such that:  
each child sleeps above the one immediately below,  
and each place has a child sleeping in it (...).

The compositional derivation of these truth conditions is based on the Logical Form in (43) and uses the PL operator in (44) - the same one as before adapted to talk about places instead of events.

(43) these 3 children  $[\text{PL}^{\text{seq}}_{\text{Cov}} \lambda x [x [ [ \text{sleep} ] [ \text{one above the other } x ] ]]$

(44)  $[[ \text{PL}^{\text{seq}}_{\text{Cov}} ]] = \lambda R. \lambda z. \lambda p. \text{Cov}[p]$  is a sequence and  $\text{Cov}[z]$  is a sequence &  
 $**[\lambda z'. \lambda p'. \text{Cov}(z') \ \& \ \text{Cov}(p') \ \& \ R(z')(p')](z)(p)$

Other prepositions occurring in the structure 'one Preposition the other' would give rise to different orderings, but be otherwise parallel to the examples discussed.

## 4 Pseudoreciprocity

In this section we will take a closer look at the internal structure of the modifier 'one...the other' and propose a more detailed analysis. We then extend that analysis to certain cases of apparent reciprocals, namely Dalrymple et al.'s (1998) Inclusive Alternative Ordering reciprocals.

### 4.1 Pseudoreciprocal 'One ... the Other'

The overt material in (45a) suggests an internal structure of the modifier as in (45b). We assume that in addition there is covert structure in the form of the anaphor  $x$  and a contextually given relation that will constrain us to the relevant other individual. A hidden anaphor in the expression 'other' has been suggested e.g. in Heim et al. (1991) on the basis of data like (46): 'another' here means 'a shirt different from this shirt'. The expression 'another'

thus includes an anaphoric reference to 'this shirt'. The difference between (46) and our data (as well as reciprocal pronouns) is that the anaphor is bound in the latter case.

- (45) a. The dogs entered the room one after the other.  
 b. [one [ after [ the [other]]]]  
 c. [one [ after [ the [ R other x ]]]]

(46) I don't like this shirt, bring me another.

In (47) we recall the desired semantics for 'the other', argued for in the previous section. We can achieve this result if the hidden relation variable is assigned by the context the value in (48a) (this must come from the preposition), and compositional interpretation proceeds as in (48b). We end up with the meaning 'that y which is not x and immediately precedes x' - the predecessor of x according to the 'after' relation.

- (47)  $\llbracket \text{the R other } x \rrbracket^g = \text{pred}(g(x))$   
 $= \lambda y: y \text{ immediately precedes } g(x)$   
 $= \lambda y: y \angle g(x) \ \& \ \forall z [z \angle g(x) \rightarrow z=y \text{ or } z \angle y]$

- (48) a.  $g(R) = \text{immediately precede}$   
 b.  $\llbracket [ \text{the } [NP \langle e,t \rangle [ \langle e, \langle e,t \rangle R \text{ other} ] x ] ] \rrbracket^g$   
 $= \lambda y: y \neq g(x) \ \& \ g(R)(g(x))(y) = \text{pred}(g(x))$

The referential NP needs to combine with 'after' in the same way as the referential NP 'Katie' would in the simpler case, repeated in (49). The 'after' from (50b) is combined with the meaning of 'the other' in (51). The actual modifier we see also includes 'one'. We propose that that provides an additional constraint on the individual argument of the relation, namely that that be a singular individual. The meaning of 'one after the other' is then as in (52).

- (49) a. Min entered the room after Katie.  
 b.  $\lambda e. \text{Min enters the room in } e \ \& \ \text{Katie enters the room in } \text{pred}(e)$

- (50) a.  $\llbracket \text{after Katie} \rrbracket = \lambda P. \lambda x. \lambda e. P(x)(e) \ \& \ P(\text{Katie})(\text{pred}(e))$   
 b.  $\llbracket \text{after} \rrbracket = \lambda z. \lambda P. \lambda x. \lambda e. P(x)(e) \ \& \ P(z)(\text{pred}(e))$

- (51)  $\llbracket \text{after the R other } x \rrbracket^g = \lambda P. \lambda y. \lambda e. P(y)(e) \ \& \ P(\text{pred}(g(x)))(\text{pred}(e))$

- (52)  $\llbracket \text{one after the R other } x \rrbracket^g = \lambda P. \lambda y. \lambda e. P(y)(e) \ \& \ \text{one}(y) \ \& \ P(\text{pred}(g(x)))(\text{pred}(e))$

We believe that (53a,b) are equivalent. Hence we suggest that the two modifiers make the same semantic contribution. One way to derive this would be to have an underlying form (54a) from which both are derived as different surface forms.

- (53) a. She washed them dog after dog.  
 b. She washed them one (dog) after the other.

- (54) a. one dog after the other dog  
 b. one ~~dog~~ after the other ~~dog~~  
 c. ~~one~~ dog after ~~the other~~ dog

It is relatively obvious how to derive 'one after the other' from (54a), namely, through a process of N-deletion. This is not obligatory, at least not for the first N to be deleted, cf. (55). (It is far less obvious how (54c) would be derived, and in fact some issues remain open regarding the internal structure that might suggest that one would not always trace reduplicative adverbials to the same source as 'one ... the other' adverbials. We will put this aside for the moment.)



- (55) a. She put the books one bundle beside the other (bundle) on the porch.  
 b. She examined the wine one bottle after the other (bottle).

The above considerations lead to a final revision for the internal semantics of the modifier which yields (56): we add the information that the relevant predecessor as well as the individual argument of the relation are Ns.

- (56) a.  $\llbracket \llbracket \text{the} \llbracket \llbracket \text{R other} \rrbracket x \rrbracket \text{N} \rrbracket \rrbracket^g =$   
 $\iota y: y \neq g(x) \ \& \ g(\text{R})(g(x))(y) \ \& \ \llbracket \text{N} \rrbracket (y) = \text{pred}(g(x))$   
 b.  $\llbracket \llbracket \text{one N after} \llbracket \text{the R other } x \text{ N} \rrbracket \rrbracket \rrbracket^g =$   
 $\lambda P. \lambda y. \lambda e. P(y)(e) \ \& \ \text{one}(y) \ \& \ \llbracket \text{N} \rrbracket (y) \ \& \ P(\text{pred}(g(x)))(\text{pred}(e))$

We call these modifiers pseudoreciprocal. They are reminiscent of reciprocals formally in the use of 'other', and semantically in talking about a different member of the same group. But they are not reciprocal pronouns formally. Moreover, the NP in the modifier is a singular. By contrast, a reciprocal pronoun introduces a second plurality of individuals (Beck (2001)).

## 4.2 IAO Reciprocals as Pseudoreciprocals

Finally, we will explore the possibility of extending our analysis of pseudoreciprocals to certain apparent reciprocals, namely those that have an Inclusive Alternative Ordering (IAO) interpretation. Some examples of such reciprocals are given in (57). The interpretation of (57a) according to Dalrymple et al. is paraphrased in (58). The general schema of an IAO interpretation is given in (59). The data in (57) are all taken to have such a weak semantics.

- (57) a. The children sleep above each other.  
 b. The three dogs came into the room after one another /  
 The three dogs followed each other into the room.

(58) **IAO:** Each child sleeps above or below some other child.

- (59) a. Schema of an elementary reciprocal sentence:  

A	R	each other.
antecedent	relation	reciprocal pronoun

 b. IAO:  $\forall x[x \leq A \rightarrow \exists y[y \leq A \ \& \ xRy \ \text{or} \ yRx]]$

We suggest instead that the data in (57) (and IAO reciprocals in general) have a pseudoreciprocal semantics. That is, (57a) really amounts to (60a). The semantics we assign to (60a), and by assumption then also to (57a), entails (60b).

- (60) a. The children sleep one above the other.  
 b. Each child sleeps above some other child  
 (namely, her "predecessor" relative to the 'below'- relation).

Why do we pursue this idea? There are three kinds of facts that motivate us. The first is that the IAO truth conditions are very weak indeed, and intuitively too weak for example for (57b). The IAO truth conditions for (57b) are given in (61a). These truth conditions predict the sentence to be true in the situation depicted in (61b). This doesn't accord with intuitions. By contrast, our truth conditions will render (57b) equivalent to (61c) and correctly predict that the sentence is false in a situation like (61b).

- (61) a. Each dog came into the room after or before some other dog.  
 b.  $D3+D2 \rightarrow D1$   
 c. The dogs entered the room one after the other.

A second problem for IAO reciprocals is the fact that an IAO interpretation is only possible with a restricted set of relations. See Beck (2001) and references therein for discussion. As an illustration, notice that (62a) with the relation 'on top of' is acceptable under an IAO interpretation while (62b) with 'outnumber' is unacceptable and cannot have an IAO reading (which would be made true by the fact that the Smiths are more numerous than the Johnsons, for instance). If IAO were a regular interpretation for reciprocal sentences, why should it not be generally available?

- (62) a. The plates are stacked on top of each other.  
 b. \* The Smiths and the Johnsons outnumber each other.

A third and final problem with IAO is noted in Beck (2001): IAO reciprocals are restricted to local reciprocal relations while other reciprocals are not. To illustrate what is meant by a non-local reciprocal relation, consider (63). The sentence is judged true if (63'a) is the case. This can be derived from the truth conditions in (63'b): the reciprocal relation 'want to kill' holds between non-identical members of the antecedent group 'Tracy and Joe'. (63) is an example of a regular reciprocal interpretation, weak reciprocity. The reciprocal relation 'want to kill' is non-local in that it is not a relation that exists as the meaning of a surface constituent.

- (63) Tracy and Joe want to kill each other.  
 (63') a. Tracy wants to kill Joe and Joe wants to kill Tracy.  
 b.  $\langle T \& J, T \& J \rangle \in **\lambda x \lambda y: x \neq y. x \text{ wants to kill } y]$

We should contrast (63) with (64). The sentence can be understood as in (65) - Tracy and Joe agree that they want to sleep above each other rather than, say, beside each other. It cannot be understood as in (66), which would be made true by the fact that Tracy wants to sleep above Joe. (66) would be a non-local IAO interpretation with the reciprocal relation 'want to sleep above'. Clearly, this is not possible. Only a local reading inside the embedded clause in (65) is acceptable.

- (64) Tracy and Joe want to sleep above each other.  
 (65) Tracy and Joe both have the following desire: we sleep above each other.  
 (66) For each  $x$ ,  $x$  one of Tracy and Joe: either  $x$  wants to sleep above the other one of Tracy and Joe, or the other one of Tracy and Joe wants to sleep above  $x$ .

The pair in (67) makes the same point: in (67a) a non-local interpretation is possible in which the different members of the antecedent group 'these people' were introduced by different linguists. A similar interpretation is not available in (67b); the same apprentice magician has to line up the glasses.

- (67) a. These people were introduced to each other by a linguist.  
 b. The glasses were lined up behind each other by an apprentice magician.

The two constraints on the availability of IAO interpretations (limited set of relations, and local interpretation only) are quite unexpected as long as one thinks of IAO as a regularly available interpretation of reciprocal pronouns. This is additional motivation then, besides the problem mentioned above with inappropriately weak truth conditions, for looking for an alternative analysis of the phenomenon of IAO. We propose that IAO reciprocals only appear to be reciprocals, and are really pseudoreciprocals:

- (68) above each other  $\implies$  (one) above the other

That is, the example in (69a) should really be interpreted as (69b).

- (69) a. Tracy and Joe want to sleep above each other.  
 b. Tracy and Joe want to sleep one above the other.

The truth conditions we predict are the ones of pseudoreciprocal, which seems right to us. As for the unexpected constraints on the relations that participate in an IAO interpretation, we have nothing concrete to offer. One may suppose that whatever process relates (69a) and (69b) is somehow restricted and cannot apply to every relation. For all we know, the connection may be lexical. But no concrete predictions arise regarding which relations can participate.

We do have something to say about the fact that apparent IAO reciprocals - now reanalysed as pseudoreciprocal - only receive a local interpretation. In (64)=(69), for instance, the whole '(one) above the other' is an adverbial that can only modify the embedded predicate 'sleep' (wishes cannot plausibly be above each other). And since there is no further potentially scope bearing element in this modifier ('the other' being a singular), there is no process that could generate a non-local interpretation.

A final comment: there are cases of IAO reciprocals for which our pseudoreciprocal truth conditions might be thought too strong. (70b) is a case in point. Dalrymple et al. point out that such a sentence can be considered true in a situation with two bunk beds each of which sleeps two children. This is different from (70a), our pseudoreciprocal. We speculate that (70b) permits a partition of the children into two groups of two, on which its interpretation with the bunk beds is based. This is excluded by the overt element 'one' in (70a) which tells us that the partition of the children is into singletons.

- (70) a. These four children sleep one above the other.  
 b. These four children sleep above each other.

## 5 Conclusions

To summarize, we subscribe to the view that all pluralization is sensitive to a division of pluralities into appropriate subparts. Pluractionals make this visible; in our cases with 'piece by piece' and 'dog after dog', they tell us which units are contained in the cover. They also show that natural language has pluralization of  $\langle e, \langle v, t \rangle \rangle$  predicates, i.e. simultaneous pluralization of an event- and an individual-argument slot. Adverbials 'one ... the other' are a case of such pluractionals which gives rise to a sequence interpretation that we have called pseudoreciprocal.

If IAO reciprocals are reanalyzed as pseudoreciprocal (i.e. pluractional 'one ... the other'), this may explain some peculiarities that otherwise set apart IAO reciprocals from better behaved reciprocals. Pseudoreciprocal would be different from regular reciprocals in not introducing a plurality of type  $\langle e \rangle$ . Rather, they are a modifier containing a singular 'the other' NP.

Let us also point out what is still missing from the discussion here. One caveat is empirical. Not all 'Noun Preposition Noun' modifiers share the pseudoreciprocal semantics proposed here for 'one ... the other'. One ought to relate the semantic contribution of modifiers like 'leaf by leaf', 'two and two', 'side by side' to our pluractionals.

The other omission is a detailed comparison of our analysis to related proposals. Let us briefly explain how we perceive the relation of our analysis to Moltmann (1995) on the one hand and Stockall/Zimmermann on the other. Moltmann suggests a semantics for pluractional 'one at a time' (extendable to 'piece by piece'-type adverbials) which is based on simultaneous division of events into subevents and entities into subparts. She thus anticipates this aspect of our analysis. It is, however, embedded into a different architecture, in that her views of the syntax-semantics interface and pluralization operations in particular, are incompatible with

our own. The same is true of Stockall/Zimmermann's analysis of 'dog after dog'. Like Moltmann, they hold the adverbial itself and/or its composition within its local structure responsible for all of the specific semantics of the construction. Our analysis has been guided by the idea that we have a system of plural predication in place independently which includes plural operators of various types plus a restriction on relevant part-whole structures. Thus the adverbial has a very slim semantics, with much of the burden to be carried by the pluralization operation. A more thorough discussion that includes an empirical comparison with other works must wait until a future occasion.

## References

- Beck, Sigrid. 2001. Reciprocals are Definites. *Natural Language Semantics* 9:69-138.
- Dalrymple, Mary et al. 1998. Reciprocal Expressions and the Concept of Reciprocity. *Linguistics and Philosophy* 21:159-210.
- Fiengo, R., and Lasnik, H. 1973. The Logical Structure of Reciprocal Sentences in English. *Foundations of Language* 9:447-468.
- Heim, Irene, Lasnik, Howard, and May, Robert. 1991. On "Reciprocal Scope". *Linguistic Inquiry* 22:173-192.
- Lasersohn, P. 1995. *Plurality, Conjunction and Events*. Boston: Kluwer Academic Publishers.
- Lewis, David. 1991. *Parts of Classes*. Oxford: Basil Blackwell.
- Link, G. 1983. The Logical Analysis of Plurals and Mass Terms: A Lattice-Theoretical Approach. In *Meaning, Use, and Interpretation of Language*, eds. R. Bäuerle, C. Schwarze and A. v. Stechow, 302-323. Berlin: de Gruyter.
- Moltmann, Friederike. 1995. *Parts and Wholes in Semantics*. Oxford: Oxford University Press.
- Schwarzschild, R. 1996. *Pluralities: Studies in Linguistics and Philosophy*. Dordrecht: Kluwer.
- Sternefeld, Wolfgang. 1998. Reciprocity and Cumulative Predication. *Natural Language Semantics*: 303-337.
- Stockall, L. 2001. Pluriactionality and Prepositions in Germanic. The Syntax and Semantics of [NP-P-NP]s. In *ConSole X*. Leyden.
- Zimmermann, Malte. 2002. Boys Buying Two Sausages Each. On the Syntax and Semantics of Distance-Distributivity, Universiteit van Amsterdam: Dissertation.

# TEMPORAL AND PROPOSITIONAL DE SE: EVIDENCE FROM ROMANIAN SUBJUNCTIVE MOOD<sup>1</sup>

Adrian Brasoveanu,  
Rutgers University and University of Frankfurt

abrsvn@eden.rutgers.edu

## Abstract

The paper investigates the interpretation of the Romanian subjunctive B (subjB) mood when it is embedded under the propositional attitude verb *crede* (believe). SubjB is analyzed as a single package of three distinct presuppositions: temporal *de se*, dissociation and propositional *de se*. I show that subjB is the temporal analogue of null PRO in the individual domain: it allows only for a *de se* reading. Dissociation enables us to show that subjB always takes scope over a negation embedded in a belief report. Propositional *de se* derives this empirical generalization. The introduction of centered propositions (generalizing centered worlds), together with propositional *de se*, dissociation and the belief 'introspection' principles, derives the fact that subjB belief reports (unlike their indicative counterparts) are infelicitous with embedded *probabil*.

## 1 Introduction

This paper is a systematic exploration of the interpretation of the Romanian subjunctive B mood when it is embedded under the propositional attitude verb *crede* (believe)<sup>2</sup>. Subjunctive B – traditionally labeled 'conditional-optative' – is one of the two subjunctive (i.e. non-indicative finite) moods in Romanian. As the example in (1) below shows, it is morphologically realized as an auxiliary verb that agrees in person and number with the subject.

- (1) Maria crede                      că    ar              fi în pericol.  
Mary believe.ind.pres.3s that subjB.3s be in danger.  
Mary believes that she is in danger.

I analyze subjunctive B as a bundle of three distinct presuppositions: (a) temporal *de se*, (b) dissociation and (c) propositional *de se*. Consider example (1) above: temporal *de se* means that the reported belief of being in danger is temporally located at the *internal now* of the believer, i.e. at the time which Mary (correctly or not) takes her 'present' to be. Dissociation basically means that the speaker dissociates herself from the reported belief, i.e. as far as the

---

<sup>1</sup> **Acknowledgements:** I am greatly indebted to Maria Bittner, Sam Cumming, Hans Kamp, Oana Săvescu-Ciucivara, Roger Schwarzschild, Adam Sennet, Magdalena Schwager, Matthew Stone and Ede Zimmermann for extensive discussion of the issues addressed here. I want to thank the *Sinn und Bedeutung 10* abstract reviewer(s) for their very helpful comments. I am also indebted to the following people for discussion: Agnes Bende-Farkas, Alexandra Cornilescu, Veneeta Dayal, Carmen Dobrovie-Sorin, Donka Farkas, Kai von Fintel, Jane Grimshaw, Nathan Klinedinst, Angelika Kratzer, Cécile Meier, Jessica Rett, Uli Sauerland, Oana Săvescu-Ciucivara, Philippe Schlenker, Ted Sider, Satoshi Tomioka, Violeta Vazquez-Rojas Maldonado, Hong Zhou, Eytan Zweig and the *SURGE* (Sept. 2005), *GK Frankfurt Colloquium* (Oct. 2005) and *Sinn und Bedeutung 10* (Oct. 2005) audiences. I want to thank Carmen Dobrovie-Sorin, Andreea Grigorean, Simona Herdan, Mihai Ignat, Cristian Lupu and Oana Săvescu-Ciucivara for the Romanian judgments and Sam Cumming, Jessica Rett, Roger Schwarzschild and Adam Sennet for the English judgments. The support of a DAAD grant during the last stages of this investigation is gratefully acknowledged. The usual disclaimers apply.

<sup>2</sup> There seem to be dialectal differences in the use of subjB with the verb *crede*: one of the native speakers I have consulted does not readily accept sentences like (1) above.

speaker is concerned, it could be the case that Mary is *not* in danger, even though Mary herself thinks that she is.

Finally, propositional *de se* means that the believer has an attitude towards a 'self-referential' kind of content similar to the self-referential experience contents proposed by Searle (1983)<sup>3</sup>. For example, the content of my visual experience of seeing a yellow station wagon is that: (a) there is a yellow station wagon there and (b) the fact that there is a yellow station wagon there is causing *this* very visual experience. This 'self-referentiality' is the expression of the common sense intuition that having an experience or an attitude is assuming a particular point of view / perspective on the content of the experience or of the attitude.

Intuitively, a belief report with subjunctive B mood is propositionally *de se* insofar it *explicitly* encodes in the believed content this *perspectival* component inherent in any attitude; the form of such a report is basically: *x* has a belief *p* that the embedded clause is true *and x's belief p is such that the proposition expressed by the embedded clause is true in any world w in p*. This makes a subjunctive B report 'self-referential' in Searle's sense and also redundant, since the commitment of the attitude holder to the proposition expressed by the embedded clause is stated twice. However, the redundancy is crucial in deriving two unexpected empirical generalizations: (a) if the believed proposition has a negative form, e.g. *x believes that not q*, then subjunctive B has to have wide-scope with respect to negation; this is a consequence of the fact that, on the narrow-scope reading, the subjunctive B report is contradictory: it has the form *x believes that not q (on the one hand) and q is what x believes (on the other hand)*; (b) moreover, subjunctive B reports with *probabil* (probably) of the form *x believes that probably q* are not felicitous, unlike their indicative counterparts; this is due to the fact that subjunctive B requires complete commitment to proposition *q*, while *probably* implicates that there is at most a partial commitment.

The structure of the paper is the following. In section 2, I argue that the contrast between indicative and subjunctive B in Romanian is parallel to the contrast between overt pronouns (e.g. *John hopes that he will win*) and null PRO (e.g. *John hopes to win*) in the individual domain. As Chierchia (1989) and Schlenker (2003) observe, overt pronouns are compatible with both the *de se* and non-*de se* readings, while null PRO allows only for a *de se* reading. The proposal is that subjunctive B is parallel to PRO in that it requires a temporally *de se* reading, while indicative is parallel to overt pronouns because it can, but does not have to receive such a reading.

In section 3, I expand on the brief observation in Farkas (1992) that subjunctive B has a dissociation component. I argue that dissociation is a *presupposition* (as opposed to e.g. a conventional implicature) based on its projection behavior in negative contexts and 'stacked' attitude reports of the form *x wants y to believe that p*. I end the section with the generalization that sets the stage for propositional *de se*: subjunctive B always has wide-scope with respect to an embedded negation, e.g. in belief reports of the form *x believes that not p*, the speaker always dissociates herself from *not p* and never from *p*, despite the fact that, on the surface, the subjunctive B morpheme is always placed between *not* and *p*.

Section 4 proposes a semantic solution to the wide-scope problem (as opposed to syntactically stipulating the wide-scope and attempting to justify the syntactic assumption on independent grounds): subjunctive B is propositional *de se* in the sense suggested above. This solution extends the *de se* vs. non-*de se* contrast between subjunctive B and indicative from the temporal to the modal domain and thus makes for an attractive overall analysis: we extend the parallel between pronouns, tenses and moods, pursued in Partee (1973), Abusch (1997), Stone (1999) and Schlenker (2003) among others, to *de se* readings. The propositional *de se* hypothesis also derives the incompatibility between subjB and *probably* if we assume the

<sup>3</sup> Matthew Stone suggested this parallel (p.c.).

belief introspection principles<sup>4</sup>, which effectively reduce iterated belief ( $x$  believes that  $x$  believes that  $p$ ) to non-iterated belief ( $x$  believes that  $p$ ).

The concluding section 5 briefly discusses whether the three components of the subjunctive B interpretation are independent.

## 2 Subjunctive B as temporal *de se*

In this section, I first review *de se* and *de re* beliefs in the individual domain and sketch the way Lewis (1979) analyzes them. In particular, I focus on the contrast between overt pronouns and null PRO in non-*de se* 'mistaken identity' scenarios, which was noticed in Chierchia (1989) and Schlenker (2003) among others (2.1). Based on a 'mistaken temporal identity' scenario, I establish that the Romanian subjunctive B mood has to be interpreted temporally *de se*, just like PRO has to be interpreted individually *de se* (2.2).

### 2.1 *De se* and *de re* belief in the individual domain

The Kaplanian sentence in (2) below can receive two distinct interpretations.

(2) Neo believes that his pants are on fire.

Under the first – *de se* – interpretation, Neo is saying to himself "My pants are on fire" and he is therefore very likely to run for the fire extinguisher.

To see the second – non-*de se* – interpretation, consider the following scenario: Neo is looking in a mirror without realizing it. He is seeing a man whose pants are on fire, which is in fact Neo himself, but he does not realize that either; (2) can be truthfully asserted in this situation, but it receives a different interpretation, as witnessed by Neo's possibly different behavior: if Neo is in a particularly mean mood, he might very well just stand there and enjoy the show (at least until the situation gets hot enough for him to realize his misunderstanding).

Under the *de se* interpretation, (2) reports Neo's belief that someone's pants are on fire, where that someone is the *belief-internal self*, i.e. whoever Neo takes himself to be. Under the non-*de se* (but *de re*) interpretation, (2) reports Neo's belief that *someone's* pants are on fire, where that someone is *the guy that Neo is looking at*, whoever that may be.

The analysis of *de se* and *de re* belief in Lewis (1979) involves three ingredients: (a) *centered worlds*: the believed content is not a proposition, i.e. a set of worlds (as the standard analysis would have it<sup>5</sup>), but a property, or, equivalently, a set of centered worlds<sup>6</sup>; a centered world is a pair  $(w, x^{self})$ , where  $w$  is a world and  $x^{self}$ , the center of world  $w$ , is the unique individual that Neo takes himself to be in  $w$ , i.e. the belief-internal 'self'; (b) *self ascription*: the verb *believe* is interpreted as a relation between an individual and a set of centered worlds (and not as a relation between an individual and a proposition); that is, we replace the function  $dox_{w^*,x^*}$  that returns a set of worlds (the set of  $x^*$ 's doxastic alternatives to  $w^*$ ) with a function  $self\_ascribe_{w^*,x^*}$ , which returns a set of centered worlds  $(w, x^{self})$ ; (c) *acquaintance relations*: the reported belief is about an individual with whom the belief-internal 'self' is acquainted in a particular way; in the *de se* case, the acquaintance relation is the most intimate relation the belief-internal 'self' can have with any individual whatsoever, namely the identity relation; in the non-*de se* (but *de re*) case, the acquaintance relation is the causal relation established between the belief-internal 'self' and whoever it is that he is looking at (see Lewis (1979): 539).

<sup>4</sup> See Hintikka (1962) for an early discussion.

<sup>5</sup> See for example Hintikka (1969).

<sup>6</sup> See for example Creswell & von Stechow (1982) for more discussion.

Thus, independently of other presuppositional features like gender or number, the pronoun *his* in (2) is triply context dependent: (a) it presupposes access to an acquaintance relation; (b) it is anaphoric to the real individual that the believer is acquainted to in the actual world; (c) it is dependent on the internal 'self' of the believer.

The *de re* but non-*de se* reading of (2) is given in (3) below.

- (3) *De re* (non-*de se*): Neo's centered belief worlds  $(w, x^{self})$  are such that, given the unique individual  $x$  the belief-internal 'self' (i.e.  $x^{self}$ ) is looking at,  $x$ 's pants are on fire in  $w$ .

The *de se* reading of (2) is given in (4) below.

- (4) *De se*: Neo's centered belief worlds  $(w, x^{self})$  are such that, given the unique individual  $x$  that is identical to the belief-self (i.e.  $x^{self}$ ),  $x$ 's pants are on fire in  $w$ .

Moreover, as Chierchia (1989) and Schlenker (2003) (among others) observe, the morphological form of the pronoun can distinguish between the two readings: overt pronouns like *he* in (5a) below are compatible with both the *de se* and non-*de se* readings, while the null PRO in (5b) allows only for a *de se* reading<sup>7</sup>.

- (5) a. Neo hopes that **he** will win.  
b. Neo hopes **PRO** to win.

To see this, consider the following *de se* and non-*de se* scenarios (based on Schlenker (2003)): (a) *de se*: young Neo participates in a singing competition; after his performance, he tells one of his friends: "I hope I'll win"; (b) non-*de se* 'mistaken identity' scenario: young Neo participates in a singing competition; after his performance, he relaxes with one too many glasses of wine; accidentally, he listens to a recording of his own performance but doesn't realize that and he says: "I hope this guy will win". Both the overt pronoun in (5a) and PRO in (5b) are felicitous in the *de se* context, but only the overt pronoun in (5a) is felicitous in the non-*de se* context.

## 2.2 *De se* and non-*de se* belief in the temporal domain

In this section, I show that the contrast between subjunctive B (subjB) and indicative (ind) in Romanian is the temporal analogue<sup>8</sup> of the contrast between PRO and overt pronouns in the individual domain. SubjB is the temporal analogue of PRO, since it requires a *de se* interpretation, in contrast to indicative, which, like an overt pronoun, can but does not have to receive a *de se* interpretation. Consider the 'mistaken temporal identity' scenario in (6) below.

- (6) John is a very gullible tabloid reader: whatever a tabloid says, he believes. A Monday tabloid said that the Martians were going to invade Bucharest on Thursday, i.e. three days later. On Thursday, the day of the invasion, John and I talked about this issue. But John was confused: he thought it was Wednesday when, in fact, it was Thursday.

In this context, the indicative report in (7a) is (more or less) felicitous, while the subjB report in (7b) is not.

- (7) Cînd m-am întîlnit cu el, Ion (de fapt) credea că...  
When I met him, John (in fact) believed that...  
a. ?marțienii invadează Bucureștiul în ziua aceea.  
Martians.the invade.ind.pres Bucharest.the in day that.

<sup>7</sup> For more discussion, see Chierchia (1989): 14 et seqq.

<sup>8</sup> Lewis (1979): 530-531 already observes that there is such a thing as a temporally *de se* attitude.



b. #marțienii **ar** invada Bucureștiul în ziua aceea.  
 Martians.the **subjB** invade Bucharest.the in day that.  
 the Martians were invading Bucharest that day.

The scenario in (6) and the examples in (7) are parallel to the individual *de se* 'mistaken identity' scenarios and examples because, just as Neo hopes that he will win without realizing that his hopes are about himself – in which case the overt pronoun *he* is acceptable, but PRO is not –, John believes that the Martian invasion happens the very day of the conversation, without actually realizing the imminence of the alien takeover – in which case indicative is acceptable, while subjunctive B is not.

The analysis of temporal *de se / de re* is parallel to the analysis of individual *de se / de re*. Just as in Abusch (1997), we extend centered worlds with a variable for time: the individual *john* is self-ascribing in world  $w^*$  at time  $t^*$  a set of centered worlds  $(w, x^{self}, t^{now})$ , where  $x^{self}$  is the unique individual that *john* takes himself to be in  $w$  and  $t^{now}$  is the unique time that *john* takes its internal 'now' to be in  $w$ . Moreover, we will have acquaintance relations relative to time intervals: for example, in (7a) above, John has a non-*de se* acquaintance relation to the following Thursday as "the day the tabloid said the Martians would invade Bucharest"<sup>9</sup> and, in (7b), a *de se* acquaintance relation with the day of his internal *now*, which he believes is a Wednesday (while in the actual world it is in fact Thursday).

The two readings of the belief report in (7) are given in (8) and (9) below.

- (8) Non-*de se*: John's centered belief worlds  $(w, x^{self}, t^{now})$  are such that, given the unique day  $t$  that the tabloid specified in  $w$ , the Martians are invading Bucharest at  $t$  in  $w$ .
- (9) *De se*<sup>10</sup>: John's centered belief worlds  $(w, x^{self}, t^{now})$  are such that, given the unique day  $t$  that is the day of  $t^{now}$  in  $w$ , the Martians are invading Bucharest at  $t$  in  $w$ .

Since the indicative in (7a) can receive the interpretation in (8), the belief report is felicitous, while the subjunctive B report in (7b) is not, because subjunctive B can receive only the *de se* interpretation in (9), which is false in the given context. Thus, we discovered that the temporal *de se* vs. non-*de se* contrast is mirrored in the morphology of belief reports just as the individual *de se* vs. non-*de se* contrast is<sup>11</sup>.

<sup>9</sup> But not exactly *de re*, if we assume that *de re* relations have to involve causal connections: how can John be *causally* acquainted on a Monday with the following Thursday? See Abusch (1997) for some discussion.

<sup>10</sup> Note that temporal *de se* belief is belief under the acquaintance relation of *inclusion* (the day of  $t^{now}$  is the day in which  $t^{now}$  is included), unlike individual *de se*, where the acquaintance relation is that of *identity*.

<sup>11</sup> The hypothesis that subjB is temporally *de se* seems to be contradicted by the fact that subjB can be part of constructions of the form subjB + auxiliary BE + past participle of the verb – which receive a perfective reading – in addition to the constructions mentioned above of the form subjB + bare verb, as shown in (i) below.

- (i) Ion tocmai și - a terminat de scris lucrarea de licență.  
 John has just finished writing his undergrad thesis.  
 Maria crede că Ion ar fi scris o capodoperă.  
 Mary believe.ind.pres.3s that John subjB.3sg BE written a masterpiece.  
 Mary believes that John wrote / has written a masterpiece.

We can maintain that subjB is temporally *de se* if we analyze the construction BE+ppart similarly to the way Kamp & Reyle (1993): 556 et seqq. analyze the English perfective *have written*: the auxiliary BE contributes an eventuality of its own (a state, but not a result state as the English *have*) which is temporally located at the internal *now* of the attitude; the completed eventuality contributed by the lexical verb is temporally located before the state contributed by BE. An independent argument for the subjB+BE+ppart construction being temporally *de se* is provided by *present* attitude reports towards a *future* eventuality: as the examples in (iia) and (iib) below show, the indicative anterior future is felicitous in such situations, but not subjB+BE+ppart.

- (ii) Ion a plecat ieri în Australia. Maria crede că în șase luni ...  
 John left for Australia yesterday. Mary believe.ind.pres.3s that in six months...  
 (a) Ion se va fi întors deja. (b) #Ion s = ar fi întors deja.  
 John SE ind.fut.3s BE returned already. John SE = subjB.3s BE returned already.  
 Mary believes that in six months John will have already come back.

### 3 Subjunctive B: dissociation

In this section, we turn to the second presuppositional component of subjunctive B, namely dissociation, which was first noticed in Farkas (1992): 82<sup>12</sup>. Dissociation means that in a report of the form *x believes that p*, where *p* is marked with subjunctive B, the speaker dissociates herself from *p*, i.e. the speaker has reason to believe that *p* might be false. In general, a speaker *a* dissociates herself from a proposition *p* iff there is at least one world *w* among *a*'s doxastic alternatives in which *p* is false. Thus, dissociation simply means that the speaker and the attitude holder do not agree on proposition *p* and not the stronger requirement that the speaker believes *not p*. In 3.1, I provide several diagnostics for dissociation and briefly indicate how dissociation is represented. In 3.2, I argue that dissociation is *presuppositional* based on its projection behavior in negative contexts and 'stacked' attitude reports of the form *x wants y to believe that p* (the projection facts in conditionals are omitted for space reasons). Finally, in 3.3, I establish the generalization that sets the stage for propositional *de se*: subjB always has wide-scope with respect to embedded negation.

#### 3.1 Diagnostics for dissociation

Once again, we contrast indicative and subjunctive B.

- (10) Ion își scrie lucrarea de licență. Maria crede că ...  
John is writing his undergrad thesis. Mary believes that...

a. Ion scrie o capodoperă.  $\sqrt{\text{IND}}$  b. Ion ar scrie o capodoperă.  $\sqrt{\text{SUBJB}}$   
John write.ind.pres a masterpiece. John subjB write a masterpiece.

The indicative report in (10a) is neutral with respect to the speaker's attitude, while the subjB report in (10b) expresses, in addition to what (10a) does, that the speaker does not also believe John's thesis to be a masterpiece, i.e. as far as the speaker is concerned, it could be a piece of junk (although the speaker does not necessarily believe that it is junk).

This intuition is supported by the fact that first-person belief reports with indicative are felicitous, while subjB reports are not. This contrasts with the third-person reports in (10) above, where both indicative and subjB are felicitous<sup>13</sup>.

- (11) Cred că Maria este / # ar fi bolnavă.  $\sqrt{\text{IND}} / \# \text{SUBJB}$   
Believe.ind.pres.1s that Mary be.ind.pres / #subjB be sick.  
I believe that Mary is sick.

Another argument for dissociation is the infelicity of subjunctive B with factive verbs like *ști* (know) or *regreta* (regret), as shown by (12) below.

- (12) Ion știe / regretă că Maria este / # ar fi bolnavă.  $\sqrt{\text{IND}} / \# \text{SUBJB}$   
John knows / regrets that Mary be.ind.pres / #subjB be sick.

Dissociation is supported by the infelicity of subjB with factive verbs because factive verbs presuppose that the reported belief is true throughout the current Context Set (see Stalnaker

<sup>12</sup> "In Romanian, in the case of declaratives, the conditional is used to indicate 'speaker reservation' with respect to the truth of the complement [...] Note that the use of a non-indicative in the complements of declaratives does not commit the speaker to a negative valuation of the propositional content of the complement; the non-indicative mood simply stresses that the speaker is not committed to a positive valuation. The complement is therefore not counterfactual, but rather 'afactual' as far as the speaker is concerned." (Farkas (1992): 82)

<sup>13</sup> First-person belief reports with subjunctive B are felicitous in the following kind of context: I am trying to objectively present a debate between me and John to a third party, e.g. to an audience of people asked to judge for themselves whether the Romanian subjunctive B is *de se* or not. In that case, I can utter:

(i) Ion crede că subjonctivul B în română nu ar fi *de se*, dar eu cred că ar fi *de se*.

John believes that the Romanian subjunctive B is (subjB) not *de se*, but I believe it is (subjB) *de se*.

(1978) for this notion) and the speaker belief-worlds are always a subset of the Context Set since all the propositions in the Common Ground have already been accepted by all participants in the conversation. Therefore, if the speaker already accepted the proposition that Mary is sick, she cannot dissociate herself from it, as the subjB in (12) requires<sup>14</sup>.

Finally, dissociation is supported by the distribution of indicative and subjB in the three kinds of contexts listed in (13) below; (13a) says that, in a context in which  $\neg p$  is true, we can felicitously assert  $x$  believes  $p$ , where  $p$  is marked with either indicative or subjB – and the same goes for (13b), where the Context Set endorses neither  $p$  nor  $\neg p$ . The only context that distinguishes between indicative and subjB is the one in (13c): if  $p$  is true throughout the Context Set (hence, the speaker also believes  $p$ ), only the indicative report is felicitous.

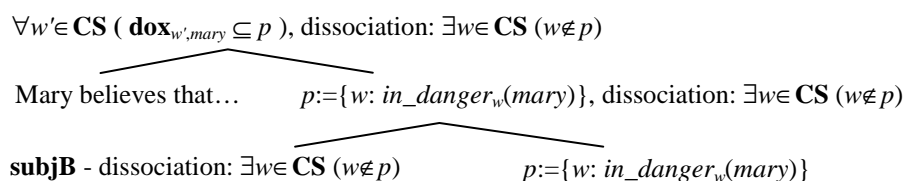
- |      |  |                  |   |
|------|--|------------------|---|
| (13) | a. $\neg p$ ;  | $x$ believes $p$ | $\sqrt{\text{IND}}$ ; $\sqrt{\text{SUBJB}}$ |
|      | b. <b>possible</b> ( $p$ ) & <b>possible</b> ( $\neg p$ ); | $x$ believes $p$ | $\sqrt{\text{IND}}$ ; $\sqrt{\text{SUBJB}}$ |
|      | c. $p$ ;   | $x$ believes $p$ | $\sqrt{\text{IND}}$ ; <b>#SUBJB</b>         |

I give the actual data only for the last case.

- (14) (Eu cred că) Maria este urâtă. Ion crede că Maria este / #ar fi urâtă.  $\sqrt{\text{IND}}$  / **#SUBJB**  
 (I believe that) Mary is ugly. John believes that Mary is ugly.

I represent dissociation as a condition  $w \notin p$ , i.e. there is at least one witness world  $w$  among the speaker belief worlds – hence, among the current Context Set worlds – such that the reported belief  $p$  is not true in  $w$ . The tree in (15) below gives the basic structure of the logical form for (1): subjB requires there to be at least one world  $w$  in **CS** (the Context Set) in which  $p$  is false and this requirement 'percolates' all the way to the top of the tree.

- (15) Mary believes that she is (subjB – dissociation) in danger.



The 'percolation' of the dissociation requirement  $\exists w \in \text{CS} (w \notin p)$  to the top of the tree is consistent with the presuppositional nature of dissociation, to which we now turn.

### 3.2 Dissociation is presuppositional

The fact that dissociation is presuppositional is shown by its projection behavior in negative contexts, conditionals and 'stacked' attitude reports of the form  $x$  wants  $y$  to believe that  $p$  (for space reasons, I do not provide the data for conditionals). A negative expression of the form *Nu este adevărat că...* (It is not the case that...), when added on top of a subjB belief report of the form  $x$  crede că  $p$  ( $x$  believes that  $p$ ) is transparent, i.e. a 'hole', for dissociation.

<sup>14</sup> It follows from these observations that matrix declarative sentences marked with subjB are infelicitous. In fact, they are not – but a subjB matrix clause like the one in (i) below can be interpreted only: (a) as expressing Mary's desire to go to the movies or (b) as the consequent of a covert conditional (hence the traditional labeling of subjunctive B as 'conditional-optative'). Either way, (i) cannot be interpreted as asserting the proposition that Mary is going to the movies – as its indicative counterpart does.

(i) Maria ar merge la film.

Mary subjB go to movie.

Mary would like to go to the movies / [If the theater weren't that far], Mary would go to the movies.

- (16)  $\neg p$ ; *it is not the case that x believes p* √SUBJB  
 Maria nu este în pericol. (Și) Nu este adevărat că Maria crede că **ar** fi în pericol.  
 Mary is not in danger. (And) It is not the case that Mary believes that she is in danger.
- (17)  $p$ ; *it is not the case that x believes p* #SUBJB  
 Maria este în pericol. #(Dar) Nu este adevărat că Maria crede că **ar** fi în pericol.  
 Mary is in danger. #(But) It is not the case that Mary believes that she is in danger.

Finally, the projection behavior of dissociation in 'stacked' attitude reports of the form *x wants y to believe that p* also shows that dissociation is presuppositional: unlike conventional implicatures<sup>15</sup>, the dissociation requirement does not have to be resolved relative to the speaker belief-worlds, but can be resolved relative to the belief-worlds of the higher attitude holder, e.g. *x's belief-worlds* in the 'stacked' report *x wants y to believe that p*<sup>16</sup>. Thus, the initial characterization of dissociation as *a speaker-oriented* requirement is an oversimplification, which I have upheld for expository reasons. Consider the scenario in (18).

- (18) Both Mary and Helen like John and they are jealous of each other. A couple of days ago, Helen suddenly decided to leave LA for a trip – and she left that very day.

In this context, the discourse in (19), in particular the subjB report in (19<sup>2</sup>), is felicitous.

- (19) <sup>1</sup> Maria crede în mod greșit că... Elena este încă în LA, (IND)  
 Mary mistakenly believes that... Helen is (**ind**) still in LA,  
<sup>2</sup> dar vrea ca Ion să creadă că... Elena nu **ar** fi în LA. √SUBJB  
 but she wants John to believe that... Helen is (**subjB**) not in LA.

Since the speaker knows that Helen is not in LA, the dissociation triggered by the subjB in (19<sup>2</sup>) cannot be resolved relative to the speaker's belief-worlds. However, subjB is felicitous because *Mary's* belief worlds can satisfy the dissociation requirement<sup>17</sup>.

### 3.3 The relative scope of subjunctive B and embedded negation

The dissociation requirement allows us to pinpoint the relative scope of subjB with respect to embedded negation and embedded negative quantifiers. We have distinct dissociation presuppositions if subjB has wide scope with respect to negation (**subjB**>>**not**>> $p$ ) and if subjB has narrow scope (**not**>>**subjB**>> $p$ ). In the wide-scope case, subjB dissociates from **not**  $p$ , i.e. for some  $w$  in the Context Set,  $w \notin \neg p$ ; in the narrow-scope case, subjB dissociates from  $p$ , i.e. for some  $w$  in the Context Set,  $w \notin p$ . Only the wide-scope dissociation is empirically attested – despite the overt surface form, in which negation precedes (and *has* to precede) the subjB morpheme. The data is provided in (20) and (21) below.

- (20)  $p$ ; *x believes not p*. √SUBJB  
<sup>1</sup> Maria este în pericol. <sup>2</sup> (Dar) Maria crede că **nu ar** fi în pericol.  
 Mary is in danger. (But) Mary believes that **not subjB** be in danger.

<sup>15</sup> For the distinction between presuppositions and conventional implicatures, see Potts (2004).

<sup>16</sup> Propositional attitude verbs like *want*, *fear* etc. are *filters* for the presuppositions of the embedded sentence: they have to be satisfied by the belief-worlds of the attitude holder (in the given local context). As Heim (1992): 183, following Karttunen, puts it, "if  $\sigma$  is a verb of propositional attitude, then a context  $c$  satisfies the presuppositions of ' $\alpha\sigma\varphi$ ' only if  $B_\alpha(c)$  satisfies the presuppositions of  $\varphi$ ; where ' $B_\alpha(c)$ ' stands for the set of beliefs attributed to  $\alpha$  in  $c$ ". For example, *John wants the king of France to get bald* does not presuppose that John *wants* it to be the case that there is a unique king of France, but that John *believes* that there is a unique king of France.

<sup>17</sup> As expected, if we embed first-person belief reports in structures like the one in (19), they are also felicitous:

- (i) <sup>1</sup> Maria crede în mod greșit că... Elena este încă în LA, (IND)  
 Mary mistakenly believes that... Helen is (**ind**) still in LA,  
<sup>2</sup> dar vrea ca **eu** să cred că... Elena nu **ar** fi în LA. √SUBJB  
 but she wants **me** to believe that... Helen is (**subjB**) not in LA.

- (21) **not**  $p$ ;  $x$  believes **not**  $p$ . #SUBJB  
<sup>1</sup> Maria nu este în pericol. <sup>2</sup> #(Și) Maria crede că **nu ar** fi în pericol.  
 Mary is not in danger. #(And) Mary believes that **not subjB** be in danger.

In a context in which  $p$  is true (as in (20)), the wide-scope dissociation from **not**  $p$  is satisfied – hence subjB is felicitous; in a context in which **not**  $p$  is true (as in (21)), the narrow-scope dissociation from  $p$  is satisfied – but subjB is not felicitous. SubjB has to have scope not only over the embedded sentential negation, but also over preverbal negative quantifiers in subject position like *nimeni* (no one) or *nici un student* (no student)<sup>18</sup> in examples of the form  $x$  believes no  $F$  is  $G$ ; due to space limitations, I do not provide the actual data.

#### 4 Subjunctive B as propositional *de se*

In this section, I propose a semantic solution to the problem of deriving the fixed wide-scope of subjB, as opposed to syntactically stipulating the wide-scope and attempting to justify the syntactic assumption on independent grounds. In particular, I assume that subjB can freely scope with respect to negation and I propose that subjB has a third presuppositional component, besides temporal *de se*<sup>19</sup> and dissociation, which rules out the narrow scope: subjB is also propositional *de se*, i.e. it *presupposes* that the proposition expressed by the embedded clause is true in the centered worlds self-ascribed by the attitude holder.

Intuitively, an individually *de se* report is about an individual that is identical to the belief-internal 'self' and a temporally *de se* report is about a time that includes the belief-internal 'now'. A propositionally *de se* report is about a proposition that includes the belief-internal 'actually', where the belief-internal 'actually' is the set of worlds self-ascribed by the believer.

The resulting analysis is theoretically appealing because it extends the parallel between pronouns, tenses and moods to *de se* readings, following the research program of Partee (1973), Abusch (1997), Stone (1999) and Schlenker (2003) among others.

##### 4.1 Deriving the 'only wide scope' generalization

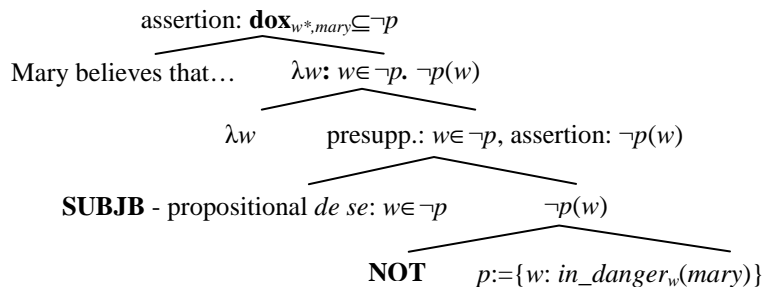
The basic idea is that subjB takes wide scope with respect to negation much like the pronominal tense takes wide scope with respect to negation in the well-known example from Partee (1973) *I didn't turn off the stove*. As Partee (1973): 602 observes, "... such a sentence clearly does not mean that [...] there exists no time in the past at which I turned off the stove". That is, subjB 'goes proxy' for, i.e. it must be bound by, the centered world variable contributed by the attitude verb. This makes it parallel to null PRO, which has to be bound by the belief-internal 'self' variable  $x^{self}$  and to the temporal *de se* presupposition, which 'goes proxy' for the belief-internal 'now' variable  $t^{now}$ .

The basic structure of a propositional *de se* report is given in (22) below:  $w^*$  stands for the actual world; in an expression of the form  $\lambda w: \phi. \psi$ ,  $\phi$  is the presupposition and  $\psi$  is the assertion; given that we are focusing on the modal coordinate, I use **dox** instead of **self\_ascribe** and omit the variables  $x^{self}$  and  $t^{now}$  for simplicity.

<sup>18</sup> Under the assumption that *nimeni* (no one) and *nici un student* (no student) are negative quantifiers exhibiting negative concord with the sentential negation *nu* and not negative polarity items.

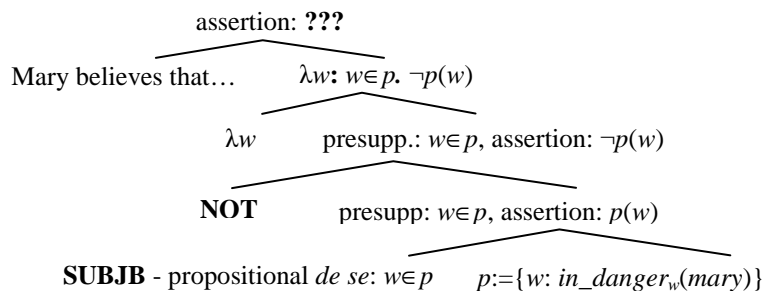
<sup>19</sup> *De se* interpretations are in general presupposed because they require the presence of a pronominal, hence anaphoric / presuppositional, element – either in the individual or the temporal domain.

(22) Mary believes that she is (subjB – propositional *de se*) not in danger.  $\sqrt{\text{subjB}} \gg \text{not}$



The *de se* presupposition redundantly iterates the asserted part of the embedded clause. But, as shown in (23) below, the same presupposition yields a contradiction if subjB has narrow-scope with respect to negation – thus we derive the 'only wide scope' generalization.

(23) Mary believes that she is (subjB – propositional *de se*) not in danger.  $\# \text{not} \gg \text{subjB}$



At the embedded clause level, we presuppose that Mary's centered worlds satisfy  $p$  and we assert that they do not. But no possible world can satisfy such a condition, hence the belief report ascribes to Mary the empty set of centered worlds which, under the assumption that Mary's beliefs are consistent, is impossible.

It is important to represent and compute the *de se* presupposition at the level of the embedded clause and *not at the matrix clause level*, e.g. as the contradiction between the assertion that Mary believes she is not in danger (see  $\mathbf{dox}_{w^*, \text{mary}} \subseteq \neg p$  in (22) above) and a presupposition of the form *Mary believes she is in danger*, i.e.  $\mathbf{dox}_{w^*, \text{mary}} \subseteq p$ . Representing the presupposition at the matrix level would not make any difference for the embedded negation in (23) above (we still derive a contradiction), but it would predict that a matrix negation is also unacceptable, e.g. in a sentence like *It is not the case that Mary believes that  $p$* , with  $p$  marked with subjB. Such a sentence asserts  $\neg \mathbf{dox}_{w^*, \text{mary}} \subseteq p$  and, if we represented the *de se* presupposition at the matrix level, we would have  $\mathbf{dox}_{w^*, \text{mary}} \subseteq p$ , thus contradicting the assertion. But we know that subjB reports with a matrix negation are felicitous (see (16) above), so we have to represent and bind the propositional *de se* presupposition locally at the embedded clause level.

The *local* binding of the presupposition at the embedded clause level is a consequence of the presupposition resolution procedure itself: the *de se* presupposition contains the bound world variable  $w$  and this variable has to still be bound when the presupposition is resolved<sup>20</sup>.

A final observation: the present account of the 'only wide scope' generalization is not entirely appealing insofar the propositional *de se* presupposition is basically identical to the assertion, which should yield infelicity if we assume something like Stalnaker's non-redundancy constraint on context update (see Stalnaker (1978)). I do not have anything to say about this except to point out that the felicitous sentence *The queen of Netherlands exists* exhibits a

<sup>20</sup> For more discussion, see van der Sandt (1992): 363-366.

similar kind of redundancy: the definite description presupposes the existence of the queen of Netherlands, which is exactly what the sentence asserts<sup>21</sup>.

#### 4.2 The incompatibility between subjunctive B and *probabil*

The contrast between subjB and indicative belief reports with *probabil* is exemplified in (24).

- (24) *x* believes that **probably** *p* √IND; #SUBJB  
 Când m-am întâlnit cu el, Ion credea că... (When I met him, John believed that...)
- a. marțienii **probabil** invadează Bucureștiul. √IND  
 the Martians **probably** invade.ind.pres Bucharest.
- b. #marțienii **probabil ar** invade Bucureștiul. #SUBJB  
 the Martians **probably subjB** invade Bucharest.  
 ...the Martians were probably invading Bucharest.

Intuitively, subjB is incompatible with *probabil* reports precisely because, being propositionally *de se*, subjunctive B expresses that the attitude holder is *completely* committed to the believed proposition, while *probably* implicates that there is at most a partial commitment.

To make this intuition precise, we need to look more closely at how *probably* is interpreted. Imagine that Mary utters the sentence in (25) below while walking through a bad neighborhood late at night. I will represent this sentence as shown in (26).

- (25) I'm probably in danger. (26) **MOST** ( $\{w: w \in \mathbf{dox}_{w^*, mary}\}$ ) ( $\{w: in\_danger_w(mary)\}$ )

The adverb *probably* is an epistemic modal quantifier, i.e. it quantifies over Mary's doxastic alternatives  $\mathbf{dox}_{w^*, mary}$  (where  $w^*$  is the actual world). In fact, we consider only a subset of  $\mathbf{dox}_{w^*, mary}$ , namely the worlds that are ideal – or close enough to being ideal – with respect to a stereotypical ordering source ('in view of what Mary takes the normal course of events to be'<sup>22</sup>), but for simplicity I will assume that (25) is true iff most of Mary's doxastic alternatives  $w$  are such that Mary is in danger in  $w$ . Since *probably* is a 'MOST'-type quantification, it has a '¬EVERY'-type scalar implicature, i.e.  $\neg \mathbf{EVERY}(\mathbf{dox}_{w^*, mary})(\{w: in\_danger_w(mary)\})$ , which is equivalent to  $\neg \mathbf{dox}_{w^*, mary} \subseteq \{w: in\_danger_w(mary)\}$ . This simply says that, if it is probable that  $p$ , then it is not certain that  $p$ .

The goal is to derive a contradiction between the propositional *de se* presupposition, which requires the complete commitment of the attitude holder, and the implicature triggered by *probabil* / *probably*, which denies the complete commitment. At a first glance, pursuing this strategy does not seem to take us too far: even if we were able to derive a contradiction, we would expect the implicature to be canceled since, by definition, implicatures are only *default* inferences. However, implicatures of this kind, i.e. which contradict presuppositions, always yield infelicity, despite their otherwise undisputed cancelability. This is shown by the pairs of sentences in (27)-(28), (29)-(30) and (31)-(32) below: the presuppositions triggered by *stop* in (27) and (29) and by the fact that the quantifier restrictor itself is presupposed in (31) contradict the implicatures of *probably* and *most*, making the examples unacceptable.

- (27) #The students that stopped smoking had **probably** smoked before.  
 (28) √The students that stopped smoking had smoked before.  
 (29) #**Most** students that stopped smoking had smoked before.  
 (30) √Every student that stopped smoking had smoked before.

<sup>21</sup> I am grateful to Philippe Schlenker (p.c.) for pointing out this type of examples.

<sup>22</sup> See Kratzer (1991): 643-645.

(31) #**Most** dolphins are dolphins.      (32)  $\sqrt{\text{Every dolphin is a dolphin}}^{23}$ .

Now consider (33) below and assume for the moment that subjB scopes under *probabil*.

(33) #Mary believes that she probably is (subjB – propositional *de se*) in danger.

The 'subjB narrow-scope' reading is interpreted as shown in (34) below. Just as in (23) above, subjB contributes a propositionally *de se* presupposition. Then, we have the asserted *probably* quantification. Finally, the formula following the semi-colon is the *probably* implicature. Generally, in an expression of the form  $\lambda w: \phi. \psi; \xi$ ,  $\phi$  is the presupposition,  $\psi$  is the assertion and  $\xi$  is the implicature. Following the observations in Chierchia (2001): 5 et seqq., we compute the scalar implicature at the embedded clause level.

(34)  $\text{believe}_{w^*}(\text{mary}, \lambda w: \text{in\_danger}_w(\text{mary}))$ .

$\text{MOST}(\text{dox}_{w,\text{mary}}(\{w': \text{in\_danger}_{w'}(\text{mary})\}); \neg \text{dox}_{w,\text{mary}} \subseteq \{w': \text{in\_danger}_{w'}(\text{mary})\})$

There is no intuitively plausible way to derive a contradiction between the presupposition and the implicature in (34). Quite the contrary: the presupposition that Mary is in danger in  $w$  (i.e.  $\text{in\_danger}_w(\text{mary})$ ) and the implicature that it is not the case that Mary believes in  $w$  that she is in danger (i.e.  $\neg \text{dox}_{w,\text{mary}} \subseteq \{w': \text{in\_danger}_{w'}(\text{mary})\}$ ) can very well be compatible – people often refuse to believe things that are actually true. Intuitively however, we *should* be able to derive a contradiction between the presupposition and the implicature: we presuppose that all of Mary's doxastic alternatives satisfy the proposition  $p := \{w': \text{in\_danger}_{w'}(\text{mary})\}$  (this is what the formula  $\text{believe}_{w^*}(\text{mary}, \lambda w: p(w))$  ... says) and we implicate that they do not.

### 4.3 Propositional *de se* all the way: centered propositions

To solve the *probabil* – subjB puzzle, I propose to replace centered worlds with centered propositions, i.e. triples of the form  $(p, f^{\text{self}}, g^{\text{now}})$ , where  $f^{\text{self}}$  is an individual concept (type *se*) and  $g^{\text{now}}$  is a time-interval concept (type  $\sigma\tau$ ). Intuitively, for any  $w \in p$ ,  $f^{\text{self}}(w)$  is the belief-internal 'self' in  $w$  and  $g^{\text{now}}(w)$  is the belief-internal 'now' in  $w$ . It is a natural assumption that there is a unique 'self' and a unique 'now' per belief-world  $w$ , although they can vary from world to world as in, for example, *Heimson believes that he is Hume or Napoleon*.

Note that we independently need centered propositions to account for cross-sentential propositional anaphora in examples like (35) below.

(35) <sup>1</sup> Maria crede că Ion **ar** fi chipeș.      <sup>2</sup> **Ar** avea ochi frumoși.  
Mary believes that John is (**subjB**) handsome. He has (**subjB**) beautiful eyes.

The subjB sentence (35<sup>2</sup>) has to be interpreted as a further elaboration of Mary's belief-worlds<sup>24</sup> and cannot be interpreted as stating that John has beautiful eyes in the actual world.

The core idea of the centered-propositions analysis is that, in a belief report of the form  $x$  believes + *embedded clause*, the matrix clause  $x$  believes sets up the context for the interpretation of the embedded clause by contributing a centered proposition relative to which the embedded clause is interpreted. Of course, as (35) above shows, a subsequent matrix clause can also be interpreted relative to the same centered proposition. The matrix clause basically introduces a centered proposition discourse referent (more exactly, three suitably related discourse referents – for  $p$ ,  $f^{\text{self}}$  and  $g^{\text{now}}$ ), which is anaphorically accessed by the embedded clause. For simplicity, we will represent this via static existential quantification

<sup>23</sup> I am grateful to Roger Schwarzschild for suggesting the examples in (31) and (32).

<sup>24</sup> We can even have modal subordination, as shown in (i) below.

(i) Maria crede că **ar** fi vampiri în LA.      <sup>2</sup> **Ar** intra noaptea în case și **ar** ataca oamenii în somn.  
Mary believes that there are (**subjB**) vampires in LA. They break (**subjB**) into houses at night and attack (**subjB**) people in their sleep.



over a propositional variable  $p$  that is contributed by the attitude verb (we systematically ignore  $f^{self}$  and  $g^{now}$ ). For example, a simple report like *Mary believes that she is in danger* is represented as shown in (36) below.

$$(36) \quad \exists p (believe_{w^*}(mary,p) \ \& \ in\_danger_p(mary)), \text{ where:} \\ believe_{w^*}(mary,p) := p=\mathbf{dox}_{w^*,mary} \text{ and } in\_danger_p(mary) := \forall w \in p (in\_danger_w(mary))$$

The first conjunct equates the proposition  $p$  with Mary's doxastic alternatives in the actual world  $w^*$ . The second conjunct simply says that for any world  $w$  in the proposition  $p$ , Mary is in danger in  $w$ . This technique of encapsulating modal quantification was first proposed in Stone (1999) and it is independently motivated by the analysis of modal subordination.

A propositional *de se* report is interpreted as in (37) below. The second conjunct is the propositional *de se* presupposition contributed by subjB. For simplicity, I do not distinguish between the status of assertions and presuppositions or implicatures. Just as in (36), the third conjunct is the assertion contributed by the embedded clause.

$$(37) \quad \text{Mary believes that she is (subjB – propositional } de \text{ se) in danger.} \\ \exists p (p=\mathbf{dox}_{w^*,mary} \ \& \ p \subseteq \{w: in\_danger_w(mary)\} \ \& \ in\_danger_p(mary))$$

The solution to the 'only wide-scope' problem in 4.1 above is easily reformulated in terms of centered propositions. Negation is interpreted as:  $\mathbf{not}_w(p') := w \notin p'$ ;  $\mathbf{not}_p(p') := \forall w \in p (w \notin p')$ . That is, negation is interpreted as any other lexical predicate (e.g. *in\_danger*) modulo the fact that it has a propositional argument. We give only the interpretation of the contradictory narrow-scope subjB ( $\mathbf{not} \gg \mathbf{subjB}$ ): the second conjunct (the propositional *de se* presupposition) contradicts the third conjunct (the assertion).

$$(38) \quad \text{Mary believes that she is (subjB – propositional } de \text{ se) not in danger.} \\ \exists p (p=\mathbf{dox}_{w^*,mary} \ \& \ p \subseteq \{w: in\_danger_w(mary)\} \ \& \ \mathbf{not}_p(\{w: in\_danger_w(mary)\}))$$

Moreover, since the existential quantification over the variable  $p$  is contributed by the attitude verb *believe*, we are still *locally* representing and binding the propositional *de se* presupposition, ruling out the narrow-scope of subjB with respect to the embedded negation while at the same time allowing for felicitous matrix negation examples like (16) above.

#### 4.4 Deriving the incompatibility between subjunctive B and *probabil*

Finally, we return to the *probabil* problem, i.e. to ruling out the 'subjB narrow-scope' reading ( $\mathbf{probabil} \gg \mathbf{subjB}$ ) of (33) above. This is interpreted as shown in (39).

$$(39) \quad \exists p ( p=\mathbf{dox}_{w^*,mary} \ \& \ p \subseteq \{w: in\_danger_w(mary)\} \ \& \\ \forall w' \in p (\mathbf{MOST}(\mathbf{dox}_{w',mary})(\{w: in\_danger_w(mary)\})) \ \& \\ \forall w' \in p (\neg \mathbf{dox}_{w',mary} \subseteq \{w: in\_danger_w(mary)\}) )$$

The second conjunct is the propositional *de se* presupposition, the third conjunct is the *probably* assertion and the last conjunct is the *probably* implicature. The advantage of using centered propositions instead of centered worlds is that now we have access to the first conjunct contributed by the attitude verb when we compute the contradiction between the presupposition and the implicature. Given the equality in the first conjunct, the presupposition is equivalent to the formula in (40a) below and the implicature with the formula in (40b).

$$(40) \quad \text{a. presupposition: } \mathbf{dox}_{w^*,mary} \subseteq \{w: in\_danger_w(mary)\} \\ \text{b. implicature: } \forall w' \in \mathbf{dox}_{w^*,mary} (\neg \mathbf{dox}_{w',mary} \subseteq \{w: in\_danger_w(mary)\})$$

To derive the contradiction between (40a) and (40b), we only need the (fairly uncontroversial) belief 'introspection'<sup>25</sup> principles in (41a) and (41b) below. The 'introspection' principles are equivalent to the formula in (41c), which exhibits the internal structure of the **dox** function that is enforced by these principles.

- (41) a. Positive 'Introspection':  $\mathbf{bel}(x, p) \rightarrow \mathbf{bel}(x, \mathbf{bel}(x, p))$   
 b. Negative 'Introspection':  $\neg \mathbf{bel}(x, p) \rightarrow \mathbf{bel}(x, \neg \mathbf{bel}(x, p))$ <sup>26</sup>  
 c.  $\forall w \forall x \forall w' \in \mathbf{dox}_{w,x} (\mathbf{dox}_{w',x} = \mathbf{dox}_{w,x})$ <sup>27</sup>

Among other things, the 'introspection' principles derive the intuitive equivalence between sentence (25) above when uttered by Mary and the belief report *Mary believes that she is probably in danger*, when *probably* is interpreted relative to Mary's doxastic alternatives.

It is easily checked that, based on (41c), we can derive a contradiction between the formulas in (40a) and (40b) above. To derive the incompatibility between subjunctive B and *probabil*, we also need to rule out the 'wide scope' reading **subjB**>>*probabil*. I propose that this is due to the fact that dissociation yields a contradiction in this case. The dissociation presupposition is provided in (42a) below and the corresponding assertion in (42b).

- (42) #Mary believes that she probably is (subjB – dissoc.) in danger. #**subjB**>>*probabil*  
 a. dissociation:  $\exists w \in \mathbf{CS} (\neg \mathbf{MOST}(\mathbf{dox}_{w,mary})(\{w': in\_danger_w(mary)\}))$   
 b. assertion:  $\forall w'' \in \mathbf{CS} (\mathbf{dox}_{w'',mary} \subseteq \{w''': \mathbf{MOST}(\mathbf{dox}_{w''',mary})(\{w': in\_danger_w(mary)\})\})$

Take a witness world  $w^* \in \mathbf{CS}$  that satisfies the dissociation requirement; hence, we have that  $\neg \mathbf{MOST}(\mathbf{dox}_{w^*,mary})(p)$ , where  $p$  is the proposition  $\{w': in\_danger_w(mary)\}$ . This world should also satisfy the assertion, i.e.  $\mathbf{dox}_{w^*,mary} \subseteq \{w''': \mathbf{MOST}(\mathbf{dox}_{w''',mary})(p)\}$ . The latter formula is equivalent to  $\forall w''' \in \mathbf{dox}_{w^*,mary} (\mathbf{MOST}(\mathbf{dox}_{w''',mary})(p))$ . By the introspection postulate in (41c), this formula is equivalent to  $\mathbf{MOST}(\mathbf{dox}_{w^*,mary})(p)$ , which contradicts the dissociation requirement. A final observation: the dissociation-based analysis of the infelicity of the wide-scope structure **subjB**>>*probabil* makes the prediction that, if subjB dissociates from a set of worlds that is different from the worlds in which the belief is reported, we will not get a contradiction between assertion and dissociation – hence, in such belief reports, there should be no contrast between indicative and subjB and the latter should be compatible with embedded *probabil*. As the example in (43) below shows, this prediction is borne out.

- (43) Maria nu încercă să îl pună pe Ion în umbră și nu vrea ca Ion să creadă că...  
 Mary is not trying to disadvantage John and she doesn't want John to believe that...  
**probabil ar** încerca să facă asta.  
**probably subjB** try subjA do this.  
 she is probably trying to do this.

## 5 Conclusion

I have analyzed the Romanian subjB as a single package of three distinct presuppositions: temporal *de se*, dissociation and propositional *de se*. The subjB – indicative contrast is the temporal analogue of the PRO – overt pronoun contrast in the individual domain. The dissociation presupposition enabled us to show that subjB always takes scope over the

<sup>25</sup> The scare quotes are meant to suggest that the one should not understand the introspection principles as psychological principles; for more discussion, see Hintikka (1962): 56-57 et seqq, who prefers the less psychological term of 'self-intimating'.

<sup>26</sup> The logic of belief is usually assumed to be the modal system **KD45**, where positive 'introspection' is Axiom **4** ( $B_x \phi \rightarrow B_x B_x \phi$ ) and negative 'introspection' is Axiom **5** ( $\neg B_x \phi \rightarrow B_x \neg B_x \phi$ ).

<sup>27</sup> The *de se* version of the introspection postulate is given in (i) below. We use the simpler **dox**-based version.

(i)  $\forall w, x, t \forall (w', x', t') \in \mathbf{self\_ascibe}_{w,x,t} (\mathbf{self\_ascibe}_{w',x',t'} = \mathbf{self\_ascibe}_{w,x,t})$ .

embedded negation. The propositional *de se* presupposition derives this generalization. The move to centered propositions (generalizing centered worlds) in combination with propositional *de se*, 'introspection' principles and dissociation conspire to derive the fact that subjB reports (unlike their indicative counterparts) are infelicitous with embedded *probabil*.

There are at least two directions for future research. First, we need to investigate the distribution and interpretation of subjB and its contrast with indicative when the two moods are embedded under other attitude verbs, e.g. *spune* (say), *zice* (say), *pretinde* (claim) and *se îndoii* (doubt). Moreover, following Farkas (1992), we need to extend the investigation to the Romanian subjunctive A and the ways it contrasts with indicative and subjB. Second, we need to examine the cross-linguistic typological predictions that the present analysis of subjB suggests. An important question is whether the three components of the subjB interpretation are truly independent; if so, we expect to encounter languages with items that have only one or two of the three presuppositions. A possibly relevant mood is the English infinitive: it is compatible with verbs like *hope* or *promise*, which suggests that it is not temporally *de se*, and it is incompatible with *probably* (#*Mary believes herself to probably be in danger* vs. *Mary believes that she is probably in danger*), which might indicate that it is propositionally *de se*.

## References

- Abusch, D.: 1997. Sequence of Tense and Temporal *De Re*, in *Linguistics & Philosophy* 20, 1-50.
- Chierchia, G.: 1989. Anaphora and Attitudes *De Se*, in *Semantics and Contextual Expression*, R. Bartsch et al. (eds.), Foris, 1-31.
- Chierchia, G.: 2001. *Scalar Implicatures, Polarity Phenomena, and the Syntax/Pragmatics Interface*, U. of Milan – Bicocca ms., May 2001.
- Cresswell, M.J. and A. von Stechow: 1982. *De Re* Belief Generalized, in *Linguistics and Philosophy* 5, 503-535.
- Farkas, D.: 1992. On The Semantics of Subjunctive Complements, in *Romance Languages and Modern Linguistic Theory*, P. Hirschbühler et al (eds.), Benjamins, 69-104.
- Heim, I.: 1992. Presupposition projection and the semantics of attitude verbs, in *Journal of Semantics* 9, 183-221.
- Hintikka, J.: 1962. *Knowledge and Belief*, Cornell University Press.
- Hintikka, J.: 1969. Semantics for Propositional Attitudes, in *Philosophical Logic*, J.W. Davis et al (eds.), 21-45.
- Kamp, H. & U. Reyle: 1993. *From Discourse to Logic*, Kluwer.
- Kaplan, D.: 1989. Demonstratives, in *Themes from Kaplan*, P. Almog et al (eds.), OUP, 481-563.
- Kratzer, A.: 1991. Modality, in *Semantik / Semantics*, A. von Stechow et al (eds.), de Gruyter, 639-650.
- Lewis, D.: 1979. Attitudes *De Dicto* and *De Se*, in *The Philosophical Review* 88:4, 513-543.

- Partee, B.: 1973. Some Structural Analogies between Tenses and Pronouns in English, in *Journal of Philosophy* 70, 601-609.
- Potts, C.: 2004. Conventional Implicatures, A Distinguished Class of Meanings, to appear in *The Oxford Handbook of Linguistic Interfaces*, G. Ramchand et al (eds.), OUP.
- Schlenker, P.: 2003. A plea for monsters, in *Linguistics and Philosophy* 26, 29-120.
- Searle, J.: 1983. *Intentionality. An Essay in the Philosophy of Mind*, Cambridge.
- Stalnaker, R.: 1978. Assertion, in *Syntax and Semantics* 9, 315-332.
- Stone, M.: 1999. *Reference to Possible Worlds*, RuCCS Report 49, Rutgers University NB.
- Van der Sandt, R.: 1992. Presupposition Projection as Anaphora Resolution, in *Journal of Semantics* 9, 333-377.

# BARE NOMINALS AND OPTIMAL INFERENCE\*

Ariel Cohen,  
Ben-Gurion University of the Negev

arikc@bgu.ac.il

## Abstract

In this paper I discuss four type of bare nominal, and note that, in some sense, all of them appear to imply stereotypicality. I consider an account in terms of Bidirectional Optimality Theory: unmarked (bare) forms give rise to unmarked (stereotypical) interpretations. However, it turns out that, while the form of bare numerals is unmarked, the interpretation sometimes is not. I suggest that the crucial notion is not unmarkedness, but optimal inference: unmarked forms give rise to interpretations that are best used for drawing inferences. I propose a revision of Bidirectional Optimality Theory to reflect this.

## 1 Stereotypical Interpretations of Bare Nominals

### 1.1 Generic Bare Plurals

What does a generic sentence like (1) mean?

(1) Ravens are black.

Clearly, this is not a universal, since the existence of the odd albino raven does not render (1) false. But what, then, does it mean? The meaning of a generic is a hotly debated topic, and I am not going to address it here.<sup>1</sup> At a pretheoretic level, however, a reasonable approximation of the meaning of the sentence is that it makes a statement not about all ravens, but about stereotypical ravens. Since an albino raven is not stereotypical, it does not count as an exception, and does not falsify (1).

Note that I am not advocating here that the truth conditions of (1) are captured by an appeal to stereotypicality—indeed, I will argue against such a claim.<sup>2</sup> All I am saying is that when (1) is interpreted, there is a “feeling” that stereotypicality is involved. Nothing more than this rather weak and, I believe, non-controversial claim is necessary for the purposes of this paper, as we shall see.

### 1.2 Existential Bare Plurals

Existential bare plurals are usually supposed to express nothing more than a simple existential claim. They are certainly rarely associated with notions of stereotypicality. And yet, stereotypicality does appear to play a role in their interpretation (Cohen 2005a).

Consider the following examples:

(2) a. This tractor has wheels.

---

\* I would like to thank Manfred Krifka for helpful comments and suggestions.

<sup>1</sup> See Cohen (1996; 1999) for my take on this question.

<sup>2</sup> Though some researchers, e.g. Geurts (1985) and Declerck (1986), argue for precisely this claim.

b. This tractor has some wheels.

Suppose the tractor in question has only two wheels. Then (1a) would be odd, but (1b) would be fine. Sentence (2a), but not (2b), suggests that the tractor has four wheels, suitably arranged: two large ones in the rear, two smaller ones in front. In other words, (1a) implies that the tractor has the stereotypical arrangement of wheels.

For another example, consider the following pair, suggested by Tova Rapoport (pc):

- (3) a. John has playing cards.  
b. John has Victorian playing cards.

Sentence (3a) suggests that John has the stereotypical set of cards, i.e. a full deck. Sentence (3b), on the other hand, may be felicitously uttered even if John has only a few Victorian cards; in the context of this sentence, John is most probably a collector of Victorian cards, and there is no specific set of cards that would be considered stereotypical for collecting purposes.

Even the “classic” example of an existential reading of a bare plural, namely the subject of *available*, may give rise to stereotypicality. Suppose we wish to send a spaceship to the moon. We contact NASA, and get the following response:

(4) Astronauts are available.

Sentence (4) says more than simply that there exist some available astronauts. Rather, it implies that there is a set of available astronauts that is stereotypical, in terms of its size, the training of its members, etc., in the context of our mission: there are, say, three astronauts, who have the respective roles of Command Module Pilot, LEM Pilot, and Mission Commander.

Note that this feeling of stereotypicality is perceived by the hearer, who may felicitously respond to it as if it were explicitly made:

- (5) A: This tractor has wheels.  
B: So where do you want to go with it?
- (6) A: John has playing cards.  
B: Great, let’s start a game.
- (7) A: Astronauts are available.  
B: But the mission cannot go ahead, because the rocket is still malfunctioning.

B’s response in (5a) relates to the implied claim that the tractor has a set of wheels suitable for the purpose of riding it; in (6b), B responds to A’s implication that John has a set of playing cards suitable for playing; and in (7b), B understands A’s purpose to indicate that the mission is ready (and the set of available astronauts is the appropriate stereotypical set).

### 1.3 Incorporated Bare Nouns

Carlson (2005) discusses a number of studies of incorporation in various languages. While the languages and the theoretical approaches differ substantially, all these works seem to converge on some sort of stereotypical interpretation of incorporated nouns.

Thus, for example, Borthen (2003) proposes:

A bare indefinite can occur in Norwegian if it is... selected as a complement by a predicate and together with this predicate (and possibly other selected elements) designates a *conventional situation type*... A *conventional situation type* is a property, state, or activity

that occurs frequently or standardly in a given contextual frame (e.g. in the macro social frame) and has particular importance or relevance in this frame as a recurring property, state, or activity type (p. 160).

Similarly, Axelrod (1990) suggests that “incorporation provides the lexicalized version of a typical activity”. Mithun (1984) relates the typicality implication of incorporation to frequency: “some entity, quality, or activity is recognized sufficiently often to be considered nameworthy.” Mulder (1994) follows suit: “Noun incorporation in Sm’algyax occurs when a habitual activity toward an object is expressed.” Similarly, de Reuse (1994) suggests that the incorporated form “refers to habitual, permanent, chronic, specialized, characteristic or unintentional activities or states, or localized events”.

## 1.4 Bare Goal Arguments

Horn (1993) considers sentences with bare goal arguments:

- (8) My brother went to  $\left\{ \begin{array}{l} \text{church} \\ \text{jail} \\ \text{school} \end{array} \right\}$ .

Horn notes that (8) implies that my brother went to church (jail, school) for the purpose of performing the stereotypically associated function (praying, being incarcerated, studying). In this its meaning is different from (9), which means simply that my brother changed his location to the specified location — the church (the jail, the school).

- (9) My brother went to a  $\left\{ \begin{array}{l} \text{church} \\ \text{jail} \\ \text{school} \end{array} \right\}$ .

It appears, then, that four different kinds of bare nominal, which differ on their syntax, semantics, and pragmatics, share a stereotypical “flavor”. Surely this cannot be mere coincidence: there must be something about bare nominals that contributes to this interpretation. How can we explain this fact?

## 2 Unmarked Forms and Interpretations

### 2.1 The basic idea

An idea that goes as far back as Atlas and Levinson (1981) and Horn (1984) can be expressed succinctly by the following well known slogan: unmarked forms receive unmarked interpretations.

The underlying notion is simple: both speaker and hearer want to minimize their effort. Unmarked (shorter) forms are easier for the speaker to produce; unmarked (stereotypical) meanings are easier for the hearer to understand. Hence, unmarked forms are preferred to marked forms, and unmarked interpretations are preferred to marked interpretations.

### 2.2 Bidirectional Optimality Theory

This notion has been formalized by Blutner (1998; 2000) in his Bidirectional Optimality Theory. Blutner considers pairs of form and interpretation:  $\langle A, \tau \rangle$  means that  $\tau$  is the interpretation of  $A$ . Blutner proposes a partial order ‘ $\succ$ ’ on such pairs. Intuitively,  $\langle A', \tau' \rangle \succ \langle A, \tau \rangle$  means that  $\langle A', \tau' \rangle$  is preferred to  $\langle A, \tau \rangle$ . A pair  $\langle A, \tau \rangle$  is *superoptimal* iff it satisfies the following two principles:

**Q principle:**  $\tau$  is a possible interpretation of  $A$  and there is no other pair  $\langle A', \tau \rangle$  satisfying the I principle s.t.  $\langle A', \tau \rangle \succ \langle A, \tau \rangle$

**I principle:**  $\tau$  is a possible interpretation of  $A$  and there is no other pair  $\langle A, \tau' \rangle$  satisfying the Q principle s.t.  $\langle A, \tau' \rangle \succ \langle A, \tau \rangle$

At first sight, the combination of these two principles might appear circular, since the definition of the Q principle refers to the I principle, and the definition of the latter refers back to the former. However, this circularity is not vicious, and, in fact, the principles can predict successfully a number of phenomena.

For an example, consider the following minimal pair, from McCawley (1978):

- (10) a. Black Bart killed the sheriff.  
b. Black Bart caused the sheriff to die.

McCawley notes that while (10a) implies that Black Bart killed the sheriff in a direct way (i.e. shot him), (10b) implies some indirect way of killing, e.g. sabotaging the sheriff's own gun so that it backfires.

Bidirectional Optimality Theory can account for this difference, under the plausible assumption that the stereotypical manner of killing is direct rather than indirect.

Note that the form-meaning pair  $\langle \mathbf{kill}, \textit{direct killing} \rangle$  is superoptimal, since both its form (short) and its meaning (stereotypical) are preferred. But the form-meaning pair  $\langle \mathbf{cause to die}, \textit{indirect killing} \rangle$  is also superoptimal. This is the case, although there are pairs that are preferred to it. For example,  $\langle \mathbf{kill}, \textit{indirect killing} \rangle$  is preferred (its form is shorter), but it doesn't satisfy the I-principle, because the pair  $\langle \mathbf{kill}, \textit{direct killing} \rangle$  is better than it. Similarly, although  $\langle \mathbf{cause to die}, \textit{direct killing} \rangle$  is preferred (its meaning is stereotypical), it doesn't satisfy the Q-principle, since the pair  $\langle \mathbf{kill}, \textit{direct killing} \rangle$  is better than it. Thus, we get the desired result: unmarked forms pair with unmarked meanings, and marked forms pair with marked interpretations.

It appears that Bidirectional Optimality Theory would straightforwardly account for the facts about bare nominals discussed above, provided we make two assumptions:

1. The meaning of bare nominals is unmarked (stereotypical)
2. The form of bare nominals is unmarked (shorter, easier to produce)

These assumptions appear quite reasonable; but are they tenable?

### 3 Non-stereotypicality

Let us first reconsider the claim that bare nominals receive stereotypical interpretations. We will see that this does not hold in general, in any of the four phenomena we have considered.

#### 3.1 Generic Bare Plurals

It is quite easy to show that generics do not, in general, express stereotypicality. Take (11), for example:

- (11) ??Mammals are placental mammals.

The stereotypical mammal is certainly a placental mammal. Hence, if generics expressed statements about stereotypes, (11) ought to be unproblematically true; but the fact is that it is quite bad.



It might be argued that the problem with is simply the fact the same word, *mammals*, occurs in both subject and predicate. Perhaps this is what makes the sentence awkward. To see that this is not the case, consider the following examples:

- (12) a. ??Primary school teachers are female.  
 b. ??People are over three years old.

Although the stereotypical primary school teacher is female, (12a) is bad, and although the stereotypical person is an adult, (12b) is very odd.

Elsewhere (Cohen 1996; 1999; 2004) I account for such facts by proposing that generics carry a *homogeneity* presupposition. The generic  $\text{gen}(\psi, \phi)$  presupposes that its domain,  $\psi$ , is homogeneous, in the following sense: for any psychologically salient criterion by which  $\psi$  may be partitioned into subsets, the conditional probability of  $\phi$  ought to be roughly the same given every such subset of  $\psi$ . That is to say, the domain of a generic may not have "chunks" where there are significantly more  $\phi$ s or significantly fewer  $\phi$ s than there are in the rest of  $\psi$ .

Homogeneity corresponds rather well to the pretheoretical notion of what a generic sentence means. For example, suppose a friend is coming to Israel for a visit, and is worried about whether she will be able to manage, speaking only English. We reassure her by saying

- (13) Israelis speak English.

Observe that (13) means more than simply that if you meet an Israeli, he or she is likely to speak English; in addition, the sentence requires that, wherever you go in Israel, whichever group of Israeli society you associate with, a member of this community will be likely to speak English. Indeed, suppose the friend spent all her visit in a town where nobody spoke English, or with members of some group of Israeli society where English was rarely spoken. In such a case, she would be justified in accusing us of misleading her.

Homogeneity can explain the oddness of examples (11-12) above. Partition according to *biological group* violates homogeneity: one subset (the placental mammals) satisfies the property, another (marsupials) does not. Hence, (11) is bad.

Sentence (12a) is odd because partition according to *sex* violates homogeneity: one subset (the females) satisfies the property, another (the males) does not. And (12b) is bad because partition according to *age* violates homogeneity: some subsets (adults) satisfy the predicated property, others (babies and toddlers) do not.

Why do generics have this requirement? In Cohen (1996) I suggest that homogeneity is useful for inference. If the domain is homogeneous, we are safe from local minima. That is to say, we will not find ourselves in a situation where, because of bad luck, we happen to find ourselves dealing with a subset of the domain where all our inferences are wrong.

For example, consider (1) again, repeated below:

- (14) Ravens are black.

This sentence is acceptable and true, despite the existence of albino ravens. Why? The reason is that albino ravens are homogeneously distributed throughout the raven community—there are no colonies of albino ravens. Hence, if, whenever we encounter a raven, we infer that it is black, this inference will be justified. It might not always prove correct—sometimes we *will* encounter the odd albino raven—but it will not be repeatedly wrong.

Hence, I suggest that the crucial notion which prefers an interpretation of a bare nominal is not whether the interpretation is stereotypical as such, but whether it provides information that is useful for inference. Thus, a generic implies that inferences about its domain are generally reliable. Of course, one of the ways to aid inference is stereotypicality; indeed, this is arguably why we have stereotypes. But it is not the only way: another one is homogeneity.

### 3.2 Existential Bare Plurals

We have seen above that existential bare plurals often imply stereotypicality. Indeed, stereotypicality can aid inference. For example, the hearer of (2a), repeated below, can draw inferences about the tractor (e.g. that it can run).

(15) This tractor has wheels.

However, existential bare plurals are not always interpreted stereotypically. Consider the following sentence:

(16) In this forest, trees are dying.

The stereotypical, indeed the common situation where trees are dying is where the trees are concentrated in some area, the location that was first infected. However, in such a case, where only a single grove out of the forest is dying, (16) would be quite odd. Rather, (16) seems to indicate that the dying trees are homogeneously distributed throughout the forest.<sup>3</sup>

As in the case of generics, so in the case of existential bare plurals, homogeneity serves as an aid to inference. The hearer of (16a) can draw inferences about the forest (e.g. that it is sick), which would not be possible if only a single grove were infected.

For further examples of existential bare plurals that express homogeneity, consider the following sentences, after Greenberg (1994):

- (17) a. (Although it is winter now, in our country...) lakes are dry.  
 b. (Wellington's army has won a great victory today, but...) soldiers are tired.  
 c. (It is New Year's Eve, and...) restaurants are full.

Note that if only lakes located in a specific geographical region, or only salt-water lakes were dry, (17a) would be odd; rather, the sentence implies that throughout the country, lakes are dry. Similarly, (17b) would be bad if only the young soldiers, or only the soldiers in a specific platoon were tired; its acceptability requires that soldiers from a variety of ages, units, etc. be tired. As for (17c), if only Italian restaurants, or only restaurants on a specific street were full, it would be odd; (17c) implies that various types of restaurant, throughout town, are full.

### 3.3 Incorporated Bare Nouns

We have seen that incorporation often implies stereotypicality. What is the role of stereotypicality? Asudeh and Mikkelsen (2000), discussing syntactic noun incorporation in Danish, propose that it is subject to the following constraint:

the resulting predicate must denote an action that is 'institutionalized' (Rischel, 1983). In other words, the denotation of the incorporated verb phrase must be an action or event which is conventionally associated with a certain structure or set of activities (pp. 5-6)

Asudeh and Mikkelsen present the following pair (phonological phrasing is indicated by square brackets):

- (18) a. Min nabo [p købte hus] sidste år  
 My neighbor bought house last year

<sup>3</sup> Or, at least, that the disease is spreading, and that the dying trees *will* be homogeneously distributed in the near future.

`My neighbour did house-buying last year.'

b. #Min nabo [p købte blyant] igår

My neighbor bought pencil yesterday.

Why is (18a) fine, while (18b) is bad? Borthen (2003) explains: “there are presumably more conventionally associated activities connected to buying a house than buying a pen, which is in accordance with the fact that in Danish, the action of buying a house can be expressed with a sentence that contains a bare singular referring to the house, whereas the action of buying a pen cannot” (p. 94).

Incorporated nominals, however, do not always denote a stereotypical activity. Just like with generic and existential bare plurals, incorporated nominals sometimes indicate homogeneity.

In his discussion of verbal incorporation in Chukchi, Dunn (1999) notes that:

the stem **qora-nm-at** — ‘slaughter reindeer’... refers to something which, in Chukchi culture, is a *unitary* activity and is exceptionally noteworthy as a focus of ritual activity and the high point of a day... this incorporation... only refers to reindeer-killing in its traditional Chukchi cultural context, i.e. killing of a domestic meat reindeer with a knife in the prescribed manner with all attendant ritual” (p. 223, my emphasis).

This traditional manner of killing reindeer is *unitary*, i.e. presumably homogeneous, and gives rise to a number of inferences (e.g. about the fact that the animal is domestic, that the killing is done with a knife, etc.), which anyone familiar with the Chukchi culture may draw.

### 3.4 Goal Arguments

We have seen that bare goal arguments imply stereotypicality. This cannot, however, be the only factor. If it were, we would expect sentences like (19) to be fine, and to imply that my brother went to the beach to perform the stereotypically associated activity (bathing).

(19) \*My brother went to beach

The fact is, however, that (19) is bad. Why, then, is (8), repeated below, good?

(20) My brother went to  $\left. \begin{array}{l} \text{church} \\ \text{jail} \\ \text{school} \end{array} \right\}$ .

The explanation I propose is that churchgoers, prison inmates, and school children are fairly homogeneous groups, and many inferences can be made about them. If we learn that the speaker’s brother belongs to one of these groups, there is a fair amount of information we can infer about him. In contrast, this is not the case for beachgoers. What inference can we draw about the speaker’s brother on the basis of his going to the beach?

### 3.5 Dutch Predicate Nominals

Perhaps the clearest case of bare nominals that give rise to an implication of homogeneity is provided by Dutch predicate nominals, studied by de Swart, Winter, and Zwarts (2004). For example, (21a), which uses a bare nominal, implies that being a manager is Henriëtte’s job. In contrast, (21b) merely says that Henriëtte has administrative duties.

(21) a. Henriëtte is manager.

`Henriëtte is manager’

b. Henriëtte is een manager.

`Henriëtte is a manager'

The class of managers is a much more homogeneous group than that of people with administrative duties. Hence, from (21a), but not from (21b), we can infer all sorts of facts about Henriëtte; this is why (21a) uses a bare nominal, while (21b) does not.

To give another example, (22a) implies that Marie's husband is literally a dictator, while (22b) merely expresses the statement that he behaves in a dictatorial fashion.

(22) a. Maries echtgenoot is dictator.

`Marie's spouse is dictator.'

b. Maries echtgenoot is een dictator.

`Marie's spouse is a dictator.'

Again, we can draw many more inferences about Marie's husband if we know that he belongs to the homogeneous group of country leaders who are dictators; we can tell much less about him just on the basis of his dictatorial behavior.

One more example is provided by the sentences in (23).

(23) a. hij is visser

`He is a fisherman'

b. hij is een visser

`He is fishing'

While (23a) says that he belongs to the rather homogeneous group of people whose profession is fishing, (23b) merely says that he is fishing at the time of utterance. Clearly, we can infer much more from the former than from the latter interpretation.

The phenomenon of *class qualifiers* provides evidence that what is at issue here really is homogeneity. These are qualifiers that are used when the predicate is taken to indicate that the argument belongs to a certain class. Significantly, such qualifiers are possible with the bare form of the predicate nominal, but not with the explicit indefinite form:

(24) a. Jan is  $\left\{ \begin{array}{l} \text{advocaat van beroep} \\ \text{Belg van nationaliteit} \\ \text{christen van religie} \end{array} \right\}$ .

b. \* Jan is een  $\left\{ \begin{array}{l} \text{advocaat van beroep} \\ \text{Belg van nationaliteit} \\ \text{christen van religie} \end{array} \right\}$ .

`Jan is  $\left\{ \begin{array}{l} \text{a lawyer by profession} \\ \text{of Belgian nationality} \\ \text{of the Christian faith} \end{array} \right\}$ .

Thus, the predicate nominal indicates that Jan belongs to the group of professional lawyers, Belgian nationals, or religious Christians; all these groups are perceived (rightly or wrongly) to allow the hearer to draw some inferences about Jan.

Compare the above to Borthen's characterization of the type of cases that allow bare singular objects in Norwegian. She notes that the bare singular is fine in sentences like those in (25), but bad in sentence such as those in (26).

- (25) a. Hun er kontorist.  
       she is clerk  
       'She is a clerk.'
- b. Hun er bellonamedlem.  
       she is Bellona-member  
       'She is a Bellona member.'
- (26) a. ??Per er liten gutt.  
       Per is little boy  
       'Per is a little boy.'
- b. \*/??Han er kjernekar.  
       he is splendid-chap  
       'He is a splendid chap.'

Borthen's explanation of these facts notes that the properties predicates in (25) denote homogeneous groups, whereas those in (26) do not. In her own words:

One particularly prominent and frequently relevant contextual frame for human communication, is the macro social frame. For Norwegian, this means the Norwegian society. In this frame, human beings are categorized relative to certain properties. Job, political affiliation, and religion, for instance, are all important properties of individuals because the society or community is organized in terms of these properties; rules make reference to them, money is being distributed according to them, and people are listed and kept track of according to them. On the other hand, being or not being—let's say—a splendid chap, a little boy, or a boring woman, for instance, might be of importance to these individuals' friends, but in the macro social frame these properties are irrelevant; no rules refer to them, no money is being distributed according to them, and presumably no lists of splendid chaps, little boys, or boring women exist anywhere in the system (p. 126).

### 3.6 Inference and Preference

It should be emphasized that homogeneity and stereotypicality are quite distinct concepts. While it might be argued that stereotypicality is the unmarked interpretation, no such argument can be made for homogeneity. Indeed, there is no reason to assume a-priori that the domain of inference is homogeneous—in most cases, this will not be so. Hence, the implication of homogeneity is actually quite informative, and is therefore not simply the unmarked reading.

I propose, then, that the crucial notion is not unmarkedness, but aid to inference. We prefer an interpretation not on the basis of how easy it is to assume it, but on the basis of its potential to support inference.

Using the notation of Bidirectional Optimality Theory, this means that

$\langle A, \tau \rangle \succ \langle A, \tau' \rangle$  if  $\tau$  aids inference, by either:

1. being more stereotypical, or
2. by implying that the domain of inference is homogeneous.

At this point, I ought to clarify what I am *not* saying. It is not my claim that every stereotypical or homogeneous statement is expressed using bare nominals. Clearly, there are other ways to express these notions. However, I *am* claiming the converse: namely, that every use of bare nominals implies that inferences are facilitated, either because the interpretation is stereotypical, or because the domain of inference is homogeneous.

#### 4 Is the Form Unmarked?

We have seen that the preferred interpretation is not necessarily the unmarked one, as claimed by Bidirectional Optimality Theory, but the one that best supports inferences. What about the form? Is the preferred form the unmarked one? Or does an alternative factor apply here as well?

##### 4.1 The Data

Bare nominals are, in a sense, underspecified: they leave out the determiner. There is some reason to believe that underspecified interpretations are preferred (Krifka 2002). But what about underspecified forms?

Obviously, a bare nominal is shorter than a full DP. It is therefore arguably easy to produce. We could therefore say that bare nominals are preferred, because it takes less effort to produce them.

There is, however, a problem with this idea: what is expressed by a bare nominal in one language, is expressed by a definite determiner in another. We can see this in all four forms of bare nominal we have considered.

##### (i) Generic plurals

While generic plurals are bare in English, they are explicitly definite in Romance. Thus, the translation of (1) into Spanish is:

- (27) Los cuervos son negros.  
 `The ravens are black`.

##### (ii) Existential plurals

In Romance, existential plurals that imply stereotypicality/homogeneity are not bare, but rather definite. Thus, the translation of (2a) into Italian is:

- (28) Questo trattore ha le ruote (G. Longobardi, pc)  
 `This tractor has the wheels`.

##### (iii) Incorporated nominals

Carlson (2005) notes that incorporated nominals are often translated into English as definites:

- (29) a-urapá-pirár (Tupinambá—Mithun 1984)

- I-bow-open  
 `I draw my bow`  
 (30) Nej-Ek ‘EIE-IgE-g’i (Chukchi—Polinsky 1990)  
 hill-LOC snow-melt-3SG.S  
 `On the hill, the snow melted.’

**(iv) Goal arguments**

In Spanish, instead of bare nominal goal arguments, we have definites. Thus, the translation of (8) is:

- (31) Mi hermano fue a la  $\left. \begin{array}{l} \text{iglesia} \\ \text{carcel} \\ \text{escuela} \end{array} \right\}$ .  
 church  
 `My brother went to the jail .’  
 school

**4.2 Definites as a Last Resort**

It appears that we can draw the following generalization: languages that can use a bare nominal in the constructions we have discussed, do so. Languages that cannot, use a definite, rather than an indefinite, instead. While it makes sense to assume that a bare nominal is easier to produce than an overt indefinite, could we also argue that a definite is easier to produce than an indefinite?

I would like to offer a speculative affirmative answer to this question. Definites are obviously more prominent than indefinites on the *definiteness hierarchy* (Comrie 1989). This hierarchy has considerable explanatory power, and has been correlated with other prominence hierarchies. For example, subjects are more prominent than objects, and animate individuals are more prominent than inanimate ones. It turns out that subjects are more likely to be definite, while objects are more likely to be indefinite. This, indeed, has been seen as an explanation for the phenomenon of Differential Object Marking: “the most natural kind of transitive construction is one where the [subject] is high in animacy and definiteness, and the [object] is lower in animacy and definiteness; and any deviation from this pattern leads to a more marked construction” (Comrie 1989, p. 128). Hence, some languages have a special way of marking definite objects (sometimes in addition to specific indefinite objects), contrasting them with indefinite ones.

If definites are higher on the prominence scale than indefinites, they may be more easily accessible, hence easier to produce. Let us see how we can use this principle to account for the distribution of definites in the cases discussed here:

**(i) Generic plurals**

In Romance, BPs cannot denote kinds (Longobardi 2001).<sup>4</sup> Elsewhere (Cohen 1996; 2005b), I argue that all generic readings, whether characterizing generics or direct kind predication, require reference to kinds. If this is granted, then Romance BPs cannot get generic readings. Consequently, a different construction is required to express genericity. Since definites are higher on the prominence scale than indefinites, they are chosen.

<sup>4</sup> Chierchia (1995) claims that this is not the case, but his arguments are rather weak; see Cohen (2005b) for discussion.

**(ii) Existential plurals**

Although existential bare plurals are not topical (Cohen and Erteschik-Shir 2002), when they express stereotypicality or homogeneity, they are typically deaccented. Indeed, when stressed, they can only be read contrastively:

- (32) a. THIS tractor has wheels.  
 b. This tractor HAS wheels.  
 c. ?This tractor has WHEELS.

Thus, it is easy to accommodate a context where (32a) is acceptable (e.g. when comparing this tractor with some other, wheeless tractor). It is also easy to accommodate such a context for (32b) (e.g. when it is uttered as a response to someone who claimed the absence of wheels on the tractor). In contrast, (32c) is somewhat odd, and it is hard to think of a context where it would be acceptable—perhaps when used to correct another speaker’s utterance that the tractor has, say, legs.

It is well known that Romance languages disprefer pragmatic deaccenting; hence, producing a bare nominal would not be so easy after all, since it would carry the cost of deaccenting. Consequently, definite plurals are actually easier. Since they are also easier than indefinites, being higher on the prominence scale, they are selected for production.

**(iii) Incorporated nominals**

English does not allow verbal incorporation. The most natural translation of an incorporated noun may be as a bare singular; however, English usually does not allow bare singulars in argument positions either. Hence, because of the prominence hierarchy, the best remaining option is to use definite singulars instead.

**(iv) Goal arguments**

Since Romance does not allow bare singulars in argument position, and since definites are more prominent than indefinites, a definite singular is produced instead.

**5 Conclusion**

We can conclude that the preferred forms are those that are easier to produce, and the preferred interpretations are those that aid inference. Applying the machinery of Bidirectional Optimality Theory, this results in the desired superoptimal form-interpretation pairs.

For example, with respect to the sentences in (2), the superoptimal pairs are:

- 1 <wheels, stereotypical interpretation>
2. <some wheels, non-stereotypical interpretation>

An interpretation can aid inference, hence be preferred, by either providing stereotypical information, or by indicating that the domain is homogeneous.

A form is preferred if it is easier to produce: this means that it is the shortest expression that is consistent with the constraints of the specific language spoken.

Plugging these constraints into Bidirectional Optimality Theory, it follows that bare nominals receive interpretations that are optimal for inference.

**References**

- Asudeh, A. and L.H. Mikkelsen. (2000). ‘Incorporation in Danish: Implications for interfaces.’ In Cann, R., C. Grover, and P. Miller (eds.): *A Collection of Papers on Head-driven Phrase Structure Grammar*. Stanford University.



- Atlas, J. and S.C. Levinson (1981) 'It-clefts, informativeness, and logical form: Radical pragmatics (revised standard version)', in P. Cole (ed) *Radical Pragmatics*. New York: Academic Press, 1-61.
- Axelrod, M. (1990). 'Incorporation in Koyukon Athapaskan'. *International Journal of American Linguistics* 56(2), 179-195.
- Blutner, R. (1998) 'Lexical pragmatics.' *Journal of Semantics* 15(2): 115-162.
- Blutner, R. (2000): 'Some aspects of optimality in natural language interpretation'. *Journal of Semantics* 17:189-216.
- Borthen, K. (2003). *Norwegian Bare Singulars*. Doctoral Dissertation, Norwegian University of Science and Technology, Trondheim.
- Carlson, G. (2005) 'The meaningful bounds of incorporation.' Talk presented at the Conference *Indefinites and Weak Quantifiers*, Brussels.
- Chierchia, G. (1995) 'Individual predicates as inherent generics.' In: G. N. Carlson and F. J. Pelletier (eds.): *The generic book*, 176-223. Chicago: University of Chicago Press
- Cohen (1996) *Think Generic! The Meaning and Use of Generic Sentences*. Doctoral Dissertation, Carnegie-Mellon University. Published 1999, CSLI, Stanford.
- Cohen, A. (1999) 'Generics, frequency adverbs, and probability. *Linguistics and Philosophy* 22: 221-253.
- Cohen, A. (2004) 'Generics and mental representation'. *Linguistics and Philosophy*, 27(5), 529-556.
- Cohen (2005a) 'More than bare existence: an implicature of existential bare plurals'. *Journal of Semantics*. 22: 389 - 400
- Cohen, A. (2005b) 'The meaning of bare plurals: evidence from Italian.' Talk presented at the Conference *Indefinites and Weak Quantifiers*, Brussels.
- Cohen, A. and N. Erteschik-Shir (2002). 'Topic, focus, and the interpretation of bare plurals.' *Natural Language Semantics* 6:339-405.
- Comrie, B. (1989) *Language Universals and Linguistic Typology*, 2nd ed., University of Chicago Press, Chicago.
- Declerck, R. (1986) 'The manifold interpretations of generic sentences' *Lingua* 68:149-188.
- Dunn, M. (1999). *A Grammar of Chukchi*. Ph.D. dissertation, Australian National University, Canberra.
- Greenberg, Yael: 1994, *Hebrew nominal sentences and the stage/individual level distinction.*, Master's thesis, Bar-Ilan University.
- Geurts B., (1985): 'Generics.' *Journal of Semantics* 4, 247-55.

- Horn, L. R.: (1984), 'Toward a new taxonomy for pragmatic inference: Q-based and R-based implicature', in D. Schiffrin (ed.), *Meaning, Form, and Use in Context: Linguistic Applications*, pp. 11—42. Georgetown University Press, Washington.
- Horn, L. R.: (1993), 'Economy and redundancy in a dualistic model of natural language', in S. Shore and M. Vilkkuna (eds.) *SKY 1993: 1993 Yearbook of the Linguistic Association of Finland*, pp. 33—72. The Linguistic Association of Finland, Turku.
- Krifka, M. (2002) 'Be brief and vague! And how Bidirectional Optimality Theory allows for verbosity and precision.' In *Sounds and systems: studies in the structure and change. A Festschrift for Theo Vennemann*, eds. David Restle and Dietmar Zaefferer, 439-458. Berlin / New York: Mouton de Gruyter.
- Longobardi, G. (2001) 'How comparative is semantics? A unified parametric theory of bare nouns and proper names' *Natural Language Semantics* 9, 335-369.
- McCawley, J.D. (1978). 'Conversational implicature and the lexicon'. In: *Syntax and Semantics 9: Pragmatics* (P. Cole, ed.), pp. 245-259. Academic Press, New York.
- Mithun, M. (1984). 'The evolution of noun incorporation'. *Language* 62, 847-94.
- Mulder, J. G. (1994). *Ergativity in Coast Tsimshian (Sm'álgyax)*. University of California Press: Berkeley.
- Polinsky, M. (1990). 'Subject incorporation: evidence from Chukchee.' In: Dziwirek et al. (eds.): *Grammatical Relations: A Cross-Theoretical Perspective*. Stanford: CSLI, 349-364.
- de Reuse, W. (1994) 'Noun incorporation in Dakota (Siouan).' *International Journal of American Linguistics* 60(3), 199-260.
- Rischel, J. (1983) 'On unit accentuation in Danish – and the distinction between deep and surface phonology.' *Folia Linguistica* 17:51–97.
- de Swart, H., Y. Winter and J. Zwarts (2004) 'The interpretation of bare predicate nominals in Dutch'. Unpublished ms.

# MENTION SOME OF ALL\*

Paul Dekker,  
ILLC, Universiteit van Amsterdam

p.j.e.dekker@uva.nl

## Abstract

In the interpretation of natural language one may distinguish three types of dynamics: there are the acts or moves that are made; there are structural relations between subsequent moves; and interlocutors reason about the beliefs and intentions of the participants in a particular language game. Building on some of the formalisms developed to account for the first two types of dynamics, I will generalize and formalize Gricean insights into the third type, and show by means of a case study that such a formalization allows a direct account of an apparent ambiguity: the ‘exhaustive’ versus the ‘mention some’ interpretation of questions and their answers. While the principles which I sketch, like those of Grice, are motivated by assumptions of rationality and cooperativity, they do not presuppose these assumptions to be always warranted.

*Key words:* natural language interpretation, dynamic semantics, semantics-pragmatics interface, Gricean pragmatics, epistemic logic, decision theory.

In the interpretation of natural language one may distinguish three types of dynamics, which, though obviously related, can be studied relatively independently. Firstly, there are the acts or moves that are made, assertions, questions and answers, commands and permissions, etc. The first two categories have been studied by Stalnaker, Groenendijk and Stokhof, Heim and Veltman, to name a few. Secondly, the strict interpretation of these moves are interrelated in that there are structural relations between subsequent moves such as anaphoric dependencies, ellipsis configurations, and discourse relations, all of which have to be resolved. The work on these subjects is so numerous that it is even impossible to mention here only the most important ones. While this second type of dynamics is of an arguably ‘local’ nature, which can be studied by focusing on move-pairs, or small sequences, I will argue that the third type of dynamics requires one to take a ‘global’ perspective, which takes into account (assumptions about) the beliefs and intentions of the participants in a language game. I will generalize and formalize Gricean insights into these subjects, and show by means of one case study that such a formalization allows a direct account of an apparent ambiguity: the ‘exhaustive’ versus the ‘mention some’ interpretation of questions and their answers. While the principles which I sketch, like those of Grice, are motivated by assumptions of rationality and cooperativity, they do not presuppose these assumptions to be always warranted. In this small paper I will not provide much technical details, but confine myself to sketching and illustrating the main ideas.

I will proceed as follows. In the first two sections I present the basic concepts of the semantics of declaratives and interrogatives, and of the dynamics of questions and their answers. I present

---

\*Various versions of this paper have been presented at the UCLA Linguistics Department in 2003, the 5-th LLC Symposium in Tbilisi 2003, Sinn und Bedeutung VIII in Frankfurt 2003, the ILLC Amsterdam in 2004, the IKP in Bonn 2004, LoLa8 in Debrecen 2004, the workshop Sémantique et Modélisation in Paris 2005, and of course Sinn und Bedeutung X in Berlin 2006. I thank the audiences for constructive criticisms and inspiring comments. The work reported on has been funded by a grant from the Netherlands Organization for Scientific Research (NWO) for the project *Formal Language Games*, which is gratefully acknowledged.

the main ideas only, and only the main concepts to be used later, as they can be deemed quite classical and because they are defined and discussed at length at various other places. In section 3 I present the notion of an ‘optimal discourse’, a reinterpretation of Grice’s conversational maxims which does not serve as a set of categorial imperatives, but as a measure to explain other people’s discourse moves, and to motivate those of one’s own. In section 4 it is shown how this notion can be used to explain, on the basis of the exhaustive semantics from the first two sections, the non-exhaustive interpretation of questions and answers in specific cases. Section 5 sums up the results and establishes directions for future work.

## 1 The Semantics of Declaratives and Interrogatives

According to a long and widely respected tradition, the spirit of which can be traced back to the work of Gottlob Frege, the meanings of declarative sentences can be equated with their truth-conditions. As Wittgenstein has put it: “Einen Satz verstehen, heißt, wissen was der Fall ist, wenn er wahr ist.” (“To understand a proposition means to know what is the case, if it is true,” *Tractatus Logico-Philosophicus*, Satz 4.024.) Declarative sentences are used to convey information about the world, and if you know what the world ought to be like in order for such a sentence to be true, you grasp what the world is like if someone sincerely asserts such a sentence, and is not misguided. It is important to emphasize that one does not need to know whether such a sentence is true, because then an assertion of it would hardly be informative; the main point of asserting declarative sentences resides in communicating information which has not been established before.

This idea can be fleshed out in a Tarskian fashion by a recursive definition of a satisfaction relation  $\models$  which defines truth of a formula relative to a model and/or world, and a number of parameters relevant to the interpretation of the formula, such as those that determine the interpretation of overt or covert pronouns, and that of, slightly more technically, free variables. In the remainder of this paper such a satisfaction relation is taken for granted.

The meanings of interrogative sentences can be understood in a similar fashion. According to the classical doctrine, set out by Hamblin, Karttunen, and Groenendijk and Stokhof, knowing the meaning of an interrogative sentence equals knowing the conditions under which it is answered, so that the meanings of interrogatives can be equated with their answerhood-conditions. Again, one does not need to be taken to know, in order to understand a question, what is the full and true answer to it, what is relevant is that one knows, what, in various circumstances, counts as a full and true answer. A uniform and perspicuous implementation of this idea has been given in (Groenendijk and Stokhof 1984), where a question is conceived of as a function, which in each circumstance or world defines the full and true answer to the question in that world, and effectively this cuts up logical space into a partition in which worlds are grouped together iff they define the same full and true answer; in turn this corresponds to an equivalence relation over the set of possibilities such that two possibilities are taken as equivalent for the question iff the same full and true answer holds there, and relevantly different iff not. Before I illustrate this notion of the meaning of a question, it must be emphasized that it is a purely semantic, if one wants Fregean or Platonic, notion. More pragmatic notions of answerhood have been presented in terms of this notion already in Groenendijk and Stokhof’s work, and a more fine-tuned practical interpretation of actual answers given will be discussed below.

Questions can be understood, in general, as querying the values of a (possibly empty) list of variables. In case the list is empty, we are dealing with a polar, or ‘yes’/‘no’-question like  $?p$  (“Does it rain in California now?”). The answers will be the singleton set containing the empty sequence (the truth value **1**) in case it is indeed raining in California, or the empty set (the truth

value  $\mathbf{0}$ ) in case it is not. This cuts up the space of possibilities in two blocks, one block of possibilities in which it rains in California, and one block of those in which it doesn't. More structure is generated by constituent, or *Wh*-questions. Consider the following question, with associated gloss:

- (1) Who will come to the banquet? ( $?x Cx$ )

A full and true answer specifies, in each possibility, all of those whom come in that possibility, and, moreover, that nobody else comes. Effectively, this renders possibilities equivalent iff exactly the same persons come to the banquet in those possibilities, and if at least one person comes in one possibility and not in another, then they are rendered distinct. If, for the purpose of exposition, we assume the domain contains only two relevant individuals,  $a$  and  $b$ , the meaning of the question can be displayed as follows:

$?Cb :=$ does $b$ come?	$\neg\exists x Cx$	$Ca \wedge \neg Cb$
	$\neg Ca \wedge Cb$	$\forall x Cx$

$?Ca :=$  does  $a$  come?

The question queries, for each individual, i.e.,  $a$  and  $b$ , whether that individual comes. The conjunction of the questions whether  $a$  comes and whether  $b$  comes cuts up logical space into four parts: one block of possibilities in which both answers are negative (none come), two blocks of possibilities in which only one of them comes (only  $a$  and only  $b$ , respectively), and one block of possibilities in which both come. Once one knows in which of these blocks the actual world resides, one knows the full and true answer. This approach generalizes to multiple *Wh*-questions like:

- (2) Who gave what to whom? ( $?xyz Gxyz$ )

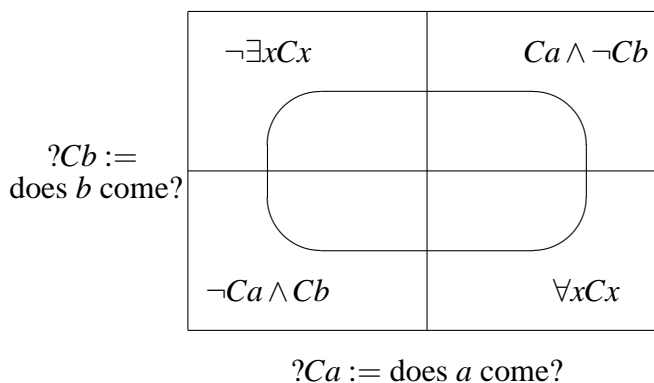
This question asks for a specification of the *give*-relation; in any possibility it will have to specify the full set of triples which stand in the *give*-relation, together with the specification that no other triple stands in that relation.

As may be clear from this exposition, the *semantics* of questions is taken to be an exhaustive one. The various (semantic) answers to a question are exhaustive answers in that they specify the full and exact set of values of a given predicate or relation. (This is the same in case of polar questions, but then there is only one possible value: the empty sequence.) As we will see below, this does not mean that actual answers given need to be understood this way—they can be felicitous when they only partially answer a question, and even questions themselves can be felicitously understood as querying only a partial specification. For now, however, it is more important to observe three things. Firstly, this semantic notion of answerhood underlies a uniform notion of entailment in terms of  $\subseteq$ , also indicated by means of  $\models$ , which corresponds to logical entailment if it relates two declaratives, which corresponds to answerhood if it relates a declarative and an interrogative, and which corresponds to question subsumption if it relates two interrogatives. That is, all of the following are valid:

$$(3) \quad \begin{aligned} \forall x Cx &\models Ca \\ \forall x(Cx \leftrightarrow x = a) &\models ?x Cx \\ ?x Cx &\models ?Ca \end{aligned}$$

Secondly, as observed by van Rooij (2003), a partition theory of questions naturally links up with decision theory, both intuitively, as well as technically. That is, an agent's decision problem may also be modeled by a partition of logical space, to the effect that the blocks in the partition correspond one to one to the alternative actions the agent has to choose from. In the example above, our protagonist may be wondering whether or not go to the banquet, and whether or not to advise Kata to go there. If none of  $a$  and  $b$  come it might be good to go together; if only  $a$  comes, I might better go alone and if only  $b$  comes Kata might better go alone; if both  $a$  and  $b$  come, Kata and me might better stay home both of us. Once I have a full answer to the semantic question displayed above, I know in this case what to do.

The very same situation can be used to make the third and final point. If my question indeed is whether or not to go to the banquet, and whether Kata should go there, the relation between the question meaning and my decision problem is mediated by a number of assumptions, for instance that it is fine for me to go there with  $a$  only, and not for Kata, and that it is no good for me to be there with only  $b$ , while this is no problem for Kata, etc. My predicament therefore better be displayed as follows:



where the oval distinguishes the possibilities I conceive of as maybe actual from those I have already excluded. If it so happens that the actual world lies, say, in the left bottom block outside of the oval, and you know it, you might truly and rightfully answer that only  $b$  comes; however, this might not appropriately solve my decision problem, because this might be one of these worlds I have mistakenly excluded because it is one in which indeed it is a problem for Kata to be with only  $b$  and not for me. For the remainder it is important that questions faced (“Will I go to the banquet? Should Kata go as well?”) are not literally the same as those posed (“Who come to the banquet?”); yet, against the background of my information, it is assumed that the latter entails the first, according to the notion of  $\models$  sketched above.

## 2 The Dynamics of Questions and Answers

Stalnaker (1978) presents it as two of four ‘truisms’ that the content of an assertion can be dependent on the context in which it occurs, and that assertions affect, and are intended to affect, this context. The interpretation of pronouns, for instance depends on the specific contexts in which they are used, and certain presuppositions may or may not be acceptable as a consequence of the information available in the context in which they are triggered. The context next, will be altered to the effect that the interlocutors can take it for granted that a certain assertion has been made, and, if no objections are made, that its contents are added to the stock of com-

mon knowledge. Although, it seems, Stalnaker regards these as observations belonging to the realm of pragmatics (Stalnaker 1998), they have been taken up in indeed quite of few formal systems of interpretation: Kamp's discourse representation theory, Heim's file change semantics, Groenendijk and Stokhof's dynamic predicate logic, and Veltman's update semantics, to name but a few. Whereas in each of the mentioned systems the concept of a context is adapted to their various purposes, they all implement the idea that the interpretation of discourse resides in a step-wise update of information.

Interrogatives have been accommodated into this picture as well, in various ways. The idea is that, while it is assumed that indicatives are used to add information to the context, interrogatives are used to add questions, in the semantic sense described in the previous section (Ginzburg 1996, Groenendijk 1999, Hulstijn 2000, Jäger 1996, Roberts 1996). The general idea, the first type of dynamics sketched above, thus consists of conceiving of the interpretation of a discourse as a step-wise update of a 'common scoreboard' (Lewis) with information and questions, and under the assumption that, in general, the information provided resolves the questions asked.

The second type of dynamics is of an, arguably, more instrumental nature. Questions and their subsequent answers may hang together in a more structural manner than one can account for according to the platonistic view sketched in the previous section. This already holds for two assertions by the way. Most of the mentioned dynamic theories of interpretation expand upon the fact that the use of a certain type of term (a name, a definite or indefinite description) may be associated with a witness as its value which can be referred back to by means of a pronoun in a subsequent assertion—while this does not (need to) hold for a truth-conditionally equivalent assertion which does not employ such a term. One of the arguments of a structured meanings approach to questions (von Stechow 1991, Krifka 1991), as against the propositional one sketched above, is that something similar holds for question-answer pairs.

Consider the following two questions:

- (4) Is it raining?
- (5) Is it not raining?

Besides some clearly pragmatic overtones, these questions are equivalent on the propositional approach, since their propositional answers are "It is raining." and "It is not raining." They are not fully equivalent, though, since an elliptical answer like "Yes." ("No.") to the first may mean something different than when it answers the second. Similarly:

- (1) Who is coming to the banquet?
- (6) Who is not coming to the banquet?

can both be taken to ask for a full specification of who is, and who is not coming to the banquet. Yet, a constituent reply like "Susanne and Wilfrid." will be interpreted differently in response to these two questions. These facts have also been observed by Groenendijk and Stokhof and they already submitted that, for a proper interpretation of these questions and their elliptical answers, one needs to have access to the *abstracts* associated with these questions, precisely the moral advocated on the structured meanings approach. Roughly, the idea is that example (1) queries that set of individuals coming, and example (6) the set of individuals not coming. Even though either set determines the extension of the other, they are obviously not the same, and thus they can help to characterize the relevant difference between the above two pairs of examples.

These observations have been implemented in an update semantics in (Aloni, Beaver and Clark 1999) and (Dekker 2003). While the papers only provide for a minor structural extension of the semantics of questions, they allow one to deal with the dynamics of question-answer pairs as indicated above, and in principle also of a kind of topical restriction like we find in the following examples. As Jäger (Jäger 1996) observed, an answer like:

(7) Only Socrates is wise.

means something different as a reply to the following two questions:

(8) Who is wise?

(9) Which Athenian is wise?

In reply to the first, it asserts that Socrates is the only wise *person*, while in reply to the second it only asserts that Socrates is the only wise *Athenian*. Also, if *A* asks:

(10) Which students join the trip?

then *B*'s counter question:

(11) Who *want* to join?

can be taken to mean which *students* want to join. And we can also identify a difference between the following assertions with 'embedded questions':

(12) Mary was surprised who came.

(13) Mary was surprised who did not come.

Finally, using a technique deriving from (Zeevat 1994),

(14) Who gave what to whom?  
 John a book to Mary.  
 Jane a funny hat to some hippie.  
 Somebody else all her recordings of "Friends" to Denise.  
 And nobody anything to anybody else.

can be interpreted totally compositionally. While the underlying notion of a question is exhaustive, the various answers can be interpreted as partial answers, while the closing statement is eventually interpreted as telling us that the full exhaustive answer has by now been given. See (Dekker 2003) for details.

### 3 The Pragmatics of Questions and Answers

The two types of dynamics discussed in the previous section will be assumed in the explanation of the third type, in this section, but they are not sufficient to motivate it. The fact that certain questions are asked, and certain assertions are made, nor structural relations between the two, may help explain what is the intended or interpreted relevance of the two. So, while it is obvious



that *John comes to the banquet, and no other students do.* can be relevant in response to a question *Who will come to the banquet?*, almost any other utterance (indicative or interrogative) can be relevant as well. This has already been noticed in (Groenendijk and Stokhof 1984), and (van Rooij 2003) gives a decision-theoretic explanation of the facts, in quantitative terms. In (Dekker 2004) I have argued that an intuitive, qualitative explanation along the lines of Grice can be furthered as well, as long as we do not give an imperative interpretation to these maxims, and formalize them sufficiently generally.

What is the point of posing questions and making assertions? There can be many such points, including that of keeping the conversation running, testing agreement, establishing face, making fun, etc. Focusing on inquisitive discourse, or games of information exchange, we may assume that the interlocutors come with their own questions (in relation to decision problems, or just out of interest) which they seek to be answered in a reliable and comfortable way. Bearing this in mind, we can say that a discourse is optimal iff the participants' questions are answered, to the best of the knowledge of all of the participants, and indeed in an efficient or otherwise convenient way.

Before I make this idea relatively precise, it is important to identify one difference with Grice's statement of the facts or principles. Grice's maxims are formulated as imperatives about how to behave in a rational and cooperative dialogue; I only want to state a notion of what would be an optimal dialogue, a notion against which actual dialogue facts can be evaluated. Even when we are engaged in an inquisitive discourse, facts of life have it that things need not be optimal: we can fail relevant information, we can fail the means to query the right type of information, and we can misjudge what is the most efficient or convenient way to achieve the intended result; besides, we may be right or wrong in assuming that our interlocutors are rational and cooperative. When engaged in a conversation, we may have to be well aware of all these possibilities. (See, however, work of Alexandru Baltag, Anton Benz, Robert Stalnaker and Ede Zimmermann for some of the philosophical and technical pitfalls in playing with notions of uncooperativity and irrationality.)

With the previous comments in mind, I have proposed the following notion of an 'optimal discourse' in (Dekker 2004), which is modeled after Grice's division into four maxims:

**Definition 1 (Optimal Inquiry)** *Given a set of interlocutors  $A$  with states  $(\sigma)_{i \in A}$  a discourse  $\Phi = \phi_1, \dots, \phi_n$  is optimal iff:*

- $\forall i \in A: D([\Phi]) \cap D(\sigma_i) \models \sigma_i$  (relation)
- $\bigcap_{i \in A} D(\sigma_i) \models D([\Phi])$  (quality)
- $\Phi$  is minimal (quantity)
- $\Phi$  is well-behaved (manner)

The requirement of relation requires an optimal discourse to answer all questions of all interlocutors. The information provided by  $\Phi$  is hoped to answer the questions in any state  $\sigma_i$ . That of quality requires these answers to be supported by the data which the interlocutors had to begin with. These two requirements are defined in full formal rigour in (Dekker 2004). The requirements of quantity and manner are deliberately left underspecified, but they ought to come with some intuitive understanding.

When agents engage in a cooperative conversation, it is reasonable that they make clear what questions they have, and that they provide information which they have support for. The above notion of an optimal inquiry accounts for this, but it also serves to guide agents in a dialogue in which the conditions are not guaranteed to be optimal.

Let us first look at an optimal situation. Suppose *A* wishes to know whether Sue comes to the banquet (?*s*), and *B* wants to know whether Tim comes to the banquet (?*t*), and assume that *B* knows that Sue will come, and that *A* knows that Tim will not come if Sue comes. The following dialogue is optimal then:

- (15) *A*: Will Sue come?  
*B*: Yes.  
       Will Tim come?  
*A*: No, not if Sue comes.

Both questions are answered, by information which was initially there distributed over the two original information states. The discourse is also quite minimal, and, depending on one's standards, well-behaved.

Example (15) can be used to show that some standard felicity requirements (like informativity, non-redundancy, consistency, and congruence of answers with questions) can be derived from the notion of an optimal discourse. More interestingly, it can also be used to explain why certain dialogues are perfectly reasonable also if certain contributions are not direct replies to questions posed just before, or if questions posed differ from questions faced. Information management may need more sophistication because understanding actual discourse requires reasoning about beliefs and intentions (epistemic logic and decision theory).

Even if we do not take into account any suspicions about irrationality or uncooperativity, the following situation must be telling. Suppose I am wondering whether or not to go to the banquet tonight. Being an academic, I don't say to myself: "Go there and have fun," but I count my blessings. I'd like to talk to professors *A* and *C*, but there are some complications. If, besides professor *A*, professor *B* is there as well she will absorb *A*, if *B* doesn't absorb professor *C*, that is, if *C* is not absorbed by professor *D*; furthermore, if neither *B* and *C* are present, *D* will absorb *A*. This is not an abnormal academic situation. The following table lists the configurations under which it is appropriate for me to go (given that my assumptions about *A*, *B*, *C* and *D* are right, of course):

•	<i>C</i> & <i>D</i>	<i>C</i> &¬ <i>D</i>	¬ <i>C</i> & <i>D</i>	¬ <i>C</i> &¬ <i>D</i>
<i>A</i> & <i>B</i>	-	+	-	-
<i>A</i> &¬ <i>B</i>	+	+	-	+
¬ <i>A</i> & <i>B</i>	-	-	-	-
¬ <i>A</i> &¬ <i>B</i>	-	+	-	-

All I want to know is if I am living in a + or – world, which corresponds to a positive or negative decision about going to the party, and which basically is a polar (*Yes/No*-) question. I could ask:

- (16) Will I go to the party? (?*C*<sub>*i*</sub>)

which, normally, is a stupid thing to ask, of course, in an academic environment. The question I face is a polar one so, in order to characterize my question I have to ask you whether I am in one of the + or – worlds. This is somewhat awkward. One of the most minimal 'linguistic' means to distinguish the + from the – worlds that I could find is rendered by the following formula:

- (17)  $(A \text{ AND } [(\neg B \text{ AND } (D \rightarrow C)) \text{ OR } (B \text{ AND } C \text{ AND } \neg D)]) \text{ OR } (C \text{ AND } \neg B \text{ AND } \neg D)?$

Nobody will be happy answering (or even interpreting) a natural language analogue of this. Instead, I could ask:

(18) Who come? ( $?x Cx$ )

Formally, and semantically speaking, this asks for more than I need to know: not just whether I am in a + or – configuration; rather, it asks in which of the 16 possible situations I am in the configuration displayed above. Even so, any answer to this question entails an answer to the question I face (the publicly posed question formally entailing the first one I really face), so the question makes sense, and, as we can see, question (18) is much more convenient than question (17).

The upshot of this discussion is that we can ask for more information than we actually need, formally speaking. This observation can be strengthened by means of the sequence that possibly follows an utterance of (18). A partial answer to (18) may be:

(19) Arms will not come, but Baker does...

In the situation sketched this would already be sufficient to resolve my decision problem. All possibilities in which Arms does not come but in which Baker does, are ones in which it does not make sense, I think, to go to the banquet. (Inspect the third row of the table, which contains only –'s.) So, even though you are not aware of my predicament, and do not know how to sort out to fulfill the purpose of giving a full exhaustive answer to my question (18), I can stop you by saying: “I know enough, thanks, I will not go myself; but let this not stop you from going there yourself.” (Kind, and irrelevant, as I am.)

The upshot of this discussion is twofold. Again, as in section 2, we face a question actually posed which does not exactly match a question actually faced. This time, however, a pragmatically partial answer to a question posed may serve to definitely settle a question actually faced. What is more, such a resolving partial answer may be anticipated, and this fact brings to bear on a quite theoretical issue, that of the exhaustive versus mention-some understanding of questions and answers in general. If a partial answer to a question, semantically understood exhaustively, can be reasonably interpreted as being settling, pragmatically, then both the semantic (‘exhaustive’) interpretation can be saved, as well as its pragmatic (‘mention some’) interpretation.

#### 4 An Application: “Mention Some”

In the academic debate there is extensive discussion about the issue whether or not an ‘exhaustive’ or a ‘mention some’ meaning of interrogatives should be taken as basic, even though this issue is not represented by polemics in the standard journals. The issue is ‘academic’ in that, in general, both approaches are intertranslatable to a certain firm degree. Exhaustive interpretations of questions entail mention-some ones, and exhaustive sets of mention-some replies to questions equal their exhaustive answers. In this paper I have taken an exhaustive semantic interpretation as basic, and allowed for a natural pragmatic interpretation of partial, or ‘mention some’ answers, basically, like Groenendijk and Stokhof (1984) did. Before we evaluate this proposal, it makes sense to inspect some examples that have been put forward to argue for the opposite approach.

The following examples typically have a ‘mention some’ interpretation:

- (20) Who's got a lighter?
- (21) How can I open a .gzip file?
- (22) How do I get to the station?
- (23) Where do they serve Thai food?

Intuitively, one instantiation of the queried variable (*Wh-term*, *How-* or *Where-*phrase) may serve to answer these question satisfactorily. They don't seem to be used, in general, to query all of their possible values. One light is enough to light a cigarette; nobody seems to be interested in all possible ways to open .gzip files; certainly nobody needs an explanation of the infinite number of ways in which one can reach the station; and one good Thai restaurant nearby will serve my purpose, not necessarily knowing all of the ones around.

Do these examples speak against an exhaustive semantics of questions? I don't think so. Two observations are in place first. All of the above questions can be used to ask for exhaustive specifications in the first place, and one really needs little imagination to see so. If there has been a big fire, and lighter owners are suspect, then the inspector asking (20) is most probably interested in the whole set of lighter owners, not just an occasional one who can light Kojak's cigar. Similarly for the other examples. In the second place, any exhaustive answer to these questions entails one or more of the possibly required mention some replies. This is simply so by definition.

The only question seems to be, then, why to raise an issue ("Who's got a lighter?") while a semantically more simple issue ("Has anybody got a lighter?") is at stake? Any smoker with some linguistic interest, and any linguist with some interest in her smoking colleagues, can figure out the answer.

I do not believe there are hard and fast arguments against or in favor of exhaustive readings of questions and their supposed answers. I do have qualms, however, like Grice, against positing ambiguities though. One line of explaining the facts is advocated here: a speaker can expect the hearer to realize that her decision problem is more difficult to formulate than the question actually posed and that *the latter entails the first*. This part of the show can be adequately formalized, as has been done before. I have doubts about the other way around, but, of course, my doubts by themselves don't constitute an argument.

To round up this paper, I would like to discuss in some detail a typical 'mention some' example. Consider again example (23):

- (23) Where do they serve Thai food?

Just to be sure, this example can naturally be used on an exhaustive interpretation, and any exhaustive reply will satisfy any 'mention some' demands of the questioner. Even so, it seems, people tend to think it is typically used with a 'mention some' interpretation.

But now wonder what will be the predicament of someone who comes up with such a question with such an interpretation. Simplifying matters, we can imagine you on a junction where you can go North, East, South and West; your intention is to have good Thai food. Your decision problem resides in choosing one of the four directions, but the chosen one must be taken to lead to a nice Thai restaurant. The question you face, and which does not make much sense to pose, is "Where do I go?" If we translate this question into a relevant one about the facts of the matter, it could be something like the conjunction of the following four:

- (24) Will I go North and find a nice Thai restaurant?  
 Will I go East and find a nice Thai restaurant?  
 Will I go South and find a nice Thai restaurant?  
 Will I go West and find a nice Thai restaurant?

The four questions are mutually exclusive, as is required on a partition approach. All four of them are also based on the assumption that you do find a nice Thai restaurant, a presupposition which can be cancelled of course. (Like we saw before in our discussion of example (18), it may be acutely relevant to dismiss such presuppositions if they are not obviously satisfied.)

Let us assume that there is indeed a nice Thai restaurant around, even in all of the four possible directions. Still the conjunction in (24) is quite laborious and even oppressive. Instead, you might ask (23) and you and I will be sensible enough to figure out that question (24) is what you aim to find out.

A pragmatic explanation of ‘mention some’ interpretations of questions which are assumed to be exhaustive semantically, of course does not suffice to explain ‘mention some’ interpretations of embedded questions (Beck and Rullmann 1999). On a first score, this is as we want it to be. Consider:

- (25) Mildred knows who come to the banquet.

We don’t want to render this qualification of Mildred true if she knows of only one person that he or she will come to the banquet. Asserting (25) implies that Mildred has exhaustive knowledge about who come, among the relevant persons, of course. The following example might cast some doubt on this conclusion:

- (26) George knows where they serve Thai food.

Asserting (26) seems to be well motivated if George knows one place where they serve Thai food and where to find it. I am not sure whether this can be taken as an argument against an exhaustive interpretation of questions. My own intuitions do not decide on the evaluation of (26) in case various good places serve Thai food; besides, arguments from attitudinal contexts like those presented by ‘know,’ ‘believe,’ and the like, are suspect anyway. My interpretation of Kripke’s puzzle about belief is that there is a bigger problem about belief ascriptions in general than about the rigid semantics of proper names, and I get similar conclusions from Stalnaker’s work. Indeed all of this may imply that an autonomous semantic enterprise is eventually doomed to failure, and maybe this is even Martin Stokhof’s conclusion in (Stokhof 2002). Nevertheless, as long as we do not bring semantics to the grave, and do not prematurely cremate formal pragmatics, there is hope for a very well established line of exhaustive research.

## 5 Conclusions

In this paper I aimed to focus on a Gricean type of dynamic interpretation which, I claim, is different from two other types of dynamics extensively studied in the literature. I have suggested that this type of dynamics stands in need of both motivation and formalization. A motivation has been given in terms of a notion of an optimal discourse, which is based upon principles of rationality and cooperativity, but which does not presuppose them. The formalization has been partial, because some of it is crucially social, cultural, or otherwise underdetermined.

I have focused on the use of declaratives and interrogatives in what are called inquisitive dialogues. The semantics of these types of sentences has been assumed to be classical: satisfaction conditions, and, in case of interrogatives, (exhaustive) answerhood conditions. Not for the purposes of this paper, but for a general semantic program in the long run, I have assumed a more structured approach along the lines of Krifka, as has also been suggested by Groenendijk and Stokhof themselves.

One of the main observations is that questions posed and questions faced, although logically related, may diverge. Thinking of it, this is not a very surprising observation. I could ask you whether Sue comes to the banquet, not because I want to know, but because I know that if she comes, Tim comes as well, and because I do not want you to know that I am interested in the question whether Tim is coming. Theoretically, the observation has some impact. It allows us to explain that we may ask for more information than we actually need, and, properly understood, our respondents may act accordingly. A ‘mention some’ interpretation of questions and answers, even on an ‘exhaustive’ semantic evaluation, can thus be rapidly explained.

As appears from the lack of definitions in this paper, it is by and large programmatic. The real work has to be done by means of some epistemic logic and decision theoretic reasoning. I hope to have shown, however, that this can be neatly based on a classical semantic understanding of declarative and interrogative sentences.

## References

- Aloni, M., Beaver, D. and Clark, B.: 1999, Focus and topic sensitive operators, in P. Dekker (ed.), *Proceedings of the 12-th Amsterdam Colloquium*, ILLC/Department of Philosophy, Amsterdam, pp. 55–60.
- Beck, S. and Rullmann, H.: 1999, A flexible approach to exhaustivity in questions, *Natural Language Semantics* 7, 249–298.
- Dekker, P.: 2003, Topical restriction and answerhood, in M. Weisgerber (ed.), *Proceedings of the Seventh Annual Meeting Sinn und Bedeutung*, Universität Konstanz, Konstanz, pp. 110–119.
- Dekker, P.: 2004, Satisfying questions, in C. Meier and M. Weisgerber (eds), *Proceedings of the Eighth Annual Meeting Sinn und Bedeutung*, Universität Konstanz, Konstanz, pp. 83–94.
- Ginzburg, J.: 1996, Interrogatives: questions, facts, and dialogue, in S. Lappin (ed.), *The Handbook of Contemporary Semantic Theory*, Blackwell, Oxford.
- Groenendijk, J.: 1999, The logic of interrogation, in T. Matthews and D. Strolovitch (eds), *Proceedings of SALT IX*, CLC Publications.
- Groenendijk, J. and Stokhof, M.: 1984, *Studies on the Semantics of Questions and the Pragmatics of Answers*, PhD thesis, University of Amsterdam, Amsterdam.
- Hulstijn, J.: 2000, *Dialogue Models for Inquiry and Transaction*, PhD thesis, University of Twente.
- Jäger, G.: 1996, Only updates. On the dynamics of the focus particle *only*, in M. Stokhof and P. Dekker (eds), *Proceedings of the Tenth Amsterdam Colloquium*, ILLC, University of Amsterdam, Amsterdam, pp. 387–405.

- 
- Krifka, M.: 1991, A compositional semantics for multiple focus constructions, in S. Moore and A. Wyner (eds), *Proceedings from SALT I*, Cornell, pp. 127–158.
- Roberts, C.: 1996, Information structure in discourse, in J. H. Yoon and A. Kathol (eds), *Working Papers in Linguistics 49*, Ohio State University, pp. 91–136.
- Stalnaker, R.: 1978, Assertion, in P. Cole (ed.), *Syntax and Semantics 9 – Pragmatics*, Academic Press, New York, pp. 315–332.
- Stalnaker, R.: 1998, On the representation of context, *Journal of Logic, Language and Information* 7, 3–19.
- Stokhof, M.: 2002, Meaning, interpretation and semantics, in D. Barker-Plummer, D. Beaver, J. van Benthem and P. S. di Luzio (eds), *Words, Proofs, and Diagrams*, CSLI Publications, Stanford.
- van Rooij, R.: 2003, Questioning to resolve decision problems, *Linguistics and Philosophy* 26, 727–763.
- von Stechow, A.: 1991, Focusing and backgrounding operators, in W. Abraham (ed.), *Discourse Particles: descriptive and theoretical investigations on the logical, syntactic and pragmatic properties of discourse particles in German*, John Benjamins, Amsterdam.
- Zeevat, H.: 1994, Questions and exhaustivity in update semantics, in H. Bunt, R. Muskens and G. Rentier (eds), *Proceedings of the International Workshop on Computational Semantics*, ITK, University of Tilburg, pp. 211–221.





# COPULAR SENTENCES IN RUSSIAN VS. SPANISH AT THE SYNTAX–SEMANTICS INTERFACE

Ljudmila Geist  
Universität Stuttgart

## Abstract

Russian and Spanish each have two variants of the predicational copular sentence. In Russian, the variation concerns the case of the predicate phrase, which can be nominative or instrumental, while in Spanish, the variation involves the choice of the copular verb, either *ser* or *estar*. It is shown that the choice of the particular variant of copular sentence in both languages depends on the speaker's perspective, i.e., on whether or not the predication is linked to a specific topic situation.

## 1 Introduction

In predicational sentences in Russian, the predicate noun phrase can have nominative or instrumental case, provided that the copula is non-zero, i.e., that it occurs in the past tense or future tense form (cf. (1a/b) with the copula *byl'* 'be' in the past). In the present tense, where the copula is zero, the predicate NP always bears nominative case.<sup>1</sup>

- (1) a. Katja byla pevicej.  
Katja was singer<sub>INS</sub>  
'Katja was a singer.'
- b. Katja byla pevica.  
Katja was singer<sub>NOM</sub>  
'Katja was a singer.'

The difference in meaning between sentences with the nominative NP and sentences in which the NP has instrumental case is so subtle that even native speakers cannot always pinpoint what it is. In the literature on Russian, a number of semantic oppositions are proposed to describe the difference between the two variants.

Traditionally it has been assumed that the choice of the predicate's case reflects the distinction between a **temporal** and a **permanent** property (cf. Jakobson 1971). Wierzbicka (1980) uses the notions **accidental vs. essential** to describe the same dichotomy. According to this view, example (1a), with the instrumental NP, could imply that Katja changed her profession at a later point in time. In this case, Katja's being a singer is regarded as temporal and accidental, whereas in (1b), the state of being a singer is interpreted as a permanent and essential property.

Potebnja (1958:504) indicates another interpretation of the variants in (1a/b). According to him, the instrumental case in (1a) implies that the individual has further professions or occupations at the same time. In (1a) the property of being a singer is presented as one of many properties that can be attributed to Katja. Put differently, the property of being a singer in (1a) describes only one facet, one part of the person. The right paraphrase for this reading would be: "Katja was, among other things, a singer." In contrast to this, the (b) sentence, with

---

<sup>1</sup> Katja pevica / \*pevicej.  
Katja singer<sub>NOM</sub> / Katja<sub>INS</sub>  
'Katja is a singer.'

In this paper only sentences with an overt copula verb will be considered.

the nominative NP, presents the property of being a singer as an exhaustive and identificational property of the person. The property characterizes a person as a whole. Let us call the interpretational opposition observed by Potebnja the **part vs. whole** opposition. A different interpretation of the instrumental case is triggered in the context given in (2).

- (2) Byla by Katja pevicej, ona by davala koncerty v raznych stranach mira.  
 was Conj. Katja singer<sub>INS</sub> she Conj. gave concerts in different countries world<sub>GEN</sub>  
 ‘If Katja were a singer, she would give concerts all around the world.’

The sentential context triggers the contrast between the real situation, in which Katja is not a singer, and the situation in which she is a singer. Since the sentence in (2) with the predicate NP in instrumental case does not refer to a real situation but expresses an imagined state, I will call such an interpretation triggered by the instrumental case **subjective**. In contrast to the instrumental case, the nominative normally occurs in descriptions of real situations, that is, it triggers an **objective** interpretation. The interpretations of the case alternations are summarized in (3):

(3)

	<b>Instrumental</b>	<b>Nominative</b>
Interpretation 1	temporal	permanent
Interpretation 2	part	whole
Interpretation 3	subjective	objective

Recent analyses of this case alternation as in Bailyn (2001), Bailyn & Citko (1999), Matushansky (2000) and Pereltsvaig (2001) concentrate on the morpho-syntactic difference between the (a) and (b) variants, but don’t provide an explanation of all the interpretational differences mentioned in (3).

From a typological perspective, Russian is not the only language that exhibits two variants of the copular sentence. Spanish, for instance, displays a similar contrast. However, in the case of Spanish, the distinction is not realized as a morphological case alternation on the predicate but lies in the (lexical) choice of the copula verb. In Spanish, there are two counterparts for the English copula ‘be’: *ser* and *estar*. In combination with predicate adjectives, the two copulas can be used interchangeably.<sup>2</sup> Interestingly, the interpretational oppositions put forward for Russian copular sentences pattern with interpretations suggested for copular sentences in Spanish.

- (4) a. La carretera está ancha.                      b. La carretera es ancha.      (Maienborn 2005:171)  
 ‘The road is<sub>ESTAR</sub> wide.’                      ‘The road is<sub>SER</sub> wide.’

It has often been assumed that the opposition *ser* vs. *estar* reflects the semantic opposition Individual Level Predicate (i.e., permanent property) vs. Stage Level Predicate (i.e., temporal property); cf. for example Diesing (1992) and Kratzer (1994). However, in addition to the opposition **temporary vs. permanent**, the grammars on Spanish propose another semantic opposition to describe the difference in interpretation between the two variants of copular sentence: the contrast **subjective vs. objective** (cf. the overview given in de Bruyne 1993). The subjective reading of (4a) is discussed in Maienborn (2005) under the term “discovery interpretation.” This reading can be triggered by the following context: It was announced that the road would be narrowed, however, the road remained wide. Under this context, the current

<sup>2</sup> Besides adjectives that can occur with either copula, there is a small group of adjectives that only combine with *estar*, e.g., *vacío* ‘empty’, *lleno* ‘full’, *ausente* ‘away’.

situation “the road is wide” contrasts with a situation “the road is not wide” expected by the speaker. The speaker uses *estar* in such a context to express the difference between the expected situation and the real situation.

Maienborn (2005) offers a third possible interpretation of (4) available in certain contexts. In her discussion she mentions that the property of being wide can be interpreted as being restricted to a local part of the subject referent *road*. The paraphrase for this reading would be: “The part of the road I am speaking of is wide.” This reading corresponds to the **part–whole** interpretation mentioned above for the Russian example (1a). The table in (5) summarizes the interpretations discussed for the examples (4a/b).

(5)

	<b>estar</b>	<b>ser</b>
Interpretation 1	temporal	permanent
Interpretation 2	part	whole
Interpretation 3	subjective	objective

It is obvious that the contrast Russian makes via two different morphological cases on the predicate noun phrase is the same one that Spanish expresses through the selection of the copula verb in predicational sentences with adjective phrases.<sup>3</sup> The question now arises of how this similarity can be accounted for in formal semantics. Could the number of interpretational oppositions of the two variants of copular sentence be reduced to one common denominator? Intuitively, *estar* predications in Spanish and predications with instrumental case in Russian imply some contrast and the predication is bounded in some respect. I will present a formal analysis based on this intuition in sections 2 and 3.

The paper argues that the difference which Russian and Spanish encode with two distinct variants of predicational sentence is the same. This difference is discourse-pragmatic in nature. The copula *estar* in Spanish and instrumental case in Russian indicate the restriction of the predication to a specific topic situation, while *ser* in Spanish and nominative case in Russian are neutral in this respect.

The paper is organized as follows: Sections 2 and 3 introduce the analyses of copular sentences in Spanish and Russian. Section 4 concludes the paper.

## 2 A discourse-pragmatic account of *ser* vs. *estar* in Spanish

As we have seen in the introduction, the interpretation of copular sentences with *estar* in Spanish and copular sentences with the instrumental case in Russian depends on the context. The question now arises of how to account for the different readings of one particular copular construction. I do not want to ascribe every reading to the copula in Spanish or to the suffix for instrumental case in Russian, thereby creating polysemy. What I want is to trace back all

<sup>3</sup> In Russian, predicate adjectives in copular constructions may come in two “flavors,” the so-called long form and the so-called short form. The short form is inflected for gender and number, whereas the long form is inflected for gender, number and case. Like predicate nouns, the long form of adjectives can occur in nominative and instrumental case.

(i) Doroga byla širokaja.                      (ii) Doroga byla širokoj.                      (iii) Doroga byla široka.  
     way    was wide<sub>LF.NOM</sub>                      way    was wide<sub>LF.INS</sub>                      way    was wide<sub>SF</sub>

Since the interpretational difference between long form adjectives in nominative and long form adjectives in instrumental is less obvious than with predicate nouns and the division of labor between the short form and the long form deserves a separate study, I restrict my analysis of Russian copular sentences to sentences with predicate nouns.

the readings to one invariant semantics. The analysis by Maienborn (2003/05)<sup>4</sup> for *ser* vs. *estar* heads in this direction. Maienborn assumes that the semantic representation of the copula *estar* contains a free contextual parameter, which can be specified on the level of the context. In what follows I present the analysis of *ser* and *estar* proposed by Claudia Maienborn (2003/05) with some minor changes. In section 3, it will be shown how this analysis can be adopted in order to account for the Russian data.

Consider the examples in (6a/b), taken from Luján (1981). Speakers would use *estar* to express that they expect a change in Jacinta’s marital status, while the variant with *ser* would be used when no such expectation on the part of the speakers is expressed. Thus, the property of having the marital status of being single will be interpreted as temporary if used with *estar*.

- (6) a. Jacinta está soltera.                                      b. Jacinta es soltera.  
           ‘Jacinta i<sub>ESTAR</sub> single.’                                      ‘Jacinta i<sub>SER</sub> single.’

The situation in the real world described by (6a) and (6b) is the same: at the utterance time Jacinta is single (unmarried). It is obvious that in (6), the decision to use either of the verbs in question depends on the speaker’s estimation of the situation and is thus largely independent of the real situation. (6a) with *estar* is an utterance about a specific topic situation which contrasts with some other possible topic situation, whereas in (6b) no such contrast is involved.

The term “topic situation” was introduced by Maienborn and is similar to the term “topic time” introduced by Klein (1994) in his theory of tense. According to Maienborn, “the topic situation of a sentence is the relevant discourse situation to which a speaker restricts his or her claim, the speaker being able to relate this claim to specific as well as non-specific/arbitrary topic situations” (Maienborn 2005).

To account for the *ser/estar* distinction, Maienborn (2005) assumes the following hypothesis:

- (7) *Ser/estar hypothesis* (Maienborn 2005:169)  
 By using *estar* speakers restrict their claims to a particular topic situation they have in mind; by using *ser* speakers remain neutral as to the specificity of the topic situation.

The restriction to a specific topic situation only makes sense if there are alternatives to this topic situation. She states that “... the use of *estar* is pragmatically legitimated only if the context supports some topic situation contrast” (Maienborn 2005:171). There are several dimensions along which a topic situation contrast can be established. The choice of the particular dimension depends on the context. Maienborn mentions the following dimensions to which the contrast can apply: temporal, spatial and epistemic dimensions.

#### *Temporal dimension*

“The current topic situation contrasts with previous or later topic situations in which the predicate does not apply to the subject referent” (Maienborn 2005:172).

[This contrast gives rise to the interpretation that the predicate holds on the subject referent only temporarily. In our example (4), the temporal contrast can lead to the interpretation that the road was used to be narrow before.]

#### *Spatial dimension*

“The current topic situation contrasts with differently located topic situations in which the predicate does not apply to the subject referent” (Maienborn 2005:172).

<sup>4</sup> Another analysis recently proposed by González-Vilbazo & Remberger (in print) is on the whole similar to that of Maienborn, but it focuses on the syntax of *ser/estar*-sentences, and does not leave the semantics transparent enough. Since the focus of this paper is put on semantics, I prefer the analysis by Maienborn.

[This contrast leads to a spatial restriction. In example (4), the speaker can restrict his claim to stating that the relevant part of the road is wide, acknowledging that there might be other parts where this road is not wide.]

*Epistemic dimension*

“The current topic situation contrasts with topic situations which were expected instead” (Maienborn 2005:172).

[This contrast leads to the subjective vs. objective interpretation. In example (4), the current situation described by the sentence contrasts with a situation expected by the speaker.]

To conclude, the different interpretations provided by the selection of *ser* and *estar*, like i.e., temporary vs. permanent, part vs. whole, and subjective vs. objective, thus receive a common basis: the linking (or the lack of such linking) to a specific topic situation. The next step is the integration of these findings in the semantic representation of the copulas in Spanish.

Maienborn assumes that these copulas have basically the same meaning as their English counterpart *be* and its counterparts in many languages, but unlike the representation of *ser*, the representation of *estar* contains a free parameter, which can be specified by the context. I follow Maienborn in this assumption, but my implementation of this idea is based on the lexical representation of verbs suggested by Bierwisch (1988). I assume for *ser* (9) the lexical entry that Bierwisch (1988) proposes for the copula *sein* in German (8). The relation INST in this representation links the situation argument of the copula *z* to the proposition  $P(x)$ .  $z$  INST  $[P(x)]$  is construed as “*z* instantiates  $P(x)$ .” The variable *z* is an anchor for adverbial modifications as well as a take-up point for the temporal and aspectual characterization of the proposition.

(8) *sein*:  $\lambda P \lambda x \lambda z [z \text{ INST } [P(x)]]$  (Bierwisch 1988:46)

(9) *ser*:  $\lambda P \lambda x \lambda z [z \text{ INST } [P(x)]]$

The lexical entry of *estar* in (10) differs from that of *ser*. The difference between them is a pragmatic one: “*Estar* ... carries an additional presupposition linking the predication to a specific discourse situation” (Maienborn 2005:167).

(10) *estar*:  $\lambda P \lambda x \lambda z [z \text{ INST } [P(x)]] / \underbrace{[R(z, s_i)]}$

specificity presupposition (cf. Maienborn 2005:168)

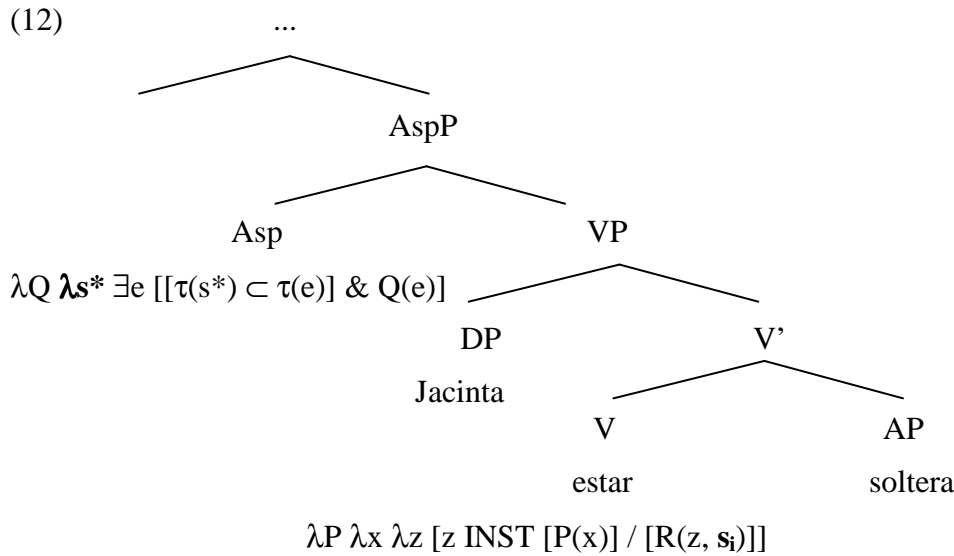
According to the presupposition of *estar* the situation argument *z* is linked to a specific topic situation  $s_i$  via the *R* relation. *R* is a free parameter, and  $s_i$  is a free variable for specific topic situations. The free variable  $s_i$  and the relation *R* can be resolved in the course of the semantic composition, as will be shown below.

To make the derivation of the meaning of copular sentences with *ser* and *estar* more precise, some background assumptions about the syntax and semantics of copular sentences from Maienborn (2003/05) need to be introduced.

- The copulas *ser* and *estar* are base-generated in the head of VP and take a predicate AP as their complement.
- As Spanish belongs to the aspect languages, a functional Aspect phrase can be assumed in which aspect is specified. Following Maienborn, I further assume that the functional category Aspect introduces a contextually determined topic situation  $s^*$  (cf. also Klein 1994).

- The semantic contribution of the functional head Asp in (12) is the establishing of a relation between the VP referent (here:  $e$ ) and the topic situation  $s^*$ . Imperfective aspect indicates that the topic time  $\tau(s^*)$  is fully contained in the situation time  $\tau(e)$ , while perfective aspect indicates that the situation time  $\tau(e)$  is fully contained in the topic time  $\tau(s^*)$  (where  $\tau$  maps situations onto their temporal extensions). The semantic representations for both aspectual features, imperfective and perfective, are given in (11) from Maienborn (2005).

- (11) imperfective aspect:  $\lambda Q \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& Q(e)]$   
 perfective aspect:  $\lambda Q \lambda s^* \exists e [[\tau(e) \subset \tau(s^*)] \& Q(e)]$



For the sake of simplicity, I will not consider the semantic discussion of tense, which, according to Klein (1994), establishes a relation between topic time and speech time.

We are now in a position to derive the sentences with *ser* and *estar* compositionally in the way suggested by Maienborn (2003/05). First, I will show how the semantic derivation works in a sentence with *estar*. For the sake of simplicity I will only consider the semantics of the sentence on the level of the AspP, as illustrated in (13).

- (13) Jacinta está soltera. ('Jacinta is<sub>ESTAR</sub> single.')
- (*estar*, imperfective)
- a. Jacinta: Jacinta
- b. soltera:  $\lambda y [\text{SINGLE}(y)]$
- c. estar:  $\lambda P \lambda x \lambda z [z \text{ INST } [P(x)] / [R(z, s_i)]]$
- d. imperfective aspect:  $\lambda Q \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& Q(e)]$
- e. [<sub>V'</sub> estar soltera]:  $\lambda P \lambda x \lambda z [z \text{ INST } [P(x)] / [R(z, s_i)]] (\lambda y [\text{SINGLE}(y)])$   
 $\equiv \lambda x \lambda z [z \text{ INST } [\text{SINGLE}(x)] / [R(z, s_i)]]$
- f. [<sub>VP</sub> Jacinta está soltera]:  $\lambda x \lambda z [z \text{ INST } [\text{SINGLE}(x)] / [R(z, s_i)]] (\text{Jacinta})$   
 $\equiv \lambda z [z \text{ INST } [\text{SINGLE}(\text{Jacinta})] / [R(z, s_i)]]$
- g. [<sub>AspP</sub> Jacinta está soltera]:  $\lambda Q \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& Q(e)]$   
 $(\lambda z [z \text{ INST } [\text{SINGLE}(\text{Jacinta})] / [R(z, s_i)]])$   
 $\equiv \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& [e \text{ INST } [\text{SINGLE}(\text{Jacinta})] / [R(z, s_i)]]]$

In the representation in (13g), two topic situations are available: the topic situation  $s^*$  is introduced by the functional head *Asp*, while the second topic situation  $s_i$  is part of the lexical entry of *estar*. Since a sentence is a claim about a single topic situation,  $s^*$  and  $s_i$  must be identified ( $s^* = s_i$ ). According to van der Sandt (1992), presuppositions can be treated as anaphors. They can be specified by the identification with its antecedent. The identification of the two topic situations permits the resolution of the specificity presupposition. The semantics of the resulting sentence after the existential binding of the topic situation is represented in (14):

- (14) Jacinta está soltera:  
 $\exists s^* \exists e [[\tau(s^*) \subset \tau(e)] \& [e \text{ INST } [\text{SINGLE}(\text{Jacinta})]] \& [s^* = s_i]]$

The precondition for the identification of  $s^*$  with  $s_i$  is that  $s^*$ , like  $s_i$ , is specific. According to Maienborn’s analysis, only a specific  $s^*$  can serve as a suitable antecedent for *estar*’s specificity presupposition.

The sentence in (14) is true if there is a situation characterized by Jacinta’s being single whose temporal extension includes a contextually specific topic time.

The derivation of a *ser* sentence is represented in (15).

- (15) Jacinta es soltera. (‘Jacinta is<sub>SER</sub> single.’) (ser, imperfective)
- a. Jacinta: Jacinta
- b. soltera:  $\lambda y [\text{SINGLE}(y)]$
- c. ser:  $\lambda P \lambda x \lambda z [z \text{ INST } [P(x)]]$
- d. imperfective aspect:  $\lambda Q \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& Q(e)]$
- e. [<sub>VP</sub> ser soltera]:  $\lambda P \lambda x \lambda z [z \text{ INST } [P(x)]] (\lambda y [\text{SINGLE}(y)])$   
 $\equiv \lambda x \lambda z [z \text{ INST } [\text{SINGLE}(x)]]$
- f. [<sub>VP</sub> Jacinta es soltera]:  $\lambda x \lambda z [z \text{ INST } [\text{SINGLE}(x)]] (\text{Jacinta})$   
 $\equiv \lambda z [z \text{ INST } [\text{SINGLE}(\text{Jacinta})]]$
- g. [<sub>AspP</sub> Jacinta es soltera]:  $\lambda Q \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& Q(e)]$   
 $(\lambda z [z \text{ INST } [\text{SINGLE}(\text{Jacinta})]])$   
 $\equiv \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& [e \text{ INST } [\text{SINGLE}(\text{Jacinta})]]]$

The sentence *Jacinta es soltera* is true if there is a situation of Jacinta being single whose temporal extension includes the topic time. Again, I will not touch on the interpretation of tense.

I will leave the discussion of Spanish here. In the next section, I will develop a formal analysis of the copular sentences in Russian. The analysis of copular sentences in Spanish by Maienborn introduced in this section will serve as the basis for my analysis of copular sentences in Russian.

### 3 An analysis of Russian copular sentences

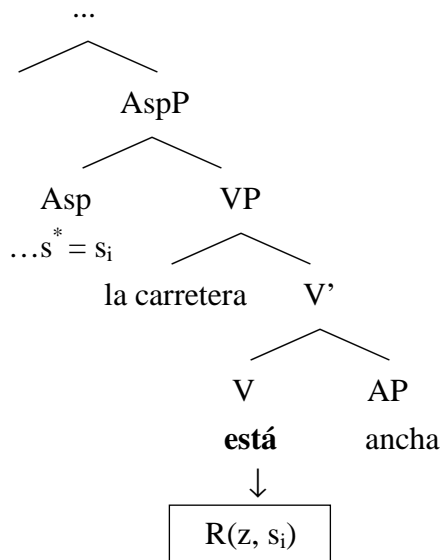
Our examination of the Russian and Spanish data in section 1 showed that the interpretative effects brought about by the choice of the respective copular sentence variant are in fact parallel. The instrumental case on the predicate noun in Russian triggers the same interpretative effects as *estar* in Spanish. The nominative case in Russian yields the same interpretations as Spanish *ser*. In order to account for the similarity between the two languages I assume the following hypothesis:

(16) *Nominative/Instrumental hypothesis*

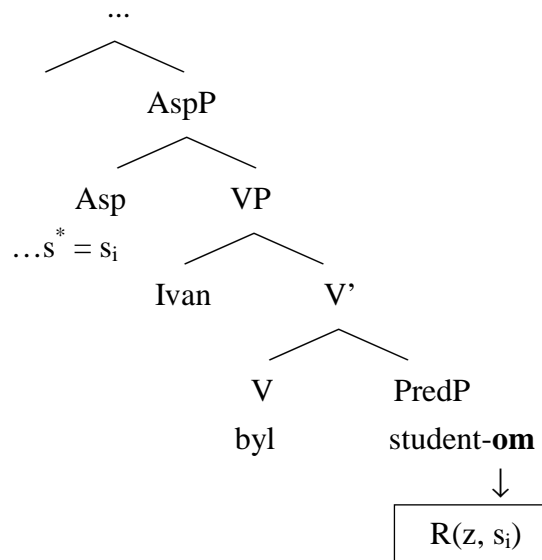
By using the predicate noun phrase with the instrumental case, speakers restrict their claims to a particular discourse situation they have in mind; by using the nominative speakers remain neutral as to the specificity of the discourse situation.

For the semantic analysis of copular sentences in Russian I assume that the instrumental suffix located on the predicate noun in Russian contains a specificity presupposition in its lexical entry, like Spanish *estar*. The following schema illustrates the main difference between Russian and Spanish:

## (17) Spanish



## (18) Russian



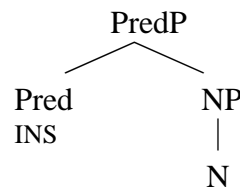
In order to develop a formal reconstruction of the difference between predicate nouns in nominative case and predicate nouns in instrumental case, I propose that there are two types of predicate phrases. The predicate phrase in the nominative case receives its case via agreement with the subject of the copular sentence, which bears nominative case. The predicate phrase in the instrumental case is more complex, syntactically and semantically. This NP is embedded in a functional projection PredP,<sup>5</sup> whose head checks instrumental case.

(19) *Two types of predicate phrases*

## a. agreement-predicate



## b. instrumental-predicate



With Bailyn & Citko (1999) I assume that the Pred head has an instrumental case feature which must be checked when merged onto a noun phrase. This instrumental feature has the following lexical content:

<sup>5</sup> This Predicate Phrase (PredP) roughly corresponds to the PredP for secondary predications in Bowers (2000), but does not contain a specifier.



(20) INS:  $\lambda P \lambda x [P(x) / [R(z, s_i)]]^6$

The instrumental feature contains the specificity presupposition. Thus, the semantic contribution of the Pred head consists of providing the link to a specific topic situation. The pragmatic-semantic difference between the NP *pevica* ‘singer<sub>NOM</sub>’ and the PredP *pevicej* ‘singer<sub>INS</sub>’ is illustrated in (21).

(21) a. [<sub>NP</sub> *pevica*<sub>NOM</sub>]:  $\lambda u [SINGER(u)]$   
 b. [<sub>PredP</sub> *pevicej*<sub>INS</sub>]:  $\lambda u [[SINGER(u)] / [R(z, s_i)]]$

(21b) means that the property of being a singer applies to the individual *u* in a specific topic situation *s<sub>i</sub>*. To derive the semantics of the whole copular sentence in Russian the semantics of the copula has to be specified. Russian differs from Spanish in that it has only one copula, as do English and German. I therefore assume the same lexical entry for Russian *byt’* as for *be* and *sein*.

(22) *byt’* / *be* / *sein* :  $\lambda P \lambda x \lambda z [z INST [P(x)]]$

Now we are in a position to derive the semantics of a copular sentence with the instrumental; cf. (23). The corresponding sentence with nominative is derived in (25).

(23) *Katja byla pevicej*. (‘*Katja* was a singer<sub>INS</sub>’) (‘*byt’*, imperfective)

- a. *Katja*: *Katja*  
 b. [<sub>PredP</sub> *pevicej*<sub>INS</sub>]:  $\lambda u [[SINGER(u)] / [R(z, s_i)]]$   
 c. *byt’* (‘*be*’):  $\lambda P \lambda x \lambda z [z INST [P(x)]]$   
 d. imperfective Aspect:  $\lambda Q \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& Q(e)]$   
 e. [<sub>V</sub> *byla pevicej*]:  $\lambda P \lambda x \lambda z [z INST [P(x)]] (\lambda u [[SINGER(u)] / [R(z, s_i)]])$   
 $\equiv \lambda x \lambda z [z INST [SINGER(x)] / [R(z, s_i)]]$   
 f. [<sub>VP</sub> *Katja byla pevicej*]:  $\lambda x \lambda z [z INST [SINGER(x)] / [R(z, s_i)]] (Katja)$   
 $\equiv \lambda z [z INST [SINGER(Katja)] / [R(z, s_i)]]$   
 g. [<sub>AspP</sub> *Katja byla pevicej*]:  $\lambda Q \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& Q(e)]$   
 $(\lambda z [z INST [SINGER(Katja)] / [R(z, s_i)]])$   
 $\equiv \lambda s^* \exists e [[\tau(s^*) \subset \tau(e)] \& [e INST [SINGER(Katja)] / [R(z, s_i)]]]$

At the level of AspP, the specificity presupposition of the instrumental suffix can be resolved by identifying *s<sub>i</sub>* with the topic situation *s\** introduced by Aspect. This presupposition resolution and the existential binding of the topic situation yield (24).

(24)  $\exists s^* \exists e [[\tau(s^*) \subset \tau(e)] \& [e INST [SINGER(Katja)]] \& [s^* = s_i]]$

The sentence is true if there is a situation characterized by *Katja* being a singer whose temporal extension includes a contextually specific topic time.

A sentence with nominative case has a similar composition but it is more straightforward since no specificity presupposition is introduced. The representation for a sentence with nominative case is given in (25):

<sup>6</sup> A more elaborated representation which accounts for other functions of the instrumental case in Russian is proposed in Geist (in print); compare also a different account in Demijanow & Strigin (2003).

- (25) Katja byla pevica. ('Katja was a singer<sub>NOM</sub>') (byt', imperfective)  
 [AspP Katja byla pevica]:  
 $\lambda s^* \exists e [\tau(s^*) \subset \tau(e)] \ \& \ [e \text{ INST [SINGER(Katja)]]$

The sentence is true if there is a situation characterized by Katja being a singer whose temporal extension includes the topic time.

Now, compare the composition results for the *estar* sentence in (14) and the sentence with instrumental case in (24) on the one hand, and the sentence with *ser* in (15g) and with nominative case in (25). Except for their idiosyncratic meaning components, the structural meaning components are identical in the compared sentence pairs. This is a desirable result.

Now, the result of the analysis of copular sentences in Russian on the basis of the analysis of Spanish copular sentences by Maienborn (2003/05) can be summarized as follows: With the choice of instrumental case in Russian and the choice of the copula *estar* in Spanish, the speaker expresses in an explicit manner that the proposition relates to a specific topic situation. This relation to a specific topic situation is embedded in the lexical entry of the case suffix in Russian and in the lexical entry of the copular verb in Spanish. The predicate noun in the nominative in Russian and the copula *ser* in Spanish are neutral with respect to the specificity of the topic situation. That is, Spanish and Russian choose different structural options to indicate the linking of a predication to a specific topic situation that the speaker has in mind.

The assumption that the instrumental case suffix in Russian serves as a link to a specific discourse situation is crucial for our comparative analysis, and one would like to have further evidence for such an assumption. An independent motivation for such an assumption comes from another use of instrumental case with predicate nouns,<sup>7</sup> namely the use in sentence initial adjuncts; cf. (26a/b). Like predicates in copular sentences, such adjuncts can also occur in nominative and in instrumental case.

- (26) a. Soldatom Boris ne imel zhalosti.      b. Soldat, Boris ne imel zhalosti.  
 Soldier<sub>INS</sub> Boris not had compassion      Soldier<sub>NOM</sub> Boris not had compassion  
 'When Boris was a soldier he was not      'Being a soldier, he was not  
 compassionate.'      compassionate.'

As the English translation in (26a) suggests, the instrumental case triggers a contrast to alternative situations in which Boris was not a soldier (cf. similar observations in Demjjanow & Strigin 2003). No such contrast is implied in (26b) with nominative case. This is what our analysis of the instrumental suffix as a link to a specific discourse situation predicts.

#### 4 Concluding remarks

In this paper, I have explored the mapping between the syntax and semantics of copular sentences in Russian in comparison to Spanish. Such a comparison makes it clear that the distinction Russian makes via two different morphological cases on the predicate noun phrase is the same as the one Spanish expresses through the selection of the copula verb in combination with predicate adjectives. The assignment of the instrumental case to the predicate noun in Russian and the selection of the copular verb *estar* in Spanish reflect the speaker's perspective on a predication in a particular discourse. By using instrumental case in Russian and the copula *estar* in Spanish the speaker restricts the predication in copular

<sup>7</sup> I consider only the combination of the instrumental suffix with predicate NPs, i.e., non-referential NPs which denote properties of an individual. The external argument of such NPs is assigned to the referential argument of some other NP in the clause. The instrumental case can also be used with non-predicate NPs. The correlation between "predicate instrumental" and other uses of the instrumental in Russian is discussed in Geist (in print).

sentences to a specific topic situation he/she has in mind. By using nominative case in Russian and *ser* in Spanish the speaker remains neutral as to the specificity of the topic situation.

This analysis leaves some questions for further research. I will mention one of them. How can we explain that the alternation *ser/estar* in Spanish is restricted to sentences with predicate adjectives while only *ser* can occur with predicate nouns? In Russian, in contrast, the situation is different. The case alternation nominative vs. instrumental applies to predicate nouns as well as to adjectives, although the instrumental occurs less frequently with adjectives than with nouns (Timberlake 1983:862).

## References

- Bailyn, J. F.: 2001, The syntax of Slavic predicate case, *ZAS Papers in Linguistics* **21**, ZAS, 1–23.
- Bailyn, J. F. and Citko, B.: 1999, Case and agreement in Slavic predicates, in K. Dziwirek et al. (eds), *Annual Workshop on Formal Approaches to Slavic Linguistics. The Seattle Meeting*, Michigan Slavic Publications, pp. 17–37.
- Bierwisch, M.: 1988, On the grammar of local prepositions, in: M. Bierwisch, W. Motsch, and I. Zimmermann, (eds.), *Syntax, Semantik und Lexikon* (=studia grammatica XXIX). Berlin, Akademie-Verlag, pp. 1–65.
- Bowers, J.: 2000, Predication, in M. Baltin and C. Collins (eds), *The Handbook of Contemporary Syntactic Theory*, Blackwell, pp. 299–333.
- Bruyne, J. de: 1993, *Spanische Grammatik*. Translated by Dirko-J. Gütschow. Tübingen: Max Niemeyer.
- Demjjanow, A. and Strigin, A.: 2003, Real adjuncts in instrumental in Russian, in E. Lang, C. Maienborn and C. Fabricius-Hansen (eds), *Modifying Adjuncts*, Mouton de Gruyter, pp. 591–625.
- Demjjanow, A. & Strigin, A.: 2003, Real adjuncts in instrumental in Russian, in: E. Lang, C. Maienborn & C. Fabricius-Hansen (eds.), *Modifying Adjuncts*. Berlin: Mouton de Gruyter, pp. 591–625.
- Diesing, M.: 1992, *Indefinites* (Linguistic Inquiry Monograph 20). Cambridge, MA/London, England: The MIT Press.
- Geist, L.: (in print), *Die Kopula und ihre Komplemente. Zur Kompositionalität in Kopulasätzen*. Tübingen: Niemeyer.
- González-Vilbazo, K.-E. and Remberger, E.-M.: in print, *Ser and estar: The syntax of stage level and individual level predicates in Spanish*, in A. Wöllstein-Leisten and C. Maienborn (eds), *Event Arguments in Syntax, Semantics, and Discourse*, Niemeyer.
- Jakobson, R.: 1971, Beitrag zur allgemeinen Kasuslehre: Gesamtbedeutungen der russischen Kasus, in: *Roman Jakobson, Selected Writings II. Word and Language*, Mouton, pp. 23–71.
- Klein, W.: 1994, *Time in Language*. London: Routledge.
- Kratzer, A.: 1994, *The Event Argument and the Semantics of Voice*, Ms., U Mass Amherst.

- Luján, M.: 1981, The Spanish copulas as aspectual indicators, *Lingua* **54**, 165–210.
- Maienborn, C.: 2003, *Die logische Form von Kopula-Sätzen*. Berlin: Akademie-Verlag.
- Maienborn, C.: 2005, A discourse-based account of Spanish *ser/estar*, *Linguistics* **43/1**, 155–180.
- Matushansky, O.: 2000, The instrument of inversion: Instrumental case and verb raising in the Russian copula, in R. Billerey and B. D. Lillehaugen (eds), *Proceedings of WCCFL 19*, Cascadilla Press, pp. 288–301.
- Pereltsvaig, A.: 2001, *On the Nature of Intra-Clausal Relations: A Study of Copular Sentences in Russian and Italian*. Ph.D. Diss., McGill University, Montréal.
- Potebnja, A. A.: 1958, *Iz zapisok po russkoj grammatike*. Vol. I-II. Moskva: Min. prosv. RSFSR.
- Sandt, R. van der: 1992, Presupposition projection as anaphora resolution, *Journal of Semantics* **9**, 333–377.
- Timberlake, A.: 1986, The Semantics of Case in Russian Predicate Complements. *Russian Linguistics* **10/2**, 137–165.
- Wierzbicka, A.: 1980, *The Case for Surface Case*. Ann Arbor, Michigan: Karoma.

# MANNER MODIFICATION OF STATES

Wilhelm Geuder,  
Universität Konstanz / SFB 471

wilhelm.geuder@uni-konstanz.de

## Abstract

In a recent contribution to a long-standing discussion in semantics as to whether the neo-Davidsonian analysis should be extended to stative predicates or not, Maienborn (2004, 2005) proposes to distinguish two types of statives; one of them is said to have a referential argument of the Davidsonian type, the other not. As one of her arguments for making such a distinction, Maienborn observes that manner modification seems to be supported only by certain statives but to be excluded by others (thus linking the issue to the use of manner modification as one major argument in favour of event semantics, cf. Parsons 1990). In this paper, it is argued that the absence of manner modification with Maienborn's second group of statives is actually due to a failure of conceptual construal: modification of a predicate is ruled out whenever its internal conceptual structure is too poor to provide a construal for the modifier; hence, the effects observed by Maienborn reduce to the fact that eventive predicates have a more complex conceptual substructure than stative ones. Hence, the issue of manner modification with statives is shown to be orthogonal to questions of logical form and event semantics. The explanatory power of the conceptual approach is demonstrated with a case study on predicates of light emission, adapting the representation format of Barsalou's (1992) frame model.

## 1 Introduction

### 1.1 General Background: Neo-Davidsonian Semantics

This paper is about the interpretation of manner modifiers and its implications for the neo-Davidsonian framework of semantics (cf. e.g. Parsons 1990). The neo-Davidsonian theory rests on two major pillars, one semantic and one ontological. Semantically, it is a theory of the logical form of sentences which is based on the idea that logical form involves predication and quantification over event variables. In particular, manner adverbs (A) modifying a verb (V) are analysed via joint predication of the event variable, hence manner modification is represented via a conjunction of the form:  $V(e) \ \& \ A(e)$ . This is, of course, the standard pattern of intersective modification that is also posited for nouns and adjectives when they predicate of concrete individuals.

The ontological aspect of the theory is that events are seen as particulars in the world; they are not abstract objects in the way facts or properties are. Some consequences which ensue from this view are pointed out by Maienborn (2004, 2005):

- (1) a. Eventualities are perceptible.
- b. Eventualities can be located in space and time.
- c. Eventualities can vary in the way that they are realized.

The third point might require some explanation. For one thing, it reflects the fact that events, being particulars, occur as instantiations of a type, i.e. the event property denoted by some verb. Another aspect implicit in (1c) is that predicates of events allow manner modification;

in this way, instantiations of an event type give rise to subtypes. When this happens, "the way in which events are realized" can be characterised via some sort of conceptual content, i.e. the "manner" of an event.

Before a neo-Davidsonian semantics can be put to work, of course, it is necessary to know precisely which types of predicates have a neo-Davidsonian argument and which ones do not.

## 1.2 Events and States

Parsons (1990), and many semanticists after him, distinguish two sorts of "eventualities" (i.e. events in a broad sense), namely events proper and states. However, other authors have denied that states should be treated as Davidsonian individuals, beginning with Davidson (1967) himself. On this second view, stative verbs and adjectives would not have referential e-arguments (a view that has also been elaborated and defended by Katz (2000, 2003), and others).

In this connection, Maienborn (2004) has recently proposed that there are actually two types of "states": certain stative predicates refer to a neo-Davidsonian entity (called "D-states" by Maienborn), others refer to an abstract entity (which she calls "K-states", i.e. "Kimian states" after Kim (1976), who proposed to explain events as basically a propositional type of entity). From the background of the characterisation of events in (1), Maienborn (2004) adduces a number of empirical effects as supporting her distinction:

- (2) a. *"Eventuality expressions can serve as infinitival complements of perception verbs".*
- |                                  |                                  |
|----------------------------------|----------------------------------|
| Ich sah Bardo schlafen.          | (I saw B. sleep(ing))            |
| * Ich hörte das Radio laut sein. | (I heard the radio be(ing) loud) |
- b. *"Eventuality expressions combine with locative and temporal modifiers."*
- |   |  |
|---|--|
| Die Perlen glänzen in ihrem Haar.         | (The pearls are gleaming in her hair)  |
| * Das Kleid ist auf der Wäscheleine nass. | (The dress is on the clothes-line wet) |
- c. *"Eventuality expressions combine with manner adverbials, instrumentals, comitatives, etc."*
- |  |  |
|--|--|
| Bardo <u>schläft</u> friedlich/mit seinem Teddy/ohne Schnuller.          |  |
| (Bardo is <u>sleeping</u> {peacefully / with his teddy / without dummy}) |  |
| * Bardo war friedlich/mit seinem Teddy / ohne Schnuller <u>müde</u> .    |  |
| (Bardo was <u>tired</u> {peacefully / with his teddy / without dummy})   |  |

The examples in (2c) show an asymmetry with respect to manner modification, supposedly establishing two subtypes of stative predicates, and this is the phenomenon that the present paper is centred on. I want to argue in this paper that the peculiar behaviour of (certain) statives with respect to manner modification is actually not related to a distinction in terms of different sorts of external arguments, and that it cannot (directly) be used to determine the range of application of the neo-Davidsonian analysis.

Rather, I want to show that the crucial factor which governs the applicability of manner modifiers is the conceptual complexity of the property expressed by a verb or an adjective. To this end, verb meanings will be decomposed into a richer conceptual structure, consisting of property values and sorted in conceptual dimensions; manner modifiers then typically have the effect of restricting the admissible property values of one dimension.

## 2 Manner Modification: Beyond Event Predication

The striking thing about the examples seen in (2) above is that verbs and adjectives may behave differently with respect to the licencing of modifiers, in spite of being fairly similar in meaning. It should be made clear, however, that the distinction at issue here is not tantamount to the categorial distinction between verbs and adjectives (even though the selection of examples given in (2) might suggest this). For one thing, there are verbs in Maienborn's data that pattern with the "K-states" (e.g. *wissen* / *know* or *wiegen* / *weigh*(*intransitive*)). For another, it seems that there are a few predicative adjective constructions in German which denote events and pattern with eventive verbs in the perception verb construction (e.g. German *behilflich sein*, which as far as I can tell means exactly the same thing as the verb *helfen* and English *help*, and behaves in the same way according to the tests — all this in spite of the adjectival derivational affix *-lich*).

Therefore, a truly semantic explanation is needed for the differences with respect to modification. Any such explanation will have to posit that similarities of meaning, as between *sleep* and *tired*, are actually misleading and that there are subtle semantic factors which make a decisive difference. As already outlined, Maienborn (2004) offers the explanation that the distinction is related to the fact that adjectives like *müde* / *tired* do not refer to events (e), but to abstract "property exemplifications" (of a sort k, i.e., "Kimian states"). Apparently, then, the modifiers in the problematic cases would not be able to accomplish exactly this kind of predication:

- (3)    *sleep*(e) & *peaceful*(e)            (to sleep peacefully)  
          *tired*(k) & \* *peaceful*(k)            (to be tired peacefully)

However, there are some immediate objections that can be raised against this sort of approach. For one thing, it seems that the effect is not strong enough for the predicted sortal mismatch. Consider the following attempts at predicating the adjective "peaceful" of different sorts of entities:

- (4)    Event:            *peaceful*(e)            John is sleeping peacefully  
          "K-state":        *peaceful*(k)            ? John is peacefully tired  
          Fact:            *peaceful*(f)            \* The fact that John is tired is peaceful  
          Proposition:    *peaceful*(p)            \* It is true, and it is peaceful, that John is tired

Truly abstract entities are found to produce a deviance that is markedly more profound. To save the idea of a sortal mismatch, one would have to posit that abstractness is a matter of degrees and that this makes K-states produce relatively weaker deviations.

However, a second objection is that the clear contrast in perception verb constructions, another diagnostic for the K-/D-distinction with states, does not align with the patterning of modifiers. In (5), it can be seen that we get clear differences between verbal and adjectival expressions for various kinds of "being open" in German:

- (5)    a. *offen sein* ≈ *offenstehen*  
             ?? Ich sah die Türe offen sein            (I saw the door be open)  
             <sup>ok</sup> Ich sah die Türe offen stehen            (I saw the door stand(ing) open)
- b. *offen sein* ≈ *klaffen*  
             ? Ich sah da eine Lücke offen sein            (I saw a gap be open)  
             <sup>ok</sup> Ich sah da eine Lücke klaffen            (~ I saw a gap yawn(ing))

c. offen haben  $\approx$  aufsperrern

? Ich sah ihn den Mund offen haben (I saw him have his mouth open)

<sup>ok</sup> Ich sah ihn den Mund aufsperrern (~ I saw him have his mouth (wide) open)

In spite of these clear contrasts, modifiers are applicable in the very same way. For instance the asymmetry shown in (5c) above cannot be replicated with modification data:

(6) a. *weit* "wide":

Er hatte den Mund weit offen / Er sperrte den Mund weit auf

b. *locker* "slack, relaxed"

Er hatte den Mund locker offen / # Er sperrte den Mund locker auf

While in (6a) the adverb *wide* is able to modify both predicates, there is a deviation in (6b) with the supposed K-state — however, it is of an interesting kind: the sentence *Er sperrte den Mund locker auf* is felt to be contradictory. This, however, shows that the modifier *locker* is semantically applicable, because otherwise the contradictoriness of its contribution could not be ascertained. This is to say, the word meaning of the verb *aufsperrern* contains a component that is the opposite of *locker*: it is a manner of keeping one's mouth open with the application of some force.

This is a simple example for why conceptual explanations may be needed to rule out deviant modification structures, and it provides an initial motivation to investigate how far such conceptual explanations can be carried, and how they can be formulated, to begin with.

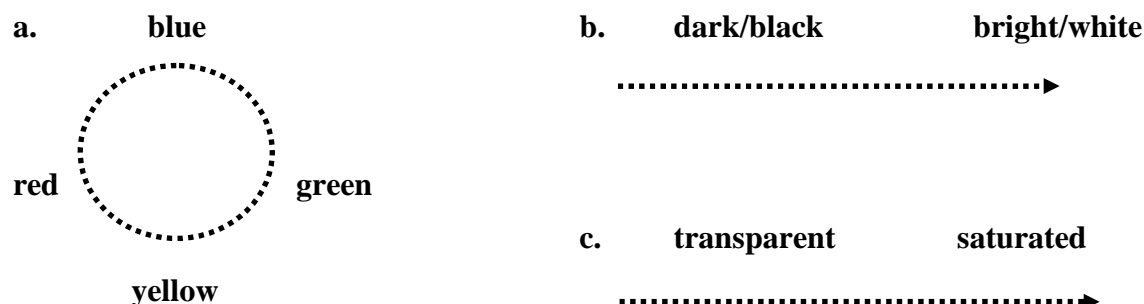
### 3 Conceptual Structure

#### 3.1 A Simple Example: Colours and Colour Terms

##### 3.1.1 Feature Dimensions

As a first approach to an analysis of conceptual structure, let us have a brief look at a fairly narrow and well-understood conceptual domain, namely colours, taking up a recent proposal of conceptual modelling by Gärdenfors (2000). Colours involve three perceptual parameters: hue, brightness, and saturation. Each of these can be represented as an array of values, depicted below as arrays of points; in reality, however, the degrees of brightness, saturation, and the hue values must be continuous scales. Following Gärdenfors (2000), I will call each of these scales a property (in a narrow sense); it is made up of property values.

(7)



Gärdenfors (2000) proposes to represent the internal structure of the conceptual domain "colour" as a unified quality space, with hue, brightness, and saturation as its three



dimensions. A particular colour concept, e.g. "green", would then correspond to a coherent region in such a 3D-space. It would involve the hues around the "prototypical green" in (7a); a medium range of brightness values from (7b), coupled with a range of saturation values from (7c) that at least excludes the transparent end of the scale.

However, as argued in detail by Geuder & Weisgerber (2005), a literally geometrical representation in terms of a unified metrical space is not a generally viable technique for the representation of concepts of all kinds, even though it does seem to work for colours and other simple properties. Therefore, let me use a more abstract representation that takes up the idea of having separate tiers ("feature dimensions") which are made up from property values.

Let us say that the conceptual substructure of a predicate P provides sets Q1, Q2, ..., Qn, called the conceptual dimensions of P, such that each Q is made up of a number of mutually incompatible property values:

- (8) P: <Q1 = {q1a, q1b, q1c, ...},  
 Q2 = {q2a, q2b, q2c, ...},  
 Q3 = {q3a, q3b, q3c, ...}, ...>

For the colour "green" as an example, we would have the substructure Q1 x Q2 x Q3, which can be characterised as follows:

- (9) **green:**  
 <QHUE = { ..., q1a, q1b, q1c, ... } (a set which includes the various "green" hues),  
 QBRIGHTNESS = { ..., q2b, q2c, ... } (brightness values, excluding at least the extrema "black" and "white"),  
 QSATURATION = { ... q3b, q3c, ... } (excluding at least the extreme values in the region "fully transparent") >

While in this particular case, an ordering can be imposed on the values, this need not be the case in general.

### 3.1.2 Modifiers

Let us now see how this simple model can be used to account for modification. The idea in Gärdenfors (2000) is to see modification as an operation that restricts the allowed range of property values of a concept in (at least) one dimension. Indeed, it appears that the modifiers which can appear with colour terms can be sorted into the dimensions outlined above:

- (10) blaugrün                      hellgrün                      blassgrün  
           blueish green                bright green                pale green

Here is a sketch of how the modification operation works. Let us consider the example *hellgrün* ("bright / light green"). The modifier *hell* is indexed for the quality dimension "brightness" and hence targets only the brightness dimension of the modified concept "green", leaving its other dimensions unchanged.

- (11) a. **hell** QBRIGHTNESS = { ..., hw, hx, hy, hz }  
 b. **grün** <QHUE = { ..., ga, gb, gc, ... },  
           QBRIGHTNESS = { ..., q2b, q2c, ... },  
           QSATURATION = { ... q3b, q3c, ... } >  
 c. **hell (grün)**  
           <QHUE — unchanged,

$$\text{QBRIGHTNESS} = \text{QBRIGHTNESS}(\text{hell}) \cap \text{QBRIGHTNESS}(\text{grün}),$$

$$\text{QSATURATION} \text{— unchanged } >$$

While this account of modification targets property values, it is equivalent to the familiar view of modification as intersection of extensions. This is so because the feature values on each dimension are mutually exclusive, so every object in the extension of a predicate must have exactly one value in each dimension. Consequently, all  $n$ -tuples of values from  $Q1 \times Q2 \times \dots \times Qn$  are mapped onto disjoint sets of objects, and every operation that restricts the set of admissible feature values has the same effect on the extension of the predicate.

### 3.1.2 Manners vs. Degrees

Given that the modification operation just described involved scales of ordered feature values, there is some similarity with degree modification, and some remarks are in order as to the distinction between substantive modification and degree modification. It is not immediately clear whether the instances discussed above should be called "manner modification", but manner modifiers can in any event be grouped with other typical intersective modifiers and contrasted with degree modifiers.

Obviously, degree scales are based on a decomposition of properties into feature values, too. In modifying the property scales that form the dimensions of colour concepts, however, we used modifiers which themselves had a conceptual content in terms of a property scale. This, then, is a first difference to degree modification: Degree modifiers carry an abstract specification for regions on arbitrary property scales, e.g. *very* denotes the upper end of any degree scale. Therefore, degree modification involves an additional step of mapping from a set of feature values onto an abstract scale of degrees, and degree modifiers operate on the latter.

Moreover, it could be seen that we were dealing with modifiers that applied to "multidimensional" conceptual structures, and these are exactly the ones that are hard to combine with degree modifiers. This difference is expected because modifiers that are indexed for some particular conceptual domain will be able to retrieve their designated domain when applied to a larger conceptual structure in the process of modification. For degree modifiers to work, however, we need a predicate that denotes one single scale, i.e. a property (in the narrow sense). It is possible to force the application of degree adverbs to complex concepts, for instance, in German we find clear cases of degree modification with verbs (cf. Stamm 2005). Either we have to formulate specific conditions as to the accessibility of particular gradable meaning dimensions inside a complex concept, a particular type of prominence that makes a conceptual dimension accessible for simple degree modifiers; or we have to formulate a mechanism that is able to map the whole concept onto a scale (say, a scale of intensity), and apply the degree modifier to this derived scale. In any case, the distinction between degree and intersective / manner modification remains intact.

As a last aspect of this distinction, we cannot reasonably suppose that all property dimensions of arbitrary concepts will always involve a scale of ordered values, although this was the case with the three dimensions of colour. The mechanism of restricting sets of feature values sketched in 3.1.2 above is also available for property dimensions without scalar ordering, while degree modification cannot apply in such a case. This is the case with the more complex concepts that I am now turning to.

## 3.2 Predicates of Light Emission

In this section, the conceptual approach will be applied (with modifications and extensions) to a set of examples that are more crucial for Maienborn's (2004) argument that certain statives do not show effects of an event argument. Consider her example (12a) along with the

contrasting examples (12b-c):

- (12) a. Die Perlen glänzten matt / rötlich / feucht  
 (The pearls were gleaming + modifiers: dull / reddish / moist)
- b. Das Licht war ?? feucht hell / ?? rötlich hell  
 (The light was moistly / reddishly bright)
- c. Die Lampe leuchtete hell / rötlich / ?? feucht  
 (The lamp was shining brightly / reddishly / moistly)

Example (12b) (not provided by Maienborn) contrasts with (12a) in the same fashion as the group of examples introduced earlier in (2c): *glänzen* (gleam, glow) allows a whole range of modifiers while the adjective *hell* (bright) does not admit any of them. In spite of the neat contrast between (12a) and (12b) it can already be seen that there is no clear-cut division between just two types of predicates: the verb *leuchten* (shine (intr.)) allows some of the modifiers that may appear with *glänzen*, but not others. This calls for an examination of the conceptual interpretations in more detail.

### 3.2.1 Re: (12b) Das Licht war ?? feucht hell / ?? rötlich hell

Example (12b) can already be understood on the basis of what has been said in the section on colour concepts above. Modification fails because the conceptual substructure of *hell* (bright) is a simple scale and does not provide isolable property dimensions that manner modifiers could target inside it. There is a slight complication here in that the construction *rötlich hell* is not immediately judged as deviant by many German speakers, but this is arguably due to interference with a compound *rötlich-hell* which does not have *rötlich* (reddish) as a modifier but rather means "reddish and bright", thus not modifying the brightness value itself. This interpretation is irrelevant to the point at hand, however.

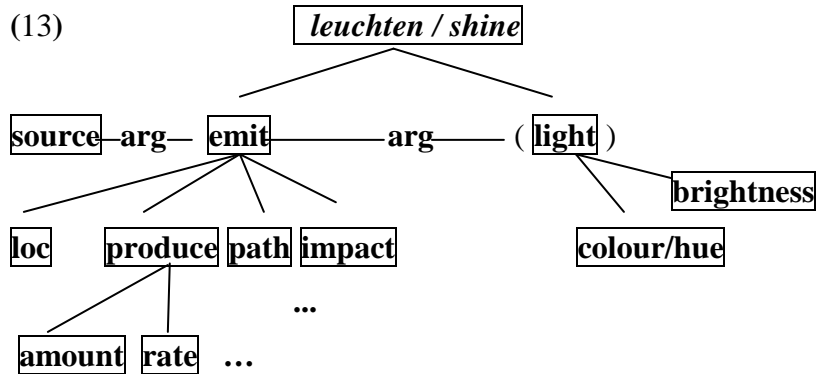
### 3.2.2 Re: (12c) Die Lampe leuchtete hell / rötlich (The lamp was shining brightly / reddish)

With the analysis of the concept *leuchten* / *shine* we get to cases that do not yield easily to a description in terms of orthogonal feature dimensions, which is one of the things that speak against Gärdenfors' (2000) geometrical interpretation of the conceptual decomposition (in addition to the points raised in Geuder & Weisgerber 2005).

Many concepts require an analysis with a richer structure in which the conceptual dimensions are linked via additional relations and constraints. Such structures have been described e.g. in the frame theory of Barsalou (1992). A first inspection of the model in Barsalou (1992) shows that some of the "relational links" which his model provides correspond to aspects of the model already given in section 3.1 above. In particular, Barsalou's "TYPE" relation mirrors the relation between conceptual dimensions and their property values, i.e., the "TYPE" relation serves to split a concept into mutually exclusive values that implement it. A further relation which Barsalou calls "ASPECT-OF" is what serves to couple a set of (what we have called) "dimensions" to form a concept. This structuring is thought to be recursive, however: a concept may be decomposed into sub-concepts which themselves exhibit a decomposition into quality dimensions.

A comprehensive review of frame theory is clearly beyond the scope of this paper, and for the present purpose, it will suffice to adapt its major ingredients into a simplified representation. However, a weakness of the system in Barsalou (1992) which must be pointed out is that the "ASPECT-OF" link serves as a cover term for a whole number of different relations without reflecting any further differences. In particular, it treats conceptual dimensions of verb

meanings on a par with participant roles. In my representation of the verb *leuchten / shine*, I will therefore annotate the structure with functor-argument relationships. Hence, the meaning of *leuchten* will be decomposed basically as "(for a source) to emit light", with the appropriate "ARGUMENT" links between these two aspects of the concept, plus a some sub-aspects of each of the main constituents that can be easily identified. The component "light" makes recourse to the concept "colour" which has already been analysed.



The conceptual constituent related to "emission" will minimally have to involve the characterisation of a process of light production, a path of the light emitted and a characterisation of what happens at the endpoint ("impact", e.g. visibility). Obviously, the argument relation that connects "emit" with "light" has to be inherited by the subconcepts of "emit". The component "light" functions as an argument, it is true, but does not surface in the argument structure of the verb; therefore it is simultaneously classified as a conceptual dimension (more on this topic below).

Without going too far into the details of conceptual knowledge that are implicit in this decomposition, let me point out that many modifiers can be easily identified as pertaining to specific sorts of sub-concepts or property values:

- (14) *hell leuchten* (shine brightly) : BRIGHTNESS  
*rot leuchten* (shine red) : COLOUR/HUE  
*konstant leuchten* (shine constantly) : PRODUCE: RATE  
*schwach leuchten* (shine weakly) : PRODUCE: AMOUNT & IMPACT ...

In this way it becomes clear why the verb *leuchten / shine* supports more modifiers than *hell / bright*: the reason is its greater conceptual complexity. Since *leuchten* includes the conceptual dimension of *hell*, modifiers of the latter carry over to the former.

### 3.2.3 Re: (12a) *Die Perlen glänzten matt / rötlich / feucht* (The pearls were gleaming + modifiers: dull / reddish / moist)

As a next step, let us consider the conceptual structure of *glänzen / gleam*, which involves an additional degree of complexity. First of all, we can observe that nearly all the modifiers that were found to combine with the verb *leuchten / shine* are found here again: we get *hell glänzen*, *rot glänzen*, *schwach glänzen*, in parallel to the data in (14). This indicates that *glänzen / gleam* should incorporate much of the conceptual structure of light emission concepts.

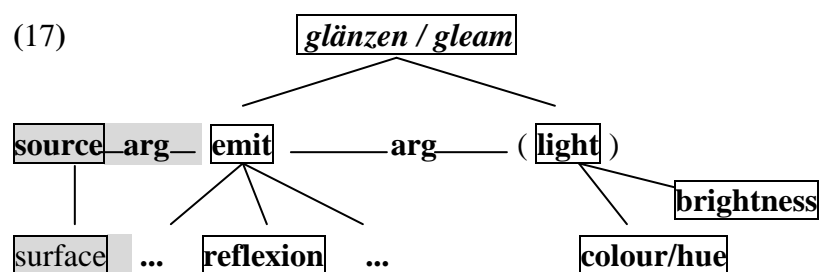
An intriguing case, however, is the use of the adjective *feucht* (moist, wet) as a modifier. Note the contrast between *glänzen* and *leuchten* in this respect:

- (15) Die Perlen glänzten feucht (the pearls gleamed wet)  
 ?? Die Kugel leuchtete feucht (the sphere shone wet)

This contrast can be explained as being due to a meaning component of *glänzen* that makes reference to properties of a surface and which is absent from *leuchten* / *shine*. To see this, note that *feucht* as a modifier can only be construed with respect to a surface in this example, although other construals would be allowed by the lexical meaning of the adjective. A log of wood, for instance, can be said to be *feucht* when it is soaked through with moisture. However, in (16) this construal is excluded:

(16) Das Holz glänzte feucht (the (piece of) wood gleamed wet)

Here, we must be dealing with a situation in which there is water on the surface (it is easier to imagine a piece of wood with a varnished surface, which is wet), not with a piece of wood which is damp and rotten and at the same time has a varnished surface which is gleaming in the sun. How do we know that *feucht* may only refer to a property of a surface when it modifies *glänzen*? The reason must be that the verb does not provide for any other way of linking the modifier to the situation frame. This demonstrates that the notion of a surface is accessible from the verb meaning. And the reason for this is the specific way in which *glänzen* / *gleam* specifies a concept of light emission: it is light emission by reflexion at a surface. Here is a sketch of the relevant parts of the situation frame:



If we say that there is a "surface" feature which licences the application of the modifier *feucht*, however, we are running into new problems, because not any adjective that is applicable to surfaces can become a manner adverb; for instance we don't get *zerkratzt* or *schmutzig glänzen* (gleam + modifiers "scratched /dirty"). And more generally, one might raise the question of how the content of such conceptual representations is to be kept within bounds, and how endless chainings of world knowledge can be avoided: do all kinds of conceptual knowledge that are related to surfaces have to be included in (17) as well?

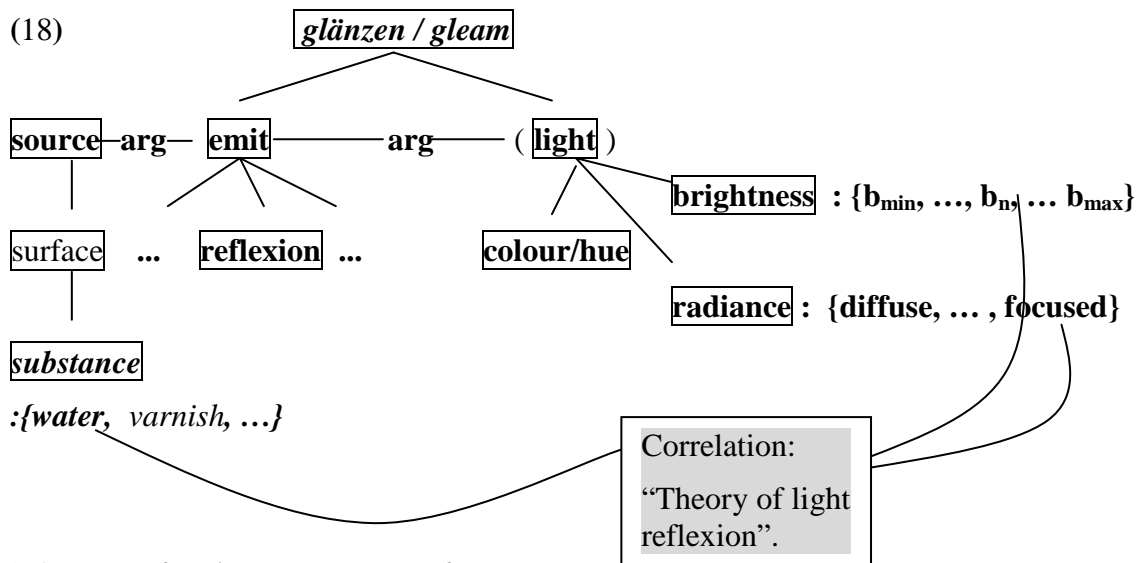
I propose that, indeed, we need a fixed, and selective, representation of that part of conceptual information that may interact with the semantics. Let us make the general stipulation that event concepts do not automatically inherit the conceptual dimensions of the possible referents of their argument roles — only if a predicate specifies implicit argument roles does their sortal information count as part of the predicate's meaning. This stipulation is also needed to secure the conclusion from the discussion surrounding (16) above: the alternative interpretation which was found unavailable for (16) (a log of wood soaked through with moisture and gleaming for some other reason) would actually correspond to a simple predication of *feucht* / *moist* on the subject of the sentence. Therefore, we generally have to exclude a construal of modifiers as simply predicating of the subject argument. Arguably, this predicational relationship is only possible in a different grammatical construction, namely a depictive construction. (See Geuder 2004 for details about the semantic delimitation between depictives and adverbial modifiers, and Geuder (2000, ch. 3) for further substantiation of the claim that manner modifiers exclude predication of a syntactic argument but can be licenced by implicit argument roles).

These considerations lead to the conclusion that the shadowed part in (17) is not a possible target for a manner modifier. If this is true, the mechanism of modification in the example *feucht glänzen* must be of a different kind than the one in (13-14). We are led to the conclusion that one of the core conceptual dimensions must undergo modification, not just the

"source / surface" part.

The solution to this problem is that, this time, the modifier applies in an indirect fashion — technically, by invoking what is called a CONSTRAINT in Barsalou (1992), i.e. a correlation between values which is part of the knowledge base. The very concept of "reflexion of light at a surface", which is at the heart of the meaning of *glänzen* / *gleam*, involves knowledge about a correlation between properties of a surface and corresponding qualities of the light emitted by it. To begin with, the surface has to have a certain smooth texture for reflexion to be possible at all, and moreover particular materials, such as water, are associated with their own characteristic pattern of light reflexion. This piece of knowledge must enter into the calculation of the conceptual interpretation of the modifier.

Let us invoke an additional attribute "radiance" in the representation below to capture more differences in the qualities of the light emitted:



**inference:** *feucht* = *water on surface*

As I have said, manner modification must involve one of the core conceptual dimensions of *glänzen*. This is indeed possible due to the correlation of "radiance" and probably "brightness" with properties of surfaces — provided that an inference is added that the predication by the modifier *feucht* concerns a surface. Via the said correlation, this modifier then effects a restriction of property values in the "radiance" and "brightness" dimensions, and thus indirectly targets the conceptual core of *glänzen*, even though it does not bear a lexical specification that targets these conceptual dimensions.

Let us sum up the findings concerning the **indirect restriction** of an event property, in which properties associated with entities external to the event concept plus a constraint on correlations of property values yields a restriction on event-internal property values. The shifted interpretation of an adjective A, for application as a modifier to an event concept C then derives as follows:

- (19)  $\text{MANNER}_{(C)}(A)$  is a set S of property values q such that for some  $a \in A$ :  
 $\exists Q$  in C with  $q \in Q$ , and  $\text{GEN}[a(x) \Rightarrow q(e)]$  (for some x)

Interpretation:

$\text{MANNER}_{(C)}(A)$  (C), with  $Q_1, \dots, Q_n$  as the conceptual dimensions (attributes) of C:  
 = the structure C with  $S \cap Q_i$  replacing  $Q_i$ , unchanged elsewhere.

### 3.3 D-States

We have now arrived at a fairly elaborate view on how manner modification may be governed by the conceptual complexity of verb meanings. Naturally, all that could be done here is to lend this claim some credibility; there is no proof in the strict sense, because the argumentation would be complete only after in-depth analyses have been conducted of each single verb type and its modifiers.

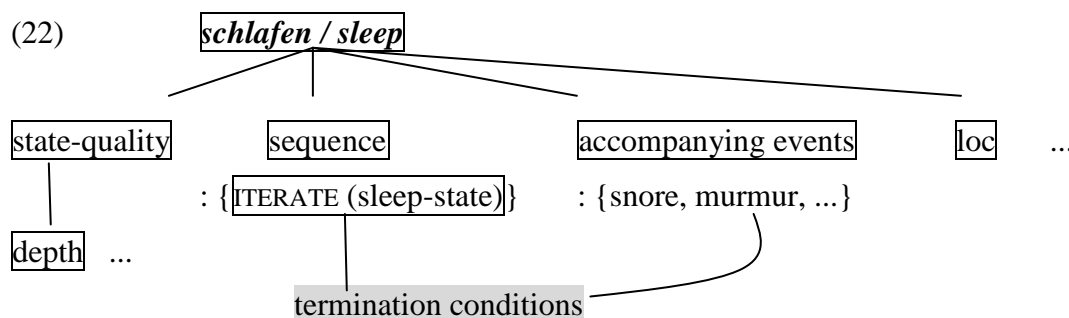
In order to provide some further substantiation for the conceptual approach to manner modification, let me now sketch an account for the intriguing contrasts uncovered by Maienborn (2004, 2005) which concern "minimal pairs" such as the following (partly taken from Maienborn, with contrasting examples added to (20b-c):

- (20) a. Bardo schläft friedlich. (B. is sleeping peacefully)  
 \* Bardo war friedlich müde (B. was peacefully tired)
- b. Carolin saß reglos am Tisch. (C. sat motionless at the table)  
 ? ... war reglos aufrecht (? C. was motionless upright)
- c. \* Carolin war geduldig durstig (\* C. was patiently thirsty)  
 Carolin schmachtete geduldig in der Hitze  
 (roughly: C. was patiently suffering / parched in the heat)

These examples show manner modification with "D-states", i.e. Maienborn's "eventive" subtype of states. I think it is important to observe that all these modifiers form a coherent semantic class — they speak about "things not happening":

- (21) friedlich peaceful = "without disturbance"  
 reglos motionless = "without moving"  
 geduldig patient = "without losing calmness / without change of attitude"

Accounting for these cases requires a new property dimension, which I would like to identify as "the continuation / termination conditions for a state". Hence, we are dealing here with a feature that is to some extent a dynamic, hence eventive, feature. While this feature is not dynamic in the sense of asserting change, it speaks about potentials of change. A device for representing this is already in place in the framework of Barsalou (1992), namely a link of the type "STATE". This relation serves to specify property values (of object concepts) which cooccur in an event because they appear in a sequence. The particular pattern of sequencing itself is stated separately as a conceptual dimension of its own. Consider the following sketch of the concept *schlafen / sleep*:



In this representation, Barsalou's "STATE" link has been rewritten as an iteration instruction, since we are dealing with a succession of states of the same type. The basic idea is then that event and state concepts may specify termination conditions: it is certainly part of our conceptual knowledge about *sleeping* that it is terminated by *waking up*. We can now begin to

understand the meaning of the modifier *friedlich* / *peaceful* via a correlation between termination conditions and accompanying events of sleeping: the modifier indicates "absence of disturbance", i.e. there are no accompanying events of a kind that could trigger, or come close to triggering, termination of the situation.

The introduction of a conceptual dimension of iteration / termination conditions should suffice to indicate the direction of an analysis; however, for reasons of space, this cannot be elaborated in more detail in this paper. In sum, however, it seems to me that this type of attribute is at the core of Maienborn's (2004, 2005) distinction between "event-like" and "property-like" statives. It should have become clear that this distinction can be modelled without making recourse to different types of referential arguments.

At the same time, however, it would not seem to be incompatible with Maienborn's analysis: predicates referring to abstract objects may well turn out to have a poorer conceptual structure than concrete, eventive predicates. The sortal distinction would then be in parallel to the differences in conceptual structures. In the first place, therefore, the conclusion to be drawn is that the analysis of manner modification is independent of the issue of neo-Davidsonian arguments with statives. The argument that predicates lack an event argument because they do not support (certain) manner modifiers is not valid.

#### **4 Conclusions and Outlook**

In the preceding sections, the restrictions on how various verbs and adjectives select their modifiers have been derived from the conceptual content of the predicates in question. I have defended the thesis that it is the factor of conceptual complexity which determines the range of modification options. If a group of predicates is observed to allow fewer modifiers than others, this can therefore be seen as pointing to a smaller conceptual complexity.

We are then led to the expectation that what Maienborn (2004, 2005) identifies as K-states on the basis of manner modification data, is actually to be characterised as a group of concepts with relatively poor conceptual substructure. It has already been pointed out that restrictions on manner modification cannot be used as an argument against a neo-Davidsonian analysis of states, because these two issues are orthogonal. We are now left with the question of whether the results of the conceptual model of modification are at least compatible with the claim of sortal differences.

One thing that casts doubt on having a sortal distinction between two types of statives is that it predicts a clear-cut dichotomy. The analysis of modifiers (e.g. with *bright* / *shine* / *gleam*) does not support such a dichotomy. The considerations in section 3.3 rather suggest that between "static" and "dynamic" concepts there is a grey area of concepts variously involving "dynamic potentials". It is not clear that all such concepts can uniformly be analysed as event-denoting and as being in contrast to nondynamic concepts. Deciding this point has to be left for future work, though.

Moreover, we are still not in a position to provide a clean definition of what is a manner adverb and what is not, although, of course, the claim that (certain) statives do not allow manner modification would require such a definition. This problem similarly applies to the work of Katz (2003), who likewise maintains that statives do not have Davidsonian arguments, and who proposes that all modifiers of statives might be explained away as predicate operators, instead of being neo-Davidsonian predicates. From my perspective, this distinction is not so clear-cut. In a way, I have sketched a view in which all kinds of manner modification are reduced to operations on predicates; but this only concerned the level of conceptual analysis, not semantic composition in the clause. My account could be implemented in Logical Form either as composition via predicate operators or via Davidsonian predication. In an extensional, neo-Davidsonian representation, a manner adverb



would appear as a context-sensitive property of events. This is to say, adverbial modifiers, defined via a set of property values as in (19) above can always be mapped onto a set of events, i.e. a neo-Davidsonian predicate of events. The template  $MANNER_{(C)}(A)$  (for a modifier  $A$  in the context of an event predicate  $C$ ) would then represent a lexical operation that shifts an adjective  $A$ , initially a predicate of some other sort of entities, to a predicate of events, in a way which is sensitive to the meaning of  $C$ . Then, the neo-Davidsonian representations of the modifiers would not reflect their underlying lexical-conceptual format; rather, the neo-Davidsonian semantics for manner modification would have to be seen as a purely compositional device. (This position has already been expressed in Geuder 2000).

In spite of the continuing uncertainty as to the precise delimitation of manner modification, one of the positive results of the present work is that a conceptual definition of "manner modification" is at least within reach. Still, we have various options as to how we can define a class of "manner adverbs" from the background of conceptual structures:

- Variant 1: Manner = "Modifiers that restrict some conceptual dimension of a multidimensional concept (a predicate of category V?)"

This is the most liberal way of defining manner. It would create a minimal contrast between *hell rot* "brightly red" (more than one dimension, hence "manner") and *angenehm hell* "pleasantly bright" (scalar adjective, hence no "manner"). Usually, however, all subsecutive modifiers of nouns would also be excluded from the class of "manner modifiers", in spite of well-known semantic parallels between many noun and verb meanings; and I have never seen the term "manner" applied to adjectives. It also remains unclear whether all subsecutive modifiers of verbs should be included.

- Variant 2: Manner = "Modifiers that restrict some conceptual dimension of an event-denoting predicate"

The distinction sounds intuitively appealing, but, evidently, it begs the question as to which predicates denote events! The definition probably creates minimal pairs like: *hell leuchten* "shine brightly" (manner) vs. *hell rot* "brightly red", but it would not contribute to an understanding of the difference.

- Variant 3: Manner = "Modifiers that restrict an eventive type of conceptual dimension"

In this way, not all subsecutive modifiers of verbs, but only those addressing change-of-state concepts or continuation conditions (etc.) inside a verbal concept would qualify as manner modifiers. This begins to appear overly strict, as it would characterise *friedlich schlafen* "sleep peacefully" as manner modification, but exclude the type *hell leuchten* "shine brightly".

Probably, "manner modification", while not devoid of content, is going to remain a notion without sharp boundaries. All in all, then, I conclude that the facts about manner modification point to a continuum between eventive and stative concepts, and that manner modification cannot be reduced to matters of Logical Form and predication of Davidsonian arguments.

## References

- Barsalou, L.: 1992, Frames, Concepts, and Conceptual Fields, in A. Lehrer & E. Kittay (eds), *Frames, Fields, and Contrasts*. Hillsdale NJ: Erlbaum, pp. 21-74
- Davidson, D.: 1967, The logical form of action sentences, in N. Rescher (ed), *The Logic of Decision and Action*, Pittsburgh: The University of Pittsburgh Press, pp. 81-95
- Gärdenfors, P.: 2000, *Conceptual Spaces*. Cambridge MA: MIT Press

- Geuder, W.: 2000, *Oriented Adverbs. Issues in the Lexical Semantics of Event Modifiers*, doctoral dissertation, Universität Tübingen. (Universität Tübingen online publication service: <http://w210.ub.uni-tuebingen.de/dbt/volltexte/2002/546/> )
- Geuder, W.: 2004, Depictives and Transparent Adverbs, in J. Austin, S. Engelberg & G. Rauh (eds), *Adverbials. The Interplay between Meaning, Context and Syntactic Structure*. Amsterdam: Benjamins, pp. 131-166.
- Geuder, W. & Weisgerber, M.: 2005, *On the Geometrical Representation of Concepts*. Ms. Universität Konstanz.
- Katz, G.: 2000, Anti neo-Davidsonianism: against a Davidsonian semantics for state sentences, in C. Tenny & J. Pustejovsky (eds), *Events as Grammatical Objects*, CSLI Publications, 393-414
- Katz, G.: 2003, Event arguments, adverb selection, and the Stative Adverb Gap, in E. Lang, C. Maienborn & C. Fabricius-Hansen (eds): *Modifying Adjuncts*, Berlin: Mouton de Gruyter, pp. 455-474
- Kim, J.: 1976, Events as Property Exemplifications, in M. Brand & D. Walton (eds), *Action Theory. Proceedings of the Winnipeg Conference on Human Action*, Dordrecht: Reidel, pp. 159-177.
- Maienborn, C.: 2004 (Ms., forthcoming), On Davidsonian and Kimian states, *To appear in* I. Comorowski & K. v. Heusinger (eds), *Existence: Semantics and Syntax*. Berlin: Springer.
- Maienborn, C.: 2005, On the Limits of the Davidsonian Approach: The Case of Copula Sentences (Target Article), *Theoretical Linguistics* **31-3**, 275-316
- Parsons, T.: 1990, *Events in the Semantics of English*, Cambridge MA: MIT Press.
- Stamm, H.: 2005, On the Semantics of Gradation of Verbs. Talk presented at "Sinn & Bedeutung X", Berlin, Humboldt University, October 15, 2005

# MANNER AND CAUSATION IN MOVEMENT VERBS

Wilhelm Geuder & Matthias Weisgerber,  
Universität Konstanz / SFB 471

{wilhelm.geuder | matthias.weisgerber}@uni-konstanz.de

## Abstract

This paper investigates the semantic underpinnings of the distinction between two syntactic types of “manner of movement” verbs in Levin (1993), namely the RUN and ROLL classes. According to Levin's (1993) and Levin & Rappaport's (1995) work on unaccusativity, a semantic factor of “internal causation” should be the trigger for the classification of a movement verb as intransitive (=not-unaccusative), and hence for its belonging to the RUN class. We point out empirical problems for this characterisation, mainly coming from the different readings of the German verb *fliegen* (*fly*). From a comparison with other semantically similar verbs, we conclude that the semantic description which underlies the class distinction should be refined: instead of “internal causation”, the crucial semantic factor is described here as “inherent specification for a momentum of movement”. This result indicates that forces, and relations between forces, have to be part of the semantic description of the manner component in movement verbs.

## 1 Introduction: Manner-of-Movement Verbs

### 1.1 A Syntactic Distinction

A topic in verb semantics that has continued to attract attention is the distinction between two types of movement verbs, viz. “directed motion” vs. “manner of motion” verbs. In view of the large amount of literature devoted to this distinction, astonishingly few authors have addressed the issue of explicating the notion of “manner of movement”, which lies at the bottom of this whole strand of research. One work which offers at least a subclassification of manner of movement verbs is Levin (1993). Levin notes a major contrast between two classes of manner of motion verbs, which she dubs the ROLL class and the RUN class. Here are some examples:

(1)

<i>run-class</i>	<i>roll-class</i>
amble, climb, fly, jump, tiptoe, ...	drift, drop, float, revolve, ...

This grouping first and foremost reflects a syntactic distinction and is therefore connected to verb semantics only in an indirect fashion. As amply discussed in Levin & Rappaport (1995), the ROLL class consists of verbs whose single argument behaves as an underlying object, i.e. they are unaccusative verbs (even when occurring in isolation), while the RUN class, in contrast, consists of verbs which are intransitive in a strict sense<sup>1</sup>, i.e., verbs with an underlying subject argument (even if these verbs may enter into unaccusative constructions when combined with directional PPs).

---

<sup>1</sup> We want to avoid the awkward terminological opposition “unaccusative” / “unergative”, so the term “(strictly) intransitive” will be reserved here for verbs with an underlying subject, as opposed to unaccusative verbs; the cover term which we use for the larger class of verbs with one argument is “one-place verbs”.

An important test for this distinction in English are constructions with a resultative adjective. As a rule, an adjective that adds a resultant state to a process verb can only be predicated of a syntactic object, cf. (2a-b) below. True intransitive verbs may still appear in this construction, but then a dummy reflexive object has to be inserted, as in (2b).

- (2) a. John kicked the door open  
 b. The children ran themselves tired. / \* The children ran tired.  
 c. The door<sub>i</sub> rolled [<sub>t<sub>i</sub></sub>] open

Example (2c) then shows how resultative constructions can be used as an unaccusative diagnostic: unaccusative verbs are a class of seemingly exceptional one-place verbs which may appear in this construction with just their sole argument and without dummy reflexive object. The reason is that the sole argument of an unaccusative verb counts as an object for the purpose of the predication rule.<sup>2</sup>

## 1.2 Semantic Correlates

Levin & Rappaport (1995) have investigated the question as to the semantic triggers of unaccusativity in great detail. They propose a set of linking rules, whose interaction derives the difference between verbs with underlying objects and underlying subjects. Given that verbs of manner of movement do not intrinsically denote a change of state — which is the single most important factor that triggers unaccusativity — what is most important for us are their “immediate cause linking rule” and the “default linking rule”.

Consider first the formulation of the “immediate cause” linking rule:

- (3) *Immediate Cause Linking Rule*

“The argument of a verb that denotes the immediate cause of the eventuality described by that verb is its external argument.” (Levin & Rappaport (1995), p.135)

One-place verbs which assign such an immediate causer role to their only argument are therefore intransitive. It is important to sort out some fine points in the interpretation of this rule, however. As the authors stress, an immediate cause(r) is not the same as an agent or a participant that exerts control over a situation. For example, verbs like *hiccup* may describe involuntary actions, but the immediate cause of the situation still lies with the subject. The same is true for verbs of emission, like *shine* or *stink*, and for verbs which denote the maintenance of a position or configuration, like *kneel*. With respect to examples of this kind, the authors explain their concept of causation as follows:

- (4) *(Internal) Causation:*

“...The concept of internal causation subsumes agency. However, an internally caused verb need not be agentive ... For example, the verbs *blush* and *tremble* ... can ... be considered to describe internally caused eventualities, because these eventualities arise from internal properties of the arguments.” (Levin & Rappaport (1995, p. 91))

The notion of “internal causation”, which figures here is a subcase of the general concept of causation. If we are to apply the immediate causer rule to movement verbs, then internal causation is what is relevant for manner of movement verbs. In general, the notion of “internal causation” serves to separate verbs like the ones just discussed from “external causation” in which the causer is not involved in the manner of the event but merely sets

<sup>2</sup> For our purposes, it is not necessary to resolve the question of whether the unaccusativity tests really establish a difference in the syntactic position of the argument, or whether they are sensitive to a semantic classification of verbs. For ease of exposition, we adopt the syntactic parlance.

things into motion. This latter class of verbs allows the causer to be dropped, giving rise to the causative-inchoative alternation, which occurs e.g. with *roll*:

- (5) a. They rolled the cheese to the train station  
 b. The cheese rolled to the train station

External causers can only appear with transitive verbs, because otherwise the remaining core of the situation (minus the causer) would not have a participant. One-place verbs therefore can only appear with internal causers, or be unaccusative, i.e. without causer at all. This leads us to an additional criterion that supports the classification of movement verbs: If there is a transitive variant with a meaning of direct causation — like (5a) above — the corresponding one-place variant was unaccusative, and hence belongs to the ROLL class.

When we are dealing with a member of the RUN class, there may sometimes be transitive-causative variants, too, but they invariably have a meaning of indirect causation. Since the lexical meaning already specifies an internal causer, the addition of another causer subject in the transitive construction leads to a chaining of causes, i.e. a role of indirect causer for the highest argument, and a role of immediate causer for the other one. For example, in (6) below, the subject is an indirect causer because it is understood that it is still the rat itself that does the running:

- (6) The psychologists ran the rat through the maze

Levin & Rappaport (1995) point out that in such examples the directional PP is needed for the example to be grammatical. This seems to be related to the finding that addition of a directional PP creates a change in syntactic categorisation, turning any agentive movement verb into an unaccusative construction. In other words, there is a linking rule according to which a feature of directionality of movement triggers unaccusativity, and this rule overrides the causer rule (Levin & Rappaport 1995, p. 158). Apparently, then, what happens is that a syntactically unaccusative structure is needed as a basis for causativisation to apply. The conceptual content of the verb's meaning is not lost, however, even if the directional PP creates a change in syntactic categorisation. Hence, the interpretation is that of indirect causation.

In sum, we can use causativisation patterns to diagnose a lexical verb as unaccusative, provided we make sure that the interpretation involves direct causation and that the derivation also works in the absence of a directional PP. Verbs of the RUN-class, in contrast, show a different causativisation pattern: causatives are confined to structures with directional PPs.

### 1.3 Unaccusativity as Default

There is one further component of Levin & Rappaport's model that we need to take into account here:

- (7) *Default Linking Rule*

“An argument of a verb that does not fall under the scope of any of the other linking rules is its direct internal argument.” (Levin & Rappaport (1995, p.154))

We need not be concerned with the question of which other linking rules there are — none of them would be relevant to the group of manner of movement verbs. But what is important is the default status of unaccusativity that follows for one-place verbs: if no particular semantic property is present that triggers linking of a verb's sole argument to the subject position (or object position), the single argument will be treated like an object. As a consequence, it would only be the RUN-class which carries a positive semantic specification for a feature “internal

causation”. In contrast, the unaccusative ROLL-class is an “elsewhere” case with no unified semantic definition.

In sum, then, the ROLL class emerges as a class of verbs which appears to be underspecified in two respects: these verbs do not provide a causer of the situation they describe, and they do not exhibit a positive specification that defines them as a unified semantic class. In contrast, RUN verbs are a type of manner of movement verbs which have a positive semantic specification (internal causer) that defines them as a unified class in terms of syntactic and semantic classification.

## 2 The Problem of Double Classification

We now want to discuss an apparent drawback of the classification of manner of movement verbs shown in (1) above, namely the fact that a large number of verbs is listed by Levin (1993) in both groups simultaneously. In other words, there appears to be a large amount of lexical variability with respect to the semantic factor that determines unaccusativity, and one might ask whether this blurring of the categories is a reason to doubt the lexical-semantic relevance of the grouping.

(8)

RUN-class	ROLL-class
amble, climb, fly, jump, float, glide, slide, roll (!), ...	drift, drop, revolve, rotate, float, glide, slide, roll, ...

The doubling of the entries in the second line of each cell points to the fact that certain verbs can be construed as internally caused movement or, alternatively, as movement brought about by an implicit external force. The resultative test confirms that these really belong to two separate classes:

(9) a. The curtain rolled [ (\*itself) open].

b. The children rolled [the grass flat]. (Levin & Rappaport 1995: 209-10)

Example (9b) is understood as describing a volitional action by the children. The resultative construction displays the structure of intransitive verbs in that it allows an additional object that is not selected by the verb roll but case-marked by it. The appearance of a non-selected object is a phenomenon which is akin to the insertion of a dummy reflexive; unaccusative verbs are unable to support either type of object.

The reason for the fact that only some of the verbs but not all of them allow the alternation in (9) should obviously be sought in their lexical semantics. Levin & Rappaport (1995: 211) state: “The variable behavior of certain verbs of manner of motion is simply the result of the existence of a lexical semantic constant that, by virtue of its nature, is basically compatible with more than one lexical semantic template.” In other words, the manner component in the meaning of the verb *roll* is neutral with respect to the feature [ $\pm$ internal causation], and so a feature of internal causation may be freely added. We take the quotation to mean that this difference in interpretation can be represented as the augmentation of a semantic template:

(10) x PROCESS<sub><ROLL></sub> → x PROCESS<sub><ROLL><INTERNALLY CAUSED></sub>

It may be noted that the variability of ROLL verbs only concerns causation while the manner of movement remains unchanged. Hence, this is not a case of lexical ambiguity, i.e. involving different lexical entries, but an instance of productive polysemy. The augmentation is only possible if the specification of a causer feature is absent from the semantic core of the verb,

and this in turn is exactly a trigger of unaccusativity. Therefore, we conclude that the existence of these two variants is actually not an irregularity that threatens the semantic relevance of the classification, but rather on the contrary, it shows a hallmark of the ROLL-class, which is to be predicted from lexical semantics. We have to view the alternating verbs as ROLL verbs in their underlying form, with the proviso that they may acquire an additional semantic feature and switch to a grammatical realisation as an intransitive.

In this way, the phenomenon of double classification is a direct result of the semantically underspecified character of ROLL verbs noted in section 1.3 above. Note, incidentally that the class of unaccusatives again proves to be heterogeneous, because not all ROLL verbs are able to undergo the shift in (10). Hence, it is possible for a verb to belong to the ROLL class, and be unaccusative, not because it is unspecified with respect to causation, but because it is negatively specified wrt. the possibility of internal causation and so blocks the application of (10).

### 3 The Problem of the Verb *fliegen* / *fly*

#### 3.1 Variants: Conceptual Modulation

In this section, we get to a problem that turns out to be the mirror image of the case discussed in section 2, namely a verb that should be expected to switch between classes but which doesn't. The German verb *fliegen*, and its English counterpart *to fly* display a range of uses that seems to replicate the distinction between internally caused and externally caused variants:

- (11) a. Ein Vogel flog durch das Fenster  
A bird flew through the window  
b. Das Flugzeug flog durch die Wolken  
The plane flew through the clouds  
c. {Ein Stein / Eine Gewehrkuugel} flog durch das Fenster  
{A stone / A bullet} flew through the window

In (11a) it is clear that the bird is an internal causer, since birds fly by moving their wings. For examples like (11b) it is hard to judge to which extent causation is internal (do we have to acknowledge the pilot of the plane as an external causer?), but it is clear that the plane is still generating the movement. (11c) behaves differently from (11a-b) since the bullet is known to have been fired from a gun — the bullet itself is not something that brought about the situation because of its intrinsic properties. In light of the preceding discussion, such examples are expected to class with the ROLL verbs. An example that clearly demonstrates that *fly* may describe situations with external causes is (12), where the context explicitly refers to one:

- (12) He was shielding his head with his arms, and was hit by a large force of some kind. Nick **flew** through the window, shattering the glass, and ...<sup>3</sup>

In spite of all this, we are going to show that there are no indications that *fliegen* / *fly* may ever display unaccusative behaviour (in isolation).<sup>4</sup> It can also be noted that *fly* is listed only

<sup>3</sup> [quizilla.com/users/Sorrow1991/quizzes/Forever](http://quizilla.com/users/Sorrow1991/quizzes/Forever)

<sup>4</sup> Remember that any kind of movement verb gives rise to an unaccusative construction when combined with directional PPs. Therefore, constructions with a directional PP have to be left out of consideration in our search for the correct lexical classification of the verb *fliegen* / *fly*.

with the RUN class in Levin (1993), but in the detailed study of Levin & Rappaport (1995) and in the other literature that we are aware of, there is no discussion on whether this classification is correct, and whether it is in need of explanation. So establishing and explaining the intransitive status of (11c) will be our central concern for the rest of this paper.

The unaccusative pattern of the resultative construction does appear with *fly*, it is true, but not in the sense of a movement verb:

- (13) a. The machine flew to pieces  
 b. The door flew open  
 c. Old Nathan flew hot frequently, and the anger puffed away like flame from thistledown. But he was capable of cold rages also.<sup>5</sup>

Example (13a) could simply be about an explosion, it does not mean that pieces came off the machine as a result of flying in the air. Likewise, in (13b) there is no door flying through the air which becomes open as a result of that movement, and (13c) is a metaphorical extension that bears very little resemblance to the movement sense.

Whenever there is a sense of movement through the air, we rather get the intransitive pattern. Compare the unaccusative (13a) above with the intransitive pattern of the resultative in (14), which describes literal flying:

- (14) The future looks grim My friends, if Nasa don't [...] start working on a new shuttle, one that doesn't **fly itself to pieces**.<sup>6</sup>

Also, we were unable to find German examples with the unaccusative pattern of the resultative construction. Most combinations of *fliegen* with a resultative adjective sound very marginal. One of the few clear examples<sup>7</sup> is shown in (15) below: imagine an inflated balloon which is flying around as it is emitting the air inside. If, in the end, the balloon is empty, this would have to be expressed as in (15b), not as in (15a):

- (15) a. # Der Luftballon ist leer geflogen<sup>8</sup>  
 The balloon has flown empty  
 b. Der Luftballon hat sich leer geflogen  
 The balloon has flown itself empty

Note, however, that this does probably still not count as a case of external causation, even though an agent is lacking. So we are still without a clear test to check the type (11c) above for unaccusativity.

<sup>5</sup> [www.webscription.net/10.1125/Baen/0671720848/0671720848\\_\\_1.htm](http://www.webscription.net/10.1125/Baen/0671720848/0671720848__1.htm)

<sup>6</sup> <http://blogorants.blogspot.com/>

<sup>7</sup> Here is our second best attempt at a counterexample: In German you can have an unaccusative resultative construction with a polysemic variant of *laufen* / *run*:

(i) *Der Pilot bemerkte, dass der Motor heiß lief.*  
 The pilot noticed that the machine was running hot

Let us consider its somewhat magical counterpart in a fairy-tale world:

(ii) [*Die Hexe, die den neuen Besen zum ersten mal flog, bemerkte, dass etwas nicht in Ordnung war:* ]  
 ? *Der Besen flog heiß*  
 [The witch, who was riding the new broom for the first time, noticed that something was wrong:]  
 the broom flew hot

To the best of our judgement, example (ii) is syntactically not acceptable, but it is indeed hard to judge.

<sup>8</sup> A surface string like (15a) is syntactically acceptable but only on the irrelevant reading as an adjectival passive, not as a verbal construction with a perfect auxiliary. (15a) as an adjectival passive is the regular outcome of derivation from the verbal construction (15b).



There is a second criterion that can be applied, namely causativisation. If *fliegen* / *fly* had an unaccusative variant (lacking internal causation), one might expect direct causatives. In the case of *fly*, a direct causative would have to be similar to the meaning of “throw”:

- (16) \* Er flog einen Stein durch mein Fenster  
He flew a stone through my window

What we have to note with respect to this example is a divergence between German and English. The German sentence is clearly impossible with the intended interpretation. For the English version, we do have attestations, although they seem to be rare. Since the point is important, and tricky, we should consult our results from a web search:

- (17) hi everyone, need to get a 3rd gen headlight have a hole in ours where a lorry **flew a stone up** and hit us  
([www.yotasurf-online.co.uk/public/forums/showthread.php?p=90648](http://www.yotasurf-online.co.uk/public/forums/showthread.php?p=90648))
- (18) Will you **fly a stone** through my window like you used to do?  
([http://www.poetryvault.com/Display\\_Print.asp?ID=4729](http://www.poetryvault.com/Display_Print.asp?ID=4729))
- (19) Japan and the US began joint research into a next-generation missile defence system shortly after North Korea **flew a missile** over Japan in 1998.  
(<http://news.bbc.co.uk/2/hi/asia-pacific/4104301.stm>)
- (20) Here's an accurate analogy of an [Toyota] MR2 being driven fast: It's like trying to fly an arrow backwards.  
(<http://www.hondaswap.com/forums/lofiversion/index.php/t46259.html>)
- (21) 'Cos You fly an arrow Straight to my heart Blow it apart...  
([www.lyricshost.com/lyrics.php/95274/Badly\\_Drawn\\_Boy\\_lyrics/Chaos\\_Theory\\_lyric](http://www.lyricshost.com/lyrics.php/95274/Badly_Drawn_Boy_lyrics/Chaos_Theory_lyric))

When going through these examples, it seems hard to judge intuitively whether the semantics is one of direct causation or not. With respect to the example (19) involving a missile, indirect causation is most plausible, as the missile is moving by itself. More importantly, all examples involve a directional complement. This in fact aligns the examples with the derived causatives from agentive intransitive verbs that we introduced in section 1.2. There are very few exceptions with *fly*:

- (22) It keeps hundreds, if not thousands, of people who can barely **fly a paper dart** rushing to your LHS to buy brightly coloured boxes covered in shrinkwrap and ...  
([www.wattflyer.com/forums/showthread.php?t=4400](http://www.wattflyer.com/forums/showthread.php?t=4400))
- (23) Throw a piece of cardboard straight out like you were **flying a paper plane**. It will almost immediately fly at an upward angle  
([www.yale.edu/ynhti/curriculum/units/1988/6/88.06.02.x.html](http://www.yale.edu/ynhti/curriculum/units/1988/6/88.06.02.x.html))

It is possible, however, that single agentive verbs or even single collocations acquire a lexicalised causative variant; the same happens with *walk the dog* and *run the dog*, which do not generalise so as to yield *\*The general walked the soldiers* etc. Our impression is that the same is the case with the collocation *fly a paper dart*. A collocation *fly an arrow*, which would be closely analogous, could not be found in an internet search: from roughly 800 attestations of the string “fly an arrow” all relevant ones had as their larger context the construction “let fly an arrow” (with object extraposition). One may speculate that the use of “let” here even points to a conceptualisation of the situation as some kind of self-propelled movement (even though the flying of an arrow is clearly an instance of externally caused movement in terms of physics).

So in sum, the behaviour of the verb *fly* exhibits close parallels to *run*: we have directionals in the productive causativisations, and the exception *fly a paper dart* is an idiosyncratic case which does not generalise.

Another observation can be made which points in the same direction: the causative uses of *fly* attested in (17) through (23) do not have counterparts in German. This seems remarkable in view of the fact that German *fliegen* otherwise exhibits almost exactly the same range of readings as *fly*. It reminds us of the fact, however, that German systematically disallows causative derivations of agentive movement verbs. The following sentences exemplify a pervasive pattern (the a.-sentences translate the German b.-sentences):

- (24) a. The cheese rolled to the train station / They rolled the cheese to the train station  
 b. Der Käse rollte zum Bahnhof / <sup>ok</sup>: Sie rollten den Käse zum Bahnhof
- (25) a. The soldiers marched to the tent / The general marched the soldiers to the tent.  
 b. Die Soldaten marschierten zum Zelt  
 / \* Der General marschierte die Soldaten zum Zelt

In order to drive home this point, note that there are also some unaccusative verbs which block causative derivations, probably for reasons of their individual lexical semantics. For example, the verb *rotate* has a causative only in the sense of “turn something around an axis” (*rotate the picture*), but the use which involves movement along a trajectory (*a planet rotates around a star*) does not have a causative (with a hypothetical meaning like “insert into orbit”). This very subtle patterning of causative readings is exactly replicated by German *rotieren* and other German verbs of similar meaning. This parallelism is to be expected if the reason lies in some lexical semantic factor. Hence, the lack of a causativised variant of the movement verb *fliegen* in German is a highly significant indicator for its status as a RUN verb: it must be the pattern in (25) that we are dealing with.

We conclude that there are good reasons to believe that all uses of *fliegen* / *fly* as a movement verb pattern with the RUN-class, in spite of the fact that objects like arrows, bullets or stones are unable to act as internal causers of the movement.

### 3.2 Polysemous Variants: Vehicle and Transport Readings

There are more variants of the verb *fliegen* which may give some further indications as to its status as a movement verb. In this paper, we will not consider variants which we think belong to different conceptual domains, like a use which makes German *fliegen* near-synonymous to *fall* (*Er flog in den Matsch* “He fell into the mud”). What is of interest to us here is rather that there are more variants which denote a movement through the air: the German example (26) shows *fliegen* as a vehicle verb, and (27) as a transport verb (the range of usage in English is mostly parallel, though not entirely: many intransitive uses of *fliegen* in the vehicle reading would be translated as *to pilot a plane*). These two types are the only transitive-causative uses that German allows for *fliegen*:

- (26) Er flog den Airbus nach Hamburg  
 He flew the Airbus to Hamburg
- (27) Er flog die Eulen nach Athen  
 He flew the owls to Athens

The relevant interpretation of (26) is one in which the subject argument refers to the person who was piloting the airplane. In (27), we normally get the interpretation that the owls were carried as the load of a plane. Since the surface structure of the two sentences is the same, we

get a number of additional interpretational possibilities that can be discarded only on the basis of reasoning from world knowledge, like the transport interpretation for (26) (but a jet will not normally be airfreighted in another one); or a kind of vehicle interpretation for (27) (but live birds would not normally do service as a mount; exceptions belong to the realm of fiction). Note also that no purely causative reading is available for (26) and (27), whether direct or indirect. Example (26), though, comes fairly close to being a causative, because piloting an airplane can be seen as indirect causation of a flying situation. Furthermore, the manner components in this use of the verb are exactly the same as in the intransitive movement variant *The airbus was flying to Hamburg* (compare also (11b)). Therefore, the vehicle variant can actually be said to involve the derivation of an indirect causative from the movement verb *fly* (even though there are other semantic differences along with this).

In sum, the absence of direct causatives in German that are based on *flying* as movement through the air, and the fact that some extensions of the underlying concept of movement through air display indirect causativity, is further support for the classification of the manner of movement verb *fly* as a RUN verb. This, however, is severely at odds with the impression that it has uses with external causation.

## 4 Analysing the Meaning of *fliegen* / *fly*

### 4.1 Decomposing Causation

As argued in section 2, the switch of some ROLL verbs to an interpretation with internal causer does not constitute an instance of deep lexical variation but is due to an underspecified slot in the lexical semantics of the verb. Notably, the manner of the movement, e.g. “rolling”, does not change in this alternation. It could be argued that this is different with the variants of *fliegen* / *fly* shown in 3.1. At the very least, flying with the active use of one's wings, as birds do, seems to involve a different manner of movement than flying as of bullets. Therefore, it might be that we are dealing with real lexical polysemy in the case of *fly*. If the differences in manner point to lexical polysemy, the explanation of the different uses of *fly* would have to proceed in a way that is entirely different from the simple augmentation model that we sketched for ROLL. The variants of *fly* also give the intuitive impression that agentive flying is not to be described as an augmented variant of a pure manner of movement involving passive projectiles; since these are felt to be the more marginal variants, the connection should rather work the opposite way: the uses with inactive projectiles would somehow seem to constitute degenerated variants of the prototypical agentive case.

While this is all true, consideration of the manner differences does not really open up a way of analysing *fly*. One would need a full-blown model for a classification of manner of movement, which we can't accomplish in this paper (although we firmly believe that a calculus for explicating manner is a desideratum in current verb semantics). And to be sure, polysemy would multiply the problem of explaining the behaviour of the verb *fly* / *fliegen*, rather than solve it.

In the following, we rather want to show that the puzzle might be resolved by elaborating on the notion of “internal / external causation”; more precisely: by reinterpreting the relevant condition in terms of forces rather than causation. The various manners associated with the variants might then even be taken as belonging to a unified category.

Let us start our analysis with the observation that we must be dealing with more than a bivalent opposition [ $\pm$ internal cause] in our examples, in view of the fact there are many intermediate cases to consider — like for instance:

(28) a. Birds / b. Airplanes / c. Cruise missiles / d. Stones ...were flying

The problem is that in the middle range of this continuum, it is unclear to which extent causation should count as “internal“. As a first step to clarify this, we propose to decompose the cause of the situation into two components, which may be dubbed Control and Force. The second refers to the source of the “energy” in the movement; the first is what guides the direction. The notion of control may be further split up into “intention of movement” (in a wide sense) or, alternatively, non-intentional factors that direct the movement. In our prototypical example (11a), all causal factors coincide in the subject argument, the bird. However, the other examples differ in the exact allocation of causal factors.

First, the examples differ in whether the source of energy lies with the subject of *fly* or not: animals and all kinds of aircraft with engines generate the movement's FORCE, and with respect to this they appear to be prototypical internal causers. Flying stones and the like do not localise the source of energy in the event of flying; here, it is known that this source must be external to this event, namely it must lie in some other prior event (cf. 12 above).

Similarly, the degree of CONTROL that can be attributed to the subject is decreasing over the items (28a) to (28d). This may mean that either, control devolves on some entity outside the scope of the event description (different types of “remote control” in (28b) and (28c)), or that it is an uncontrolled event. This is what must be posited for (28d). The peculiarity of (28d) is that it is an event which must have an external origin of FORCE, but which nevertheless disallows external CONTROL. More precisely: while the generation of force (by the thrower) may be under control, the event of flying is not. Let us elaborate on this point via a comparison of *fliegen* with some related movement verbs.



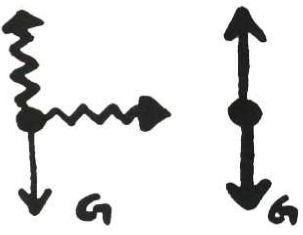
#### 4.2 Verbs of Movement Through a Medium

In this section we will elucidate the meaning of *fly* via a comparison with other verbs that denote movement of freely suspended objects: German *schweben* (*float, hover*), *schwimmen* (*float [in water], swim*), and *fallen / fall*.

German, as can be seen from these examples, does not make a distinction that seems systematically encoded in English: *schwimmen* refers to situations of active movement in water (*swim*) or passive movement or suspension in water (*float*). Likewise, *schweben* encompasses passive suspension in air (or water) (*float*) as well as situations in which an agent invests force to remain in a suspended position (*hover*).<sup>9</sup> The relevant distinction is one in terms of the forces at play. In the illustrations below, we represent forces that are produced by the participant of the situation as curled arrows, and environmental forces as straight arrows. In a first approximation, this reflects a distinction between internal and external causation:

---

<sup>9</sup> Another piece of evidence for this lexical regularity (but of a different semantic type) is the pair *bounce / jump*, indiscriminately rendered as *springen* in German.

(29)	(30)	(31)
Fallen (fall): 	Schweben (float, hover): 	Schwimmen (swim, float): 

The external forces at play can be identified as gravitational and buoyant forces. In a situation of *falling*, a movement is created by gravitation, which at least outweighs buoyancy. *Schweben*, is depicted in (30) with two upward arrows which are to be understood as alternative, i.e. as underspecified wrt their quality; choosing the curly force arrow would represent *hover*, the straight arrow *float*, because the latter relies on the environmental force of buoyancy. *Schwimmen*, on one reading, is represented via two force components, which secure staying at the surface and locomotion, respectively; the constellation to the right is an alternative interpretation for the German word, which would then correspond to *float*.

It might be expected that *fliegen* / *fly* should exhibit the same variability between self-propelled motion and motion caused by environmental forces. If so, however, there would be an irregularity in that English does not make the lexical distinction which it makes in the cases *swim/float* and *hover/float*. A second peculiarity is that *float* is unspecified as to whether there is movement or not, while in contrast, *fliegen* has no interpretation with the object being at rest.

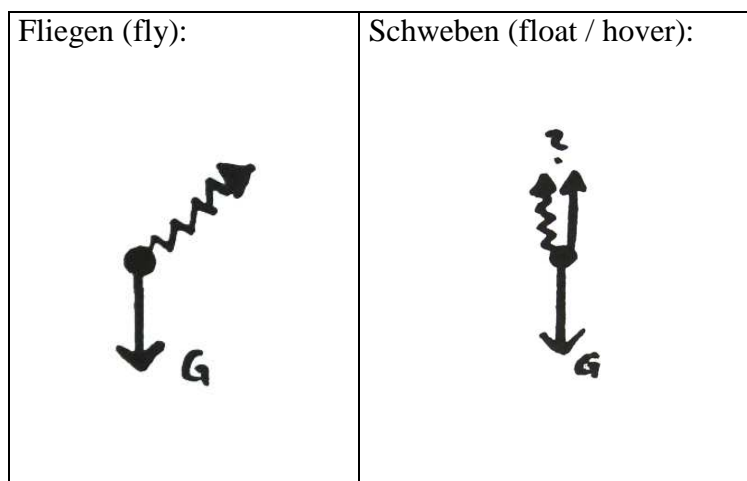
- (32) a. Eine Feder flog durchs Fenster  
A feather flew through the window
- b. Eine Feder schwebte in der Luft  
A feather floated in the air
- c. # Eine Feder flog in der Luft  
A feather flew in the air

Example (32c) needs careful analysis: it is acceptable on the interpretation that a feather is flying past, with unspecified direction. However, it does not allow a stationary reading (with, say, the feather being supported in a more or less stationary position by small turbulences in the air; this would not yield a movement path).

We believe that there is good reason why *fliegen* / *fly* does not alternate with a stationary interpretation in the same way as other verbs do, like *schwimmen*, *schweben*. There is no stable position with *fliegen* for a reason that is rooted in the very physics of flying: in this special case, the support is created by the motion itself. In other words, *fliegen* / *flying* is a situation in which an object carries a momentum of movement that prevents it from going straight downwards.

Thus we claim that the relevant distinction between *fliegen* and *schweben* (*float*) is to be represented as a lexical specification for a movement with an intrinsic momentum.<sup>10</sup> *Schweben* / *float*, in contrast, is a verb that describes an equilibrium of buoyancy and gravitational forces; movement is extrinsic to this description and can be freely added. The difference can be illustrated as follows — note that the curly arrows now have to be reinterpreted as referring to inherent as opposed to environmental forces. The momentum, depicted in (33) by a diagonal arrow, can be decomposed into two components, upward and forward, in keeping with the observation mentioned above that flying is a situation in which it is the movement which creates a support vector.

(33)



### 4.3 Conclusion

If our analysis is correct that *fliegen* requires its participant to carry a momentum of movement, this aligns it with the RUN-class in some sense: it is a factor intrinsic to the participant and to the situation. On the other hand, however, this factor is not the causation of the movement, which must be acknowledged as external in the case of flying stones etc. Therefore, we believe that the crucial semantic factor that distinguishes the RUN-class is not agentivity (even though this class is usually listed under “agentive verbs of manner of motion” even in Levin & Rappaport 1995), nor is it situation-internal cause of the movement. Rather, it has to be inherent specification of a momentum of movement.

An observation which supports this conclusion is that the RUN verbs listed in Levin & Rappaport (1995) in general disallow readings in terms of stationary support or passive movement by environmental forces, as far as we can determine. This is even true for the case of *hover* (which a reviewer mentioned as a potential counterexample). The verb *hover* specifies the exertion of a force in vertical direction which balances gravitation, and so this is another type of intrinsic force specification. It is true that *hover* behaves like *float* with respect to sideward movements, i.e. it is neutral as to whether they occur or not and leaves this to environmental forces; but this parallelism is only due to the fact that *hover* specifies a momentum of force only in one spatial dimension. The verb *float* also describes an equilibrium between two vertical forces (gravitation and buoyancy), but this is an equilibrium of external, environmental forces. A stone or arrow inherits a momentum of movement from

<sup>10</sup> The use of German *fliegen* in a sense similar to *fall* mentioned at the beginning of section 3.2 still reflects this, as the interpretation seems to be a falling with a forceful component. However, we continue to assume that it is a separate lexical variant that is connected via a similarity link to the sense of movement through air

the external force which launched it, and then carries it as its own intrinsic property; as soon as the projectile is flying, it is no longer under external control with respect to this property.

Many situations that may be described by words like *roll*, *spin*, etc. are situations in which an object likewise has inherited a momentum of movement. This, however, is merely a fact about the situation, it is not part of the property expressed by the verb. The property denoted by these verbs rather lies in the domain of shape or directionality properties of the movement. By virtue of their not carrying any intrinsic specification concerning momentum of movement, they are classed as unaccusative.

### **Acknowledgement**

This work was written with support from the SFB 471 “Variation and Evolution in the Lexicon”, funded by the Deutsche Forschungsgemeinschaft.

### **References**

- Levin, B.: 1993, *English Verb Classes and Alternations*. Chicago: Univ. of Chicago Press.
- Levin, B. & Rappaport Hovav, M.: 1995, *Unaccusativity*. Cambridge MA: MIT Press.





# EFFECTS OF TOPIC AND FOCUS ON SALIENCE\*

Elsi Kaiser,  
University of Southern California

elsi.kaiser@usc.edu

## Abstract

This paper investigates what factors make a particular referent a good antecedent for subsequent pronominal reference. In particular, it explores two seemingly conflicting claims in the literature regarding the effects of topicality and focusing on referent salience. In light of new experimental results combined with a review of existing work, I conclude that neither topicality nor focusing alone can explain referent salience as indicated by patterns of pronoun reference. Rather, the data provide support for a multiple-factor model of salience (e.g. Arnold 1999). More specifically, the results show that grammatical role has a striking effect: being a subject makes a referent more salient than either pronominalization/givenness or focusing alone. Furthermore, the results of the experiment suggest that the likelihood of subsequent pronominal reference is also influenced by structural focusing and pronominalization, but not as strongly as by subjecthood. I argue that these data are best captured by a multiple-factor model in which factors differ in how influential they are relative to one another, i.e. how heavily weighted they are. A single-factor system does not seem adequate for these data.

## 1 Introduction

The notion of ‘salience’ plays a crucial role in theories of reference resolution, as it is widely assumed that the most reduced (and least semantically informative) referring expressions refer to the most salient referents – i.e., the referents which are most prominent, most accessible at that point in the discourse. This, of course, raises the crucial question of what makes a referent salient. A number of factors have been proposed in the literature, and this paper focuses on two apparently contradictory claims, namely that both topicality and focusing – which are often thought of as opposites – increase referent salience. In light of new experimental results combined with a review of existing work, I conclude that neither topicality nor focusing alone can explain referent salience as indicated by patterns of pronoun reference. Rather, the data provides support for a multiple-factor model of salience, suggesting that a referent’s salience depends on a number of competing factors which differ in the strength of their influence (see Arnold 1998, 1999).

The structure of this paper is as follows. Section 2 provides an overview of the notion of salience, including claims that have been made in the literature regarding the connections between salience and referential form, and discusses four factors that have been argued to influence the salience of entities, namely subjecthood, givenness, pronominalization and focus. In Section 3 we turn to existing research on the question of whether topical or focused entities are more salient, and Section 4 outlines the open questions that this paper aims to tackle. Section 5 presents the results of the sentence completion experiment, and conclusions and wider implications are discussed in Section 6.

---

\* Many thanks to Rebekka Puderbaugh, Sasha Eloi and Joyce McDonough for assistance with the experiment described in this paper. I would also like to thank Christine Gunlogson, Jeffrey Runner, Michael Tanenhaus and the audience at *Sinn und Bedeutung* for useful feedback and comments.

## 2 Salience

Many researchers have claimed that there are correlations between different kinds of referential expressions (full NPs, pronouns, demonstratives etc) and the level of salience/accessibility of their antecedents (e.g. Gundel, Hedberg and Zacharski 1993, Givón 1983 and Ariel 1990). The general consensus appears to be that the more reduced an anaphoric expression is, the more salient / accessible its antecedent has to be. In this research, the term ‘salient’ is generally used to mean entities that are currently at the center of attention, i.e. those that are most prominent at that point in the discourse. The view that most researchers assume is summed up in this quote from Arnold (1998): “Loosely speaking, all researchers have observed that pronouns are used most often when the referent is represented in a prominent way in the minds of the discourse participants, but more fully specified forms are needed when the representation of the referent is less prominent” (Arnold 1998:4).

However, in order for the claim that salient referents are referred to with reduced anaphoric forms to be meaningful, the notion of salience needs to be defined. More specifically, if we accept the claim that the most salient entities are referred to with the most reduced forms, then we can use pronouns as a tool to investigate the notion of salience in more detail. In other words, we can probe what factors make an entity likely to be referred back to with a pronoun, and assume that these factors are what influence salience.<sup>1</sup> A number of factors have been put forth in the literature as increasing the likelihood of subsequent pronominalization (see Arnold 1998 for an overview), many of which could be regarded as increasing the topicality of a referent. These include occupying the grammatical position of subject, being given information and being realized as a pronoun.

However, before we go any further, it is worth pointing out that the term ‘topic’ is used differently by different researchers. Strawson (1964) defines the topic of an utterance as “what is of current interest or concern” (Strawson 1964:104). Reinhart (1982) defines the topic of a sentence as “the expression whose referent the sentence is about” (Reinhart 1982:5). Gundel (1985) characterizes topics in terms of ‘shared knowledge’: “the topic of a speech act will normally be some entity that is already familiar to both speaker and addressee” (Gundel 1982: 92). In more recent work, Prince (2003) and Beaver (2004) use the term ‘topic’ to refer to the backward-looking center in Centering Theory (Grosz, Joshi & Weinstein 1995); a use which links topicality with pronominalization and givenness. As will become clearer later, in this paper my aim is not to provide an exhaustive definition of topicality; rather, I would simply like to point out that many of the factors that have been claimed to influence referent salience (and which I try to ‘pull apart’ in order to see what their individual contributions are) have also been linked to the general notion of topicality.

---

<sup>1</sup> The assumption that degree of salience and degree of ‘reduction’ of the referential form are related is not entirely unproblematic (see Kaiser 2003, Kaiser & Trueswell in press). In particular, it seems that not all referential forms (e.g. pronouns vs. demonstratives in languages like Finnish that allow both to have human antecedents) are sensitive to the same supposedly salience-influencing factors, which argues for a more complex mapping between referential forms and degree of salience of the antecedent that is normally assumed (for details, see Kaiser 2003, Kaiser & Trueswell in press). However, in this paper we are focusing only on one referential form, namely personal pronouns in English, and thus the conclusions should be interpreted as restricted to this form. For the purposes of this paper, we assume that English personal pronouns can be used as a tool to probe referent salience. Even if one wants to argue that this assumption is problematic (e.g. due to the nature of the mapping between salience and referential forms, or due to differences in bottom-up and top-down processing), the results are still relevant: Even if one wants to argue that they do not shed light on the factors that influence salience *per se*, they still shed light on the factors that influence pronoun interpretation (e.g. whether pronoun interpretation is sensitive to only one factor or several differently-weighted factors) as well as the processes that underlie reference resolution.

In contrast to the claims that topicality-related factors make a particular referent especially salient and hence a good antecedent for a pronoun, some researchers have claimed that focusing is what makes a referent salient. In this section, we briefly review these two claims, which seem to conflict, at least at first glance. We will first consider claims regarding subjecthood, givenness and pronominalization, which could be regarded as being related to topicality, and then move onto a discussion of the claims regarding the effects of focusing.

## 2.1 Subjecthood

A number of researchers have claimed that grammatical role is correlated with saliency; more specifically, that entities realized in subject position are more salient than those in non-subject positions (Brennan, Friedman & Pollard 1987, Matthews & Chodorow 1988, Crawley & Stevenson 1990, Stevenson et al. 1994, and McDonald & MacWhinney 1995, *inter alia*). Both corpus evidence and psycholinguistic research support this claim. For example, in a sentence completion study, Crawley & Stevenson (1990) found that when given sentence fragments such as “Shaun led Ben along the path and he....”, participants tended to continue the sentence such that the pronoun referred back to the preceding subject more often than to the object. These findings are corroborated by self-paced reading studies, such as Gordon, Grosz and Gilliom (1993) and Stevenson & Urbanowicz (1995), which also found that the grammatical role of an antecedent influences reading times for subsequent pronouns.

## 2.2 Givenness

Another factor that has been claimed to increase the saliency of a referent is givenness, i.e. being ‘old’ information. For example, Strube & Hahn (1996) argue that the saliency of referents is determined by “the functional information structure (IS) of the utterance” (Strube & Hahn 1996:272); more specifically, that “any *context-bound* expression...is given the highest preference as a potential antecedent of an anaphoric or elliptical expression” (Strube & Hahn 1996:272). In other words, when a sentence with a discourse-old referent and a discourse-new referent is followed by an anaphoric expression, the anaphor refers to the discourse-old referent. In related work, Ballantyne (2004) conducted a corpus study of Yapese (Oceanic language in Micronesia) and found that givenness is a better way of ranking referents (in Centering-theoretic terms, leads to more coherent transitions between utterances) than grammatical role or linear order.

## 2.3 Pronominalization

A number of researchers have found that the referential form with which an entity is realized can affect that entity’s saliency. Kameyama (1999) claims that a pronominalized referent in non-subject position gains in saliency by virtue of being pronominalized, and becomes so salient that it ‘competes’ in saliency with a non-pronominalized entity in subject position. Similarly, Beaver (2004) suggests an Optimality-theoretic approach to anaphora resolution that includes a constraint called SALIENT FORM, which states that “If in the previous sentence discourse entity  $\alpha$  was realized by a more minimal form than discourse entity  $\beta$ , then  $\alpha$  is more salient than  $\beta$ ” (Beaver 2004:31). It is important to note that the constraint SALIENT FORM is different from the idea that the most salient referents are referred to with the most reduced forms, since, as Beaver point out, SALIENT FORM “implies that being pronominalized makes a referent salient *in the future*” (Beaver 2004:31 fn 30, italics added, see also Kehler 2001:169).

As mentioned above, factors such as subjecthood, givenness and pronominalization could all be regarded as increasing the topicality of a referent. Thus, one might be tempted to conclude

that a salient referent is a topical referent. However, as we will see in the next section, not all researchers agree that salience is necessarily linked to topicality. In addition, not all researchers agree that a conglomeration of factors is what determines salience. Some researchers seem to either assume or claim that salience is determined by only one factor (e.g. see Strube & Hahn 1999), whereas others argue in favor of a multiple-factor view (e.g. Ariel 1990, Arnold 1998, see also Givón 1983). We return to this question in Section 4.

## 2.4 Focus

This section reviews claims that focused referents are more salient than non-focused referents. Like the term ‘topic’, the term ‘focus’ would also benefit from some clarification. Focus is often divided into contrastive focus (or identificational focus, to use Kiss’s (1998) term) and presentational focus (information focus, according to Kiss). The existing psycholinguistic work investigating focusing has tended to look at the effects of contrastive focus, since it has used structures such as *it*-clefts (‘It was Mary who called Lisa’), which are usually regarded as expressing contrastive (identificational) focus.<sup>2</sup> The experiment, described in Section 5, uses both clefts and *in-situ* focus constructions, but due to the context in which they occur, both involve contrastive focus. (Green and Jaggar (2003) claim that *in-situ* focus can also be interpreted contrastively.) Thus, the claims made in this paper regarding focus only apply to contrastive focus. The effects of presentational focus are an important direction for future work (see also Hajičová, Kubon & Kubon 1992).

Now, let us turn to the research that supports the claim that (contrastively) focused entities are more salient than non-focused ones. In a cognitive psychology experiment, Hornby (1974) presented participants with pictures and sentences, and asked people to say whether the sentence matches the picture. When participants were presented cleft sentences (e.g. ‘It is the girl who is riding the bicycle’), Hornby found that the participants were better at detecting mismatches when the mismatching information was focused than when it was presupposed. This suggests that participants attend more to the non-presupposed, focused part of the sentence (but see Delin 1990). In related work, Singer (1976) probed people’s memory of focused and non-focused referents using sentences such as ‘It was the king who led the troops’ and ‘It was the troops that the king led.’ He found that focused referents are remembered better than non-focused referents. Thus, it seems that focused information is noticed and remembered better than non-focused information, which could be regarded as result of its being perceived or represented differently from non-focused information due to its being more salient.

Extending this work to reference resolution, Almor (1999) conducted a reading time study which found that reference to focused referents is read faster (i.e., presumably processed with greater ease) than reference to non-focused referents. Almor tested sentence pairs such as those in (1) (with focused subjects) and (2) (with focused objects), and found that (1a) is read faster than (1b), and (2b) is read faster than (2a), suggesting that an anaphoric expression (e.g. the bird, the fruit) is interpreted faster when it refers to an antecedent that is in focus than when it refers to an antecedent that is not focused (in this case, presupposed).

- (1) a. It was the robin<sub>focus</sub> that ate the apple.  
       The bird seemed very satisfied.

<sup>2</sup> It is important to note that corpus studies have shown that regarding all clefts as structures where the clefted constituent is contrastively focused and the rest of the sentence is presupposed is a gross oversimplification (see e.g. Delin 1990). However, the *it*-clefts used in the experiment described in Section 5 were all very simple in that the focused constituent was new information and the rest of the sentence was given (see example (8)).

- b. It was the robin<sub>focus</sub> that ate the apple.  
The fruit was already half rotten.
- (2) a. What the robin ate was the apple<sub>focus</sub>.  
The bird seemed very satisfied.
- b. What the robin ate was the apple<sub>focus</sub>.  
The fruit was already half rotten.

If we assume that a referring expression referring to a highly salient referent is read faster (processed with greater ease) than one referring to a low-salience referent, these results indicate that the focus of a cleft is more salient than the non-focus. These findings also appear to be compatible with the claim that clefts involve low topic continuity (Givón 1983), which can be roughly paraphrased as stating that a cleft is used when the discourse is shifting to a new center of attention, namely the entity that is focused in the cleft.

In a different tradition, Hajičová, Kubon & Kubon (1992) claim, on the basis of computationally-oriented corpus work on Czech, that entities in the focal part of an utterance are the most salient, and entities in the topical part are less salient. In contrast to the other research on focus, however, Hajičová et al. use the term ‘focus’ to refer not to the focus of clefts, but to the ‘contextually non-bound’ parts of an utterance, i.e. those parts which are, roughly, new information. Moreover, it is worth noting that according to Hajičová et al., certain pronominal forms tend to refer to focused entities and others prefer topical entities – i.e. even though they explicitly claim that focused referents are more salient than topical referents, they do not claim that the most reduced referring expressions refer to the most salient (i.e. focused) referents.

Thus, there exists an intriguing division in the literature. On the one hand, a number of factors have been claimed to render a particular referent highly salient and thus a good antecedent for a subsequent anaphor, and many of these factors could also be argued to be related to the general notion of topicality. On the other hand, it has also been argued that (contrastively) focused referents are especially salient and prominent in people’s mental models of the discourse. In the next section, we turn to some existing experimental work that aims to shed light on this seeming contradiction.

### 3 Topic vs. focus: Which is more salient?

In light of the contrasting claims presented in the preceding sections, let us now turn to existing experimental work (Arnold 1999, Cowles 2003) that aims to resolve the conflicting claims regarding the salience of topics and the salience of foci.

Arnold (1999) conducted a number of psycholinguistic experiments investigating the salience of topics and foci. She used pronouns as a tool for probing which referent in the preceding discourse is the most salient. To test whether topical and focused referents are more salient than other referents, she tested three-sentence ‘mini-narratives’ such as (3) and (4) in a rating study. She manipulated whether the second sentence was clefted<sup>3</sup> or not, whether the subject of the third sentence referred to the first- or second-mentioned character of the second sentence ((c) vs. (c’)), and whether the subject of the third sentence was a pronoun or a name. The subscripts on the examples illustrate which constituents Arnold assumes to be topics and

<sup>3</sup> Arnold used clefts with ‘the one’ rather than it-clefts or wh-clefts, but she notes that the ‘one’-construction has been called a cleft with a lexical head by Prince (1978). In Arnold’s cleft sentences, strictly speaking, the subject and object of the matrix copular sentence (e.g. ‘the one [+ relative clause] was Emily’) both refer to the same entity, namely the focus. The topic in these one-clefts is the subject of the relative clause modifying ‘one’ (e.g. ‘the one [he decided on at last] was Kysha’). This is in contrast to the it-clefts used in the experiment described in this paper, where the topic is either the matrix subject or the matrix object.

foci. It is important to note that she constructed these sentences such that the non-clefted ones contained a topic (she follows existing research in assuming that the subject functions as a topic) but no syntactically marked focus, and the clefted ones contained a clear focus but no strong topic. This was done because the aim of this experiment was to investigate topics and foci independently of each other.

- (3) a. The guests were nervously standing around in the living room, trying to decide which person to talk to.  
 b. Ann<sub>topic</sub> decided to say hi to Emily<sup>4</sup> first. (NON-CLEFT)  
 c. Emily/She looked like the friendliest person in the group.  
 c'. Ann/She hated to be in a room full of people where no-one was talking.
- (4) a. The guests were nervously standing around in the living room, trying to decide which person to talk to.  
 b. The one Ann<sup>5</sup> decided to say hi to first was Emily<sub>focus</sub>. (CLEFT)  
 c. Emily/She looked like the friendliest person in the group.  
 c'. Ann/She hated to be in a room full of people where no-one was talking.

The results of the rating study indicate that, in general, topics and foci are more salient than other referents. More specifically, with nonclefted sentences (3), participants prefer pronouns in the third sentence to refer to the subject of the second sentence (the topic), as in (3c'), and with clefted sentences (4), participants prefer pronouns to refer to the object of the second sentence (the focus), as in (4c). Furthermore, for referring to entities other than the topic in non-clefts and the focus in clefts, full names are preferred.

To investigate what happens when topics and foci are directly pitted against each other, Arnold conducted a production study, where participants were given sequences of sentences such as those in (5), ending in either a clefted or a non-clefted sentence ((5a) vs. (5b)). In this experiment, Arnold established a particular referent as the discourse topic by introducing it in the subject position of the first sentences, and referring back to it with a pronoun in the next two sentences. The participants' task was to provide a continuation for the story.

- (5) Ron was looking through his address book, trying to make up his mind.  
 He had an extra ticket to the opera, but he didn't know which friend to invite.  
 a. The one he<sub>topic</sub> decided on at last was Kysha<sub>focus</sub> / Fred<sub>focus</sub>. (CLEFTED)  
 b. At last he<sub>topic</sub> decided on Kysha<sub>focus</sub> / Fred<sub>focus</sub>. (NON-CLEFTED)

An analysis of the pronouns occurring in participants' continuations reveals a strong preference to use pronouns to refer to the subject of the preceding sentence (the topic), regardless of whether the sentence was clefted (97%) or not clefted (98%). This suggests that topics are more salient than foci, regardless of the syntactic form of the sentence.

In a third experiment, Arnold investigated the difference between a well-established discourse topic (as in (5), a referent that has already been mentioned in preceding discourse by the time it is realized, as a pronoun, as the topic of a cleft) and a sentence topic (as in (4), a referent that is realized, as a full NP, in the topic position of a cleft but had not been mentioned in the preceding discourse). The results of a rating study indicate that when a clear discourse topic exists, participants prefer the focus of the cleft to be referred to with a name, but when no discourse topic is present, there is no such preference. Arnold concludes that this is because the absence of a clear discourse topic makes it possible for the focus to be relatively more salient than it could be in the presence of an overwhelmingly salient discourse topic; in other

<sup>4</sup> As Arnold notes, this referent is realized as an oblique object, and not syntactically marked for focus.

<sup>5</sup> Note that this referent is realized as an embedded subject, which Arnold notes is not highly topical. It is also new information.

words, she regards saliency as a competitive phenomenon, where “where the representations of different referents in a particular discourse compete for activation” (Arnold 1999:28).

Using a different methodology, Cowles (2003) reaches a somewhat different conclusion. She uses cross-modal priming to investigate the impact of discourse-topicality, sentence-topicality and contrastive focus on referent saliency. She uses clefts to mark focus, and uses the term ‘discourse topic’ for referents that have been realized twice in subject position, and the term ‘sentence topic’ for referents that have been realized once in subject position. The results indicate that “[a]ll three information statuses [discourse topic, sentence topic and contrastive focus, EK] appear to make their referent more likely to be interpreted as the antecedent of a subsequent pronoun” (Cowles 2003:93). In fact, in contrast to Arnold who found that established discourse topics are more salient than foci, Cowles concludes that “two information structure types that are considered distinct ... appear to have the same psychological effect” (2003:94). However, it appears that Cowles tested referents that were subjects whereas Arnold tested subject topics and object foci. It seems that their studies differ not only in methodology but also in the nature of the materials, which may be partly responsible for the different findings.

In sum, although existing experimental work suggests that topics and contrastive foci are more salient than other referents (see also Navarretta 2002), the results conflict when it comes to the question of which is more salient, a topic or a focus.

#### 4 Effects of different factors

As we saw in Section 2, subjecthood is very often regarded as being correlated with saliency/topicality, but based on the research discussed in Section 3, it appears that (to the best of my knowledge) existing experiments on pronoun resolution have not fully investigated possible consequences of grammatical role on the effects of topicality and focusing. In light of the claim that grammatical role influences saliency, I would like to suggest that in order to improve our understanding of how topicality and focusing influence saliency, we should investigate both subject and non-subject topics and foci. For example, how do topics in object position compare to foci that are objects?

Let us briefly consider the nature of the relation between subjects and topicality. As already noted, many researchers have observed that entities realized in subject position tend to be interpreted as topical. However, it seems that this does not always have to be the case. Consider the example below:

- (6) After serving little more than a year in jail, Cruz-Mendoza was deported for a third time in January, records and interviews show. U.S. Border Patrol agents arrested him in Arizona a month later. At that point, he could have been charged with a felony....  
(Los Angeles Times, October 30, 2005)

Most approaches would agree that the topic of the second sentence is the referent of the object pronoun ‘him’ and not the subject of the sentence ‘U.S. Border Patrol agents’ (see e.g. Prince 2003 on Centering Theory, Beaver 2004 and others)<sup>6</sup>. Thus, it is not the case that topics are restricted to occurring in subject position. In the case of foci, it is also clear that they are not restricted to occurring in object position, as illustrated by examples such as (7) below. Here we see a subject *it*-cleft, where the subject ‘Lisa’ is in focus:

---

<sup>6</sup> Of course, this statement would not be compatible with a theory where the notion of topic is inherently linked to subjecthood. However, the burden would then be on such a theory to show that ‘U.S. Border Patrol agents’ is more topical than the referent of ‘him.’

(7) Mesmerized, I called them up and asked for an interview to discuss how they cast applicants for reality TV. First, I talked to Debbie, who said she'd get back to me. Instead, it was Lisa who returned my call.

([www.themorningnews.org/archives/manufacturing\\_reality/mirror\\_mirror.php](http://www.themorningnews.org/archives/manufacturing_reality/mirror_mirror.php))

If we combine the observation that topics do not have to be subjects and foci do not have to be objects with the well-known claim that subjecthood influences referent salience, it becomes clear that investigating subject topics and object foci, for example, may result in overestimation of the effects of topicality as a result of associating it with subjecthood. However, looking only at subject foci and subject topics may also be insufficient, since if subjects turn out to be highly salient simply due to their subject status, then this could potentially 'wash out' effects of the topic/focus distinction. One of the main aims of the experiment described in this paper is to investigate subject-topics, subject-foci, object-topics and object-foci (in both clefted and nunclefted sentences) in order to see which factors are the most influential in determining which referents are good antecedents for subsequent pronouns.

More generally, these issues are related to the larger question of how different factors interact during reference resolution. In particular, as mentioned earlier, is it the case that a single factor determines which entities can be referred to with pronouns in subsequent discourse, or might it be the case that a number of factors, perhaps with different degrees of influence (different weights) all play a role? In other words, if we accept the claim that the most salient entities are referred to with the most reduced referential forms, then we can use pronouns as a tool to ask: Does one unique factor determine salience, or can multiple factors interact? If multiple factors interact, are they all weighted equally, or are some more influential than others? These are the questions that the experiment in the next section explores.

## 5 Experiment

In order to shed light on the issues sketched out above, this experiment investigates how subjecthood, pronominalization, semantic focusing and syntactic focusing influence subsequent pronoun use. The specific aim of the experiment is to pull apart the subject-topic / object-focus correlation that is common in previous experimental work. On a more general level, in disassociating these factors the experiment will also help us to better understand the issues sketched out above regarding the interaction and degree of influence of different kinds of information during reference resolution.

We manipulated syntactic form (cleft vs. SVO) and the grammatical role of the topical/focused constituent, as illustrated in example (8). Thus, there are four conditions, which will be referred to with the following shorthand labels: [SVO.Object=focus], [SVO.Subject=focus], [Cleft.Object=focus] and [Cleft.Subject=focus]. The referent marked as 'focus' in (8) is always semantically focused thanks to the context, and in the clefted conditions it is also structurally focused as a result of being in the focus position of the cleft. The referent subscripted as 'topic' in the example in (8) is discourse-old and pronominalized, and follows Prince's (2003) and Beaver's (2004) use of the term 'topic' to refer to the Centering Theory notion of backward-looking center. (However, my use of the subscript 'topic' in (8) is not intended to convey the claim that the referent of the pronoun is more salient than the focused expression. See Section 5.1.)

The participants' task was to provide a natural-sounding continuation sentence using the pronoun prompt that followed each critical sentence. They were told to imagine that someone has just made the claim in part A, and that they were now responding to this other person by saying part B and providing a continuation. Participants were recorded using a Tascam digital tape recorder and a Shure unidirectional headmounted microphone.



All verbs were agent-patient verbs, as defined by Stevenson et al (1994). This was done in order to control for any potential verb focusing effects. Both human referents mentioned in the sentences were of the same gender; either both (stereotypically) male or both (stereotypically) female. There were 16 target items and 16 fillers.

- (8) A: The maid scolded the bride.  
 a. B: No, that's wrong! She<sub>topic</sub> scolded the secretary<sub>focus</sub>. She....  
 b. B: No, that's wrong! The secretary<sub>focus</sub> scolded her<sub>topic</sub>. She...  
 c. B: No, that's wrong! It was the secretary<sub>focus</sub> that she<sub>topic</sub> scolded. She...  
 d. B: No, that's wrong! It was the secretary<sub>focus</sub> who scolded her<sub>topic</sub>. She...

Participants' (n=24) continuations were digitized and transcribed, and the referent of the prompt pronoun in each of the continuations was double-coded by two coders working independently. Disagreements were resolved by discussion. If it was not clear who the pronoun refers to, the item was coded as 'unclear.' Table 1 provides some examples.

(i) A: The waiter criticized the sailor.
B: No, that's wrong! He criticized the businessman. He gave him too small a tip.
<i>Coded as: he = businessman, i.e. object</i>
(ii) A: The waiter criticized the sailor.
B: No, that's wrong! He criticized the businessman. He didn't get a very good tip.
<i>Coded as: he = waiter, i.e. subject</i>
(iii) A: The maid scolded the bride.
B: No, that's wrong! She scolded the secretary. She told me about it after it happened.
<i>Coded as: she = unclear</i>

Table 1. Coding samples

## 5.1 Predictions

As mentioned earlier, there are different hypotheses regarding the nature of the relation between factors such as subjecthood and focusing. In particular, some researchers seem to espouse a single-factor view, which assumes that one factor plays a decisive role in determining which referents can be subsequently referred to with pronouns, whereas others appear more supportive of a multiple-factor view.

Let us start by considering the predictions that a single-factor view would make for the factors investigated in this experiment, namely subjecthood, pronominalization, semantic focusing and syntactic focusing.<sup>7</sup> If subjecthood is the one factor that determines referent saliency, the prediction is that prompt pronouns will refer to preceding subjects, regardless of NP form or topic/focus status. In contrast, if pronominalization (and givenness) determines referent saliency, we predict that prompt pronouns will refer to whatever is pronominalized in the preceding sentence, regardless of whether it is the subject or the object, clefted or unclefted. However, if semantic focusing is the one factor that determines referent saliency, prompt

<sup>7</sup> These factors are not fully crossed in this design – partly due to the nature of the phenomena being investigated. For example, syntactically focused entities are also necessarily semantically focused, but not vice versa. Furthermore, in this design pronominalization and focusing are in complementary distribution in the sense that a particular referent is either pronominalized or focused, but never neither and never both.

pronouns are predicted to refer to the focused referent, regardless of syntactic role or sentence structure (cleft vs SVO). If structural focusing (clefting) alone is what determines referent salience, the prediction is that prompt pronouns will refer to the focus of the cleft in clefted sentences, but it is not clear what the prediction would be for unclefted sentences.

Let us now turn to the multiple-factor view, according to which two or more factors could be influencing referent salience, and hence the likelihood of subsequent pronominal reference. Let us assume, for expository ease, that all four factors are relevant and weighted equally. The rightmost column of Table 2 summarizes which referent in each condition is predicted to be most likely to be referred to with a subsequent pronoun.

In the [SVO.Object=focus] condition (line A of Table 2), two factors (subjecthood and pronominalization) contribute to the salience of the subject. Semantic focusing contributes to the salience of the object. This could also be cast in terms of activation in the participant's mental model of the discourse: both subjecthood and pronominalization increase the level of activation of the subject, and semantic focusing increases the activation level of the object. Thus, if all factors are weighted equally, the subject 'wins' over the object; it is more activated. In the [SVO.Subject=focus] condition (line B), pronominalization points towards the object, but subjecthood and semantic focusing both point towards the subject. Thus, if all factors are weighted equally, we again predict that the subject wins out over the object. Note that in this condition the subject is focused, whereas in the preceding condition it was the discourse-old, pronominalized referent.

Now, turning to the first of the two cleft conditions, in the [Cleft.Object=focus] condition (line C) we see that both subjecthood and pronominalization increase the salience of the subject, but structural and semantic focusing both point towards the object. Thus, in contrast to the [SVO.Object=focus] condition, now the object is focused both structurally and semantically. Assuming that this would have a stronger effect than semantic focusing alone (see also Navarreta 2002 on the effect of information-structural devices being used to mark focus) leads us to the prediction that in the [Cleft.Object=focus] condition, the subject and object are tied. Put differently, they have equal levels of activation. Finally, in the [Cleft.Subject=focus] condition (line D), everything except pronominalization is pointing towards the subject: subjecthood status, structural focusing and semantic focusing. This leads to the prediction that the subject has a higher level of activation than the object.

It is important to note that I have been assuming that all factors are weighted equally; i.e. that they make equal contributions to the salience levels of the subject or the object. Of course, this might very well not turn out to be the case. In fact, in constraint-based models of language processing (e.g. MacDonald et al., 1994, Tanenhaus & Trueswell, 1995, Trueswell et al., 1994, see also Bates and MacWhinney, 1989) which claim that language processing is guided by weighted constraints, the constraints differ in their weights and hence can differ in magnitude of the impact they have on language processing, depending also on the number of competing alternatives (see also Arnold 1998).

		Subject	Pronom	Sem foc	Str foc	Overall
A	She scolded the SECRETARY.	S	S	O	...	S (top)
B	The SECRETARY scolded her.	S	O	S	...	S (foc)
C	It was the SECRETARY that she scolded.	S	S	O	O	?
D	It was the SECRETARY who scolded her.	S	O	S	S	S (foc)

Table 2. Multiple-factor view (if each factor is weighed equally)

## 5.2 Results and discussion

Overall, participants' continuations reveal an overall preference to interpret prompt pronouns as referring to subjects, regardless of whether the subject was a topic or a focus. This is illustrated in Figure 1, which shows the average subject advantage scores for the four conditions. These scores were calculated by taking the proportion of subject continuations in each condition and subtracting from that the proportion of object continuations. Thus, a positive subject advantage score indicates more subject continuations than object continuations, and a negative subject advantage score indicates more object continuations than subject continuations. As Figure 1 clearly shows, the subject advantage score is positive in all four conditions, indicating that there were more subject continuations than object continuations. Participants were more likely to interpret the subsequent pronoun as referring to the subject than to the object.

The overall subject preference indicates that subjecthood matters more than pronominalization, more than semantic or structural focusing. It seems that subjecthood makes both topics and foci good antecedents for a subsequent pronoun.

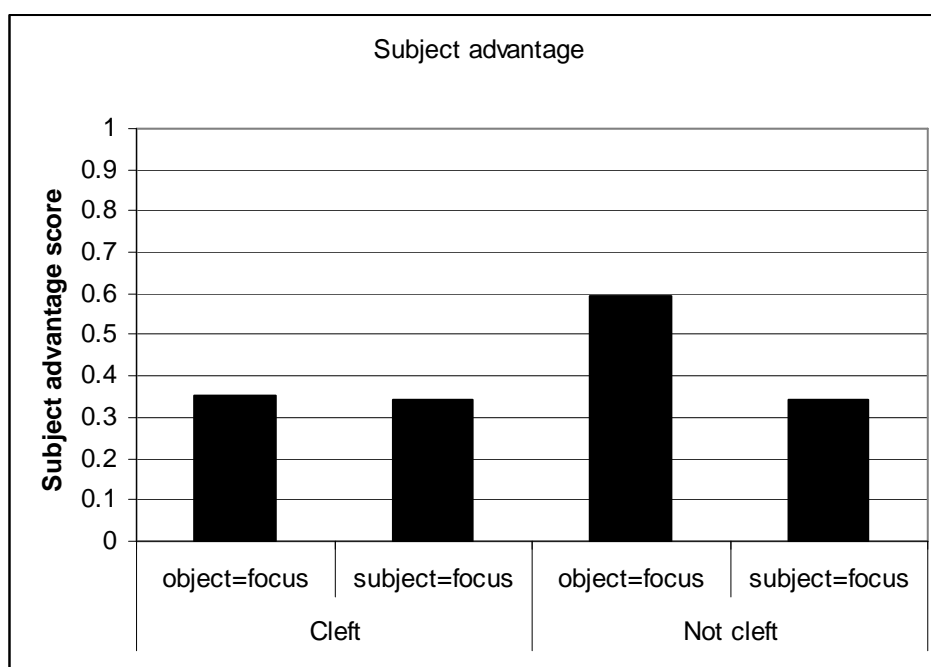


Figure 1. Subject advantage scores (proportion of subject continuations minus proportion of object continuations)

However, let us now look more closely at the different conditions. Let us first compare conditions with clefted and non-clefted focused objects. As Figure 1 shows, in the conditions with focused objects, there is a greater subject advantage in the non-clefted condition [SVO.Object=focus] than in the clefted condition [Cleft.Object=focus]. Why is this? A possible reason for the weaker subject preference in the [Cleft.Object=focus] condition is that in this particular condition, both semantic and structural focusing point towards the object. In other words, the only difference between the [SVO.Object=focus] and the [Cleft.Object=focus] conditions is structural; the latter is clefted (see also Navarreta 2002 for related corpus work on clefts in Danish). Thus, the difference between these conditions can be straightforwardly captured if one assumes, as Arnold (1999) suggests, that saliency is a competitive phenomenon. More specifically, I hypothesize that the combination of syntactic and semantic focusing increases the saliency of the object sufficiently so that it can compete

with the subject and weaken the subject advantage in the clefted version. Thus, the results indicate that clefting a focused object increases its chances of being referred to by a subsequent pronoun, compared to a non-clefted focused object.<sup>8</sup>

However, if this is the reason for the difference that emerges between the [SVO.Object=focus] and [Cleft.Object=focus] conditions, then why do the [SVO.Subject=focus] and [Cleft.Subject=focus] conditions not show as strong a subject preference as the [SVO.Object=focus] condition does? Why do they both show a subject preference comparable to that in the [Cleft.Object=focus] condition, as Figure 1 clearly illustrates? In the two Subject=focus conditions, there is no structurally focused object to pull participants away from the subject, so that cannot be the reason for the weakened subject preference. However, it is important to note that in the Subject=focus conditions, subjecthood and pronominalization are pitted against each other. As we saw in Section 2, in previous work both of these factors have been found to influence referent salience. Again, if we assume that salience is a competitive phenomenon, then it follows that the conflict between subjecthood and pronominalization is responsible for the weaker subject preference we see in the Subject=focus conditions, since pronominalization increases the salience (or activation) of the object, which leads to it being better able to compete with the subject.

It is worth noting that in these particular conditions, the SVO vs. cleft distinction does not appear to have any effect on the strength of the subject advantage; it is not the case that the [Cleft.Subject=focus] condition has a stronger subject preference than the [SVO.Subject=focus] condition. However, in light of the claim that subjecthood is more heavily weighted than structural focusing, this is not entirely surprising, as it could be explained simply by the much greater influence of subjecthood masking or ‘swamping’ the effects of structural focusing. In other words, structural focusing seems to have a stronger effect on the salience of objects than on (already ‘inherently’ salient) subjects.

Taken as a whole, the results support the multiple-factor model. However, it is clearly not the case that all factors are weighted equally. The results suggest that subjecthood is more influential (weighted more heavily) than either pronominalization or structural or semantic focusing. However, the effects of subjecthood are modulated by structural focusing and pronominalization. As we saw, the contrast between the [SVO.Object=focus] and the [Cleft.Object=focus] conditions suggests that structural focusing can increase the salience of a referent. Furthermore, the finding that the subject advantage is stronger in the [SVO.Object=focus] condition than in the [SVO.Subject=focus] and [Cleft.Subject=focus] conditions suggests that if pronominalization and subjecthood are pitted against each other, the effects of subjecthood are weakened. In sum, even though the pattern of results is fairly complex and will of course need to be investigated more in future work, it seems clear that we are dealing with a competition-based system sensitive to multiple factors which are weighted differently.

## 6 Conclusions

Let us now return to the conflict sketched out at the beginning of this paper, namely the seemingly contradictory claims that topics are the most salient or that foci are the most

---

<sup>8</sup> One might also wonder whether parallelism is at work here. According to the Smyth’s (1994) parallelism account, pronouns prefer antecedents that are in the same syntactic position as the pronoun itself. However, this preference only holds, according to Smyth, when the relevant sentences both have the same global constituent structure and the thematic roles of the verbs in the two sentences match. Consider, for example, a sentence like ‘Peter hit John. Alex pinched him.’ However, an examination of participants’ continuations suggests that the required degree of matching across sentences does not seem to be consistently present. This casts doubt on the idea that parallelism is at work here.

salient. The results of the sentence completion experiment suggest that both claims are partly right, but that the picture is actually more complex and involves multiple interacting factors mediating between referents competing for salience. Crucially, the results show that subjecthood makes both topics (pronominalized, discourse old referents) and foci good antecedents for a subsequent pronoun. The observation that being a subject makes a referent more salient than pronominalization / givenness or focusing alone suggests that looking only at subject topics and object foci may result in an inadvertent overestimation of the effects of topicality, and that looking only at subject topics and subject foci may not be very fruitful due to the overwhelming effects of subjecthood.

However, subjecthood is not the only thing that matters; there are also effects of structural focusing and pronominalization. As mentioned in Section 5, the subject advantage difference between sentences with clefted and unclefted focused objects suggests that structurally clefting a focused object influences its salience – but to a lesser degree than subjecthood. Furthermore, we also saw in Section 5 that the finding that the [SVO.Subject=focus] and [Cleft.Subject=focus] conditions do not show as strong a subject preference as the [SVO.Object=focus] can be straightforwardly explained if we assume that pronominalization increases the salience of a referent. Like structural focusing, pronominalization has an effect on the salience of a referent, but is not as ‘powerful’ a factor as subjecthood.

Of course, many questions still remain open, and further research is needed to investigate the validity of the hypotheses presented here, both in English and other languages. For example, given data suggesting that different factors are weighed differently, I would like to know more about the reasons or causes of these weight differences, as well as the extent of crosslinguistic variation in this domain. In future work, I would also like to investigate the intonational patterns used in these kinds of contexts, in particular in the *in-situ* focus sentences as compared to the clefts, in order to see how prosodic information is contributing to the reference resolution process. The distinction between stressed and unstressed pronouns is also a crucial question for future work. Another issue that would benefit from further research is the relation between agentivity and subjecthood. This experiment only investigated agentive subjects, and thus confounds agentivity and subjecthood. Comparing agentive and non-agentive subjects (e.g. experiencers) would shed light on the question of whether it is the structural notion of subjecthood or the semantics of agentivity that is behind the subjecthood effect observed in the sentence completion experiment.

In sum, the results of the experiment presented here suggest that in order to begin to untangle the seemingly conflicting claims regarding the impact of topicality and focusing on salience, subjecthood must be taken into account. Furthermore, the results indicate that the strong effect of subjecthood on referent salience is modulated by effects of pronominalization and structural focusing. Thus, as a whole, the data presented here are best captured by a multiple-factor model in which factors differ in how influential they are relative to one another, i.e. how heavily weighted they are, and referents compete for activation (see Arnold 1998, 1999, *inter alia*).<sup>9</sup> A single-factor system does not seem adequate for this kind of data, and thus it seems reasonable to conclude that salience (at least insofar as we are measuring salience by looking at likelihood of subsequent pronominal reference) is not a monolithic concept.

---

<sup>9</sup> It would also be very interesting to see whether the findings reported here could be captured in an Optimality-theoretic system, perhaps similar to the one in Beaver (2004).

**References**

- Almor, A. (1999) Noun-phrase anaphora and focus: The informational load hypothesis. *Psychological Review*, 106(4), 748-765.
- Ariel, M. 1990. *Accessing NP antecedents*. London: Routledge, Croom Helm.
- Arnold, J. 1998. *Reference form and discourse patterns*. Ph.D. dissertation, Stanford University.
- Arnold, J. 1999. *Marking Salience: The similarity of topic and focus*. Manuscript, Univ. of Pennsylvania.
- Ballantyne, H.G. 2004. Givenness as a Ranking Criterion in Centering Theory: Evidence from Yape. *Oceanic Linguistics*, Volume 43(1): 49-72.
- Bates, E. & MacWhinney, B. (1989). *Functionalism and the competition model*. In E. Bates, & B. MacWhinney (Eds.), *The crosslinguistic study of sentence processing*. Cambridge: Cambridge University Press.
- Beaver, D. 2004. The optimization of discourse anaphora. *Linguistics and Philosophy* 27(1):3-56.
- Brennan, Susan E., Friedman, Marilyn A. & Pollard, Charles J. 1987. A Centering approach to pronouns. *Proceedings of the 25<sup>th</sup> Annual Meeting of the Association for Computational Linguistics*, Stanford, Calif., 155-162.
- Cowles, H.W. 2003. *Processing Information Structure: Evidence from Comprehension and Production*. Ph.D. dissertation, UCSD.
- Crawley, R.J. and Stevenson, R.J. 1990. Reference in single sentences and in texts. *Journal of Psycholinguistic Research* 19(3):191-210.
- Delin, J. 1990. A psychological investigation of the processing of cleft constructions. Blue Book note no. 2.
- Givón, T. 1983. *Topic continuity in discourse: A quantitative cross-language study*. Amsterdam: John Benjamins.
- Gordon, P.C., Grosz, B.J., & Gilliom, L.A. 1993. Pronouns, names, and the Centering of attention in discourse. *Cognitive Science* 17:311-347
- Green, M. and Jaggar, P. 2003. Ex-situ and In-situ Focus in Hausa: syntax, semantics and discourse. In Lecarme, J (Ed.) 2003. *Research in Afroasiatic Grammar II*. [CILT 241]. Amsterdam: John Benjamins: 187-213.
- Grosz, B., Joshi, A. & Weinstein, S. 1995. Centering: A Framework for Modelling the Local Coherence of Discourse. *Computational Linguistics*, 2(21).
- Gundel, Jeanette K., Hedberg, Nancy & Zacharski, Ron. 1993. Cognitive status and the form of referring Expressions in Discourse. *Language* 69, 274-307.

- Gundel, Jeanette. 1974. *The role of topic and comment in linguistic theory*. University of Texas Ph.D. dissertation.
- Hajicova, E., Kubon, V., & Kubon, P. 1992. *Stock of shared knowledge - a tool for solving pronominal anaphora*. Proc. of COLING-92, Vol. 1, 127-133.
- Hornby, P.A. 1974. Surface structure and presupposition. *Journal of Verbal Learning and Verbal Behavior* 13:530-538.
- Kaiser, E. 2003. *The quest for a referent: A crosslinguistic look at reference resolution*. Ph.D. dissertation, University of Pennsylvania.
- Kaiser, E. & J.C. Trueswell (In press) Investigating the interpretation of pronouns and demonstratives in Finnish: Going beyond saliency. To appear in E. Gibson & N. Pearlmuter (eds), *The processing and acquisition of reference*. Cambridge, Mass.: MIT Press.
- Kameyama, M. 1999. Stressed and unstressed pronouns: Complementary preferences. In *Focus: Linguistic, Cognitive, and Computational Perspectives*, ed. P. Bosch & R. van der Sandt, 306-321. Cambridge University Press.
- Kehler, A. 2001. *Coherence, Reference and the Theory of Grammar*. Stanford: CSLI
- Kiss, K. 1998. Identificational focus vs. Information Focus. *Language* 74(2):245-273.
- MacDonald, M.C., N.J. Pearlmuter & M.S. Seidenberg. 1994. The lexical nature of syntactic ambiguity resolution. *Psychological Review* 101: 676-703.
- Matthews, A. & Chodorow, M. 1988. Pronoun resolution in two-clause sentences: Effects of ambiguity, antecedent location, and depth of embedding. *Journal of Memory and Language* 27:245-260.
- McDonald, J.L. & MacWhinney, B. 1995. The time course of anaphor resolution: Effects of implicit verb causality and gender. *Journal of Memory and Language* 34:543-566.
- Navarretta, C. 2002. Combining Information Structure and Centering-based models of saliency for resolving intersentential pronominal anaphora. In A. Branco, T. McEnery and R. Mitkov (eds), *Proceedings of the 4th Discourse Anaphora and Anaphor Resolution Colloquium*, pp.135-140. Lisbon: Edições Colibri
- Prince, E.F. 1978. A Comparison of Wh-Clefts and It-Clefts in Discourse. *Language* 54:883-906.
- Prince, E.F. 2003. *The Yiddish impersonal pronoun men 'one' in discourse*. Presented at the Annual Meeting of the Linguistic Society of America, Atlanta, January 2003. (available online at [www.ling.upenn.edu/~ellen](http://www.ling.upenn.edu/~ellen))
- Reinhart, Tanya. 1982. *Pragmatics and linguistics: an analysis of sentence topics*. University of Indiana Linguistics Club. (also *Philosophica* 1981, 27.53-94).
- Singer, M. 1976. Thematic structure and the integration of linguistic information. *Journal of Verbal Learning and Verbal Behavior* 15:549-558.

- Smyth, R. 1994. Grammatical determinants of ambiguous pronoun resolution. *Journal of Psycholinguistic Research*, 23:197-229.
- Stevenson, R. and Urbanowicz, A. 1995. Structural focusing, thematic role focusing and the comprehension of pronouns. In *Proceedings of the 17<sup>th</sup> Annual Conference of the Cognitive Science Society*, 328-332. Pittsburg, PA.
- Stevenson, Rosemary J., Crawley, Rosalind J. and Kleiman, D. 1994. Thematic roles, focus and the representation of events. *Language and Cognitive Processes*, 9, 519-548.
- Strawson, P.F. 1964. Identifying reference and truth-values. *Theoria* 30:96-118. Reprinted in *Semantics: An Interdisciplinary Reader in Linguistics, Philosophy and Psychology*, ed. by Danny D. Steinberg and Leon A. Jakobovits. 1971. Cambridge: Cambridge University Press.
- Strube, M. & Hahn, U. 1996. Functional Centering. In *Proceedings of ACL '96*, 270-277.
- Strube, M. & Hahn, U. 1999. Functional Centering: Grounding Referential Coherence in Information Structure. *Computational Linguistics* 25(3).
- Tanenhaus, M. K., & Trueswell, J. C. 1995. *Sentence comprehension*. In J. L. Miller & P. D. Eimas (Eds.), *Handbook of Perception and Cognition: Volume 11*, 217-262. Academic Press, San Diego.
- Trueswell, J.C., Tanenhaus, M.K., & Garnsey, S. 1994. Semantic influences on parsing: Use of thematic role information in syntactic ambiguity resolution. *Journal of Memory and Language* 33:285-318.



# WHAT INFLUENCES THE REFERENTIAL PROPERTIES OF REFLEXIVES AND PRONOUNS IN FINNISH?\*

Elsi Kaiser,  
University of Southern California

elsi.kaiser@usc.edu

Jeffrey T. Runner, Rachel S. Sussman and Michael K. Tanenhaus,  
University of Rochester

## Abstract

According to standard Binding Theory, pronouns and reflexives are in (nearly) complementary distribution. However, representational NPs (e.g. ‘picture of her/herself’) allow both. It has been suggested that in English, reflexives in representational NPs (RNPs) have a preference for ‘sources of information’ and that pronouns prefer ‘perceivers of information.’ We conducted two experiments investigating the effects of structural and non-structural (source/perceiver) factors on the interpretation of two kinds of RNP structures in a typologically different language, namely Finnish. Our results reveal source/perceiver effects for postnominal but not for prenominal RNPs in Finnish, with a difference in the degree of sensitivity that pronouns and reflexives exhibit to the source/perceiver manipulation, and our results also suggest that morphological differences in Finnish reflexives correspond to interpretational differences. As a whole, these results support a multiple-factor model of reference resolution, which assumes that multiple factors can play a role in reference resolution and that the relative contributions of these factors can be different for different anaphoric forms (Kaiser 2003b, Kaiser & Trueswell in press).

## 1 Introduction

According to standard binding theory, pronouns and reflexives are in (nearly) complementary distribution. This complementarity breaks down in representational NPs (e.g. *picture of {her/herself}*), and it has been suggested that in English, non-Binding Theory compatible reflexives in representational NPs are acceptable if they refer to “sources-of-information” (e.g. Kuno 1987) and pronouns with local antecedents are acceptable if they refer to “perceivers-of-information” (Tenny 2004). Psycholinguistic experiments support these claims for English (Kaiser, Runner, Sussman & Tanenhaus 2005, in press). In this paper, we present two experiments investigating whether these claims hold for a typologically different language, Finnish, whether they arise in more than one structural domain, and whether morphological differences in Finnish reflexives correspond to interpretational differences.

The structure of this paper is as follows. In Section 1.1, we discuss the basics of Binding Theory, and in Section 1.2 we turn to some of the structures where traditional Binding Theory runs into trouble, including so-called representational noun phrases. Section 1.3 considers some of the non-structural factors that have been argued to influence anaphor resolution in cases where Binding Theory is not sufficient. Section 2 summarizes the psycholinguistic work we have conducted on English, investigating the role of nonstructural factors in anaphor resolution, and Sections 3 and 4 present the experiments we conducted on Finnish. Section 5 is the conclusion.

---

\* We gratefully acknowledge support from NSF grant BCS-0110676 and NIH grant HD-27206.

## 1.1 Basics of Binding Theory

It is well known that pronominal and reflexive noun phrases in English have a nearly complementary distribution, as illustrated in (1).

- (1) a. Julius<sub>i</sub> saw him<sub>\*i/j</sub>.  
 b. Julius<sub>i</sub> saw himself<sub>i/\*j</sub>.  
 c. Julius<sub>i</sub> saw a picture of him<sub>\*i/j</sub>.  
 d. Julius<sub>i</sub> saw a picture of himself<sub>i/\*j</sub>.

Principles A and B of Chomskyan Binding Theory (BT) offer a structural account of this complementarity (e.g. Chomsky 1981, 1986). Principle A states that an anaphor (a reflexive pronoun) must be bound (by a c-commanding antecedent) in a local domain, whereas Principle B states that a pronoun must be free in a local domain. For the purposes of this paper, we can simply regard the clause as the relevant local domain. For the most part, we will use the term ‘reflexive’ rather than ‘anaphor’, but the two terms can be regarded as synonymous.

## 1.2 Where traditional Binding Theory runs into trouble

Although Binding Theory captures many of the configurations in which reflexives and pronouns can and cannot appear, it has been known for a long time that there are certain structures where the predicted complementarity between pronouns and reflexives does not arise. Some naturally-occurring examples of non-Binding Theory compatible reflexives (reflexives without local antecedents) are given in (2), and examples of non-Binding Theory compatible pronouns (pronouns with local antecedents) are in (3).

- (2) a. Bismarck’s impulsiveness has, as so often, rebounded against **himself**. (quoted in Zribi-Hertz 1989)  
 b. Warren says it’s a good time to be an astrophysicist. Fifteen years ago, “we were starved for observations,” he says. Now it’s the opposite: Theorists like **himself** are drowning in data from modern telescopes. (from The New Mexican newspaper in Santa Fe, NM, 6/28/04)
- (3) a. Poor John. Now he’s got an ambitious little snake next to **him**.  
 ([www.freerepublic.com/~regulator/in-forum](http://www.freerepublic.com/~regulator/in-forum))  
 b. Except he could not throw the ball because he was getting tackled. He was about to hit the ground. He had to do something else. He saw someone behind **him**. He flipped the ball in desperation. ([www.wildbillschiefs.com/news/data/604.txt](http://www.wildbillschiefs.com/news/data/604.txt))

The existence of such examples raises the question of what guides the choice of one form over the other in these contexts. This question has been investigated by a number of researchers, focusing primarily on English (e.g. Cantrall 1974, Kuno 1987, Zribi-Hertz 1989, Pollard & Sag 1992, Reinhart & Reuland 1993, Tenny 1996, 2003, 2004), who have suggested that choice of referential form in these contexts is influenced by semantic and/or discourse factors.

In this paper we will focus on a subclass of structures known to be problematic for standard Binding Theory, so-called representational NPs (RNPs), e.g. ‘a picture of her/herself’, ‘a story about him/himself’, which are well-known for showing clear discourse/semantic effects<sup>1</sup> for

<sup>1</sup> We often use the hybrid label ‘discourse/semantic factors’ when discussing the effects of non-structural factors on pronouns and reflexives. One could argue that the source/perceiver manipulation to be discussed below is a semantic, thematic role manipulation. However, it could also be argued that source/perceiver is related to

both pronouns and reflexives (e.g. Kuno 1987, Pollard & Sag 1992, Reinhart & Reuland 1993, Keller & Asudeh 2001, Tenny 2003).

Let us first consider reflexives in RNPs. Strikingly, example (4a) is acceptable, although the antecedent of ‘himself’ is not in the same sentence as the reflexive, and thus cannot bind ‘himself’. The contrast between (4a) and (4b) (both from Pollard & Sag 1992) shows that pragmatic factors such as ‘point of view’ can have a strong influence on the acceptability of such reflexives. Example (4a) is judged to sound better than (4b), and Pollard & Sag suggest that this is because (4a) – but not (4b) – is from John’s point of view. In other words, it appears that reflexives referring to ‘point of view’-antecedents are acceptable, even if the antecedent does not bind the reflexive as required by Binding Theory.

- (4) a. John<sub>i</sub> was going to get even with Mary. [That picture of him<sub>i</sub>/himself<sub>i</sub>] in the paper would really annoy her, as would the other stunts he had planned.  
 b. Mary was quite taken aback by the publicity John<sub>i</sub> was receiving. [That picture of him<sub>i</sub>/\*himself<sub>i</sub>] in the paper would really annoy her, as would the other stunts he had planned.

More generally, Kuno (1987) argues that factors like point of view, awareness and semantic roles influence whether a given entity can act as the antecedent for a non-BT compatible reflexive (see also Pollard & Sag 1992, Reinhart & Reuland 1993). We focus on the hypothesis in (6), based on Kuno’s claims (see his example (5)) and drawing on Sells (1987)’s definition of *source* as the one who is the intentional agent of the communication

- (5) John heard from Mary about a damaging rumor about <sup>?</sup>herself/<sup>(?)</sup>her (that was going around). (Kuno 1987:175)  
 (6) *Hypothesis for reflexives*: BT-incompatible reflexives in RNPs are acceptable if they refer to sources-of-information.

Let us now turn to the question of what kinds of pragmatic factors have been claimed to influence pronouns in RNPs. According to standard Binding Theory, none of the examples in (7) (based on Reinhart & Reuland 1993) should be grammatical, since in each case the pronoun is c-commanded by a local antecedent.

- (7) a. Lucie<sub>i</sub> saw the picture of her<sub>i</sub>.                      b. \* Lucie<sub>i</sub> took the picture of her<sub>i</sub>.  
 c. Max<sub>i</sub> heard the story about him<sub>i</sub>.                      d. \* Max<sub>i</sub> told the story about him<sub>i</sub>.

However, (7a) and (7c) tend to be judged as more acceptable than (7b) and (7d). Tenny (2003) calls these kinds of pronouns short-distance pronouns (SDPs) and notes that “verbs that provide a sentient, perceiving antecedent are especially conducive to SDPs” (Tenny 2003:42). She continues that “...SDPs in representational contexts [...] are especially felicitous with perceiving subjects” (Tenny 2003:42). In light of this claim, it is not surprising that (7a) and (7c) are judged to sound better, since in both cases the antecedent is a perceiver. Thus, for pronouns we investigate the hypothesis in (8):

- (8) *Hypothesis for pronouns*: BT-incompatible pronouns in RNPs are acceptable if they refer to perceivers-of-information.

Although Kuno and Tenny do not comment on this, the hypotheses in (6) and (8) can be regarded, in some sense, as ‘two sides of the same coin’ – given that verbs like *tell/hear* involve both a source-of-information and a perceiver-of-information. Thus, it might turn out to be the case that BT-incompatible pronouns and reflexives have a (non-structurally driven) complementary distribution.

---

perspective-taking, which can be regarded as a discourse-related factor. The semantics/discourse distinction is an important question for future work.

### 1.3 What kinds of information contribute to anaphor resolution?

The more general theme underlying our investigation of pronouns and reflexives in RNPs concerns the question of what kind of information contributes to reference resolution – in particular, how structural and non-structural information interact in the course of reference resolution. RNPs provide an ideal tool to further test the ‘multiple-factor model’ of reference resolution argued for by Kaiser (2003b) and Kaiser & Trueswell (in press). According to this approach, different referential forms are sensitive to different kinds of information (e.g. syntactic, semantic, discourse) to different degrees. For example, certain referential forms are primarily sensitive to syntactic factors, whereas others are influenced mainly by discourse-level factors such as referent salience. In other words, the claim is that the relative contributions of different factors for each referential form can vary. Kaiser (2003b) (see also Kaiser & Trueswell, in press; Brown-Schmidt, Byron & Tanenhaus, 2005) argues in favor of the multiple-factor model on the basis of reference resolution across clauses in Finnish, Dutch and Estonian, and RNPs provide an ideal tool for testing whether the same model can be applied to reference resolution within clauses, which is a domain that has traditionally been regarded as more constrained by syntactic factors than across-clause reference resolution.

In this paper, we compare the predictions of a multiple-factor approach (which we will refer to as an interactive/modulation view in this paper) to those of two ‘single-factor’ approaches, which we will refer to as the pure structural view and the pure discourse/semantic view. We focus on the interpretation of pronouns and reflexives in sentences such as those in (9):

- (9) a. Peter told Andrew about the picture of {him/himself} on the wall.  
b. Peter heard from Andrew about the picture of {him/himself} on the wall.

According to the pure structural view, only syntactic factors are relevant for determining the antecedents of pronouns and reflexives, and differences only on the level of verb semantics do not lead to differences in binding patterns. The prediction is that reflexives always refer to local c-commanding antecedents (here, subjects) and pronouns to non-commanding antecedents (here, objects; see also footnote 2). In contrast, the other extreme of the scale is the pure discourse/semantic view, according to which the antecedents of pronouns and demonstratives in RNPs are determined on basis of discourse/semantic role only. According to this approach, reflexives are predicted to refer to sources of information (e.g. the subject of ‘tell’ and the object of ‘hear’) and pronouns to perceivers of information (e.g. the subject of ‘hear’ and the object of ‘tell’) – regardless of grammatical role. Finally, according to the interactive/modulation view (which assumes that multiple factors can be relevant), both structure and discourse/semantics play a role. The predictions are, therefore, that reflexives will have more non-BT compatible object-antecedents with ‘hear’ than with ‘tell’ (since the object is the source with ‘hear’), and pronouns will have more non-BT compatible subject with ‘hear’ than ‘tell’ perceivers than sources (since the subject is the perceiver with ‘hear’).

## 2 Representational NPs in English: Previous work

In earlier experimental work (Kaiser, Runner, Sussman & Tanenhaus 2005, in press), we explored the three hypotheses sketched out in section 1.3 for pronouns in picture NP constructions in English (ex.(9)). We opted to investigate these issues experimentally because judgments concerning these kinds of constructions are notoriously variable. With an experimental approach, we can manipulate the structural and pragmatic/semantic variables that we are interested in test, and we can collect a set of data from a large group of participants that can then be statistically analyzed to see whether there are any reliable patterns. In addition, using eye-tracking methodology (see Kaiser et al. in press), we can obtain incremental, real-time information about interpretation. Thus, we obtain information about participants’ final referential choices and also about the possible referents they consider

before they make a choice. These kinds of data can shed further light on the nature of the relation between syntactic and discourse/semantic factors in anaphora resolution.

Our results show that the interpretation of pronouns and reflexives in RNPs in English is influenced by the source/perceiver manipulation. More specifically, pronouns exhibit a strong preference for perceivers, and reflexives show a weaker preference for sources. Thus, as a whole the results support the modulation view, which posits that both structural and discourse/semantic information play a role in the processing and interpretation of pronouns and reflexives in RNPs. Furthermore, as the asymmetrical nature of the results reveals, the effects are not equally strong for reflexives and pronouns. Pronouns display a much greater sensitivity to non-structural factors. This supports Kaiser (2003b)'s multiple-factor model, which claims that not only are multiple factors relevant, but the relative contributions of different factors for each referential form can vary. In other words, the Kaiser et al. (in press) results show that in English, the relative strength of discourse/semantic factors, when compared to structural factors, is greater for pronouns than for reflexives.

In this paper we focus on three questions left unanswered by our work on English. As will become clear later, Finnish is very well-suited for shedding light on these issues.

- (i) Are the source/perceiver effects and the pronoun/reflexive asymmetry English-specific or do they extend to a typologically distinct language as well?
- (ii) Is the source/perceiver preference for reflexives and pronouns respectively limited to one particular syntactic structure (RNPs where the pronoun/reflexive is embedded in a PP), or does it also show up in other syntactic configurations? This question will shed light on the question of whether different syntactic structures differ in how impervious they are to the effect of non-structural factors.
- (iii) Given that many other languages exhibit greater morphological complexity in their pronominal and reflexive systems than English does, is it the case that morphological differences correspond to interpretational differences? For example, if a language has two reflexive forms, do they differ in their sensitivity to non-structural information? The multiple-factor model's claim that the relative contributions of different factors for each referential form can vary suggests that this could indeed be the case.

To investigate these questions, we conducted two experiments on Finnish. The first one investigates different referential forms in prenominal RNPs and the second one turns to postnominal RNPs.

### 3 Experiment 1: Finnish prenominal RNPs

#### 3.1 Finnish possessives

In Finnish, possession is represented by a system of possessive pronouns and possessive suffixes (Px's). In this paper we will focus on the third person possessive suffix, which surfaces as [-nsA] or [-An] (the capital letter indicates that the vowel undergoes vowel harmony and can surface as [a] or [ä]). In third person possessive constructions with pronominal possessors (e.g. 'his car'), the possessive suffix is present on the possessed noun. However, the possessive pronoun itself is null in certain contexts: According to the judgments reported in the literature, when an overt possessive pronoun is *not* present, then – 'reflexive-style' – the referent of the subject of the sentence is the possessor (Vilkuna 1996:228-230, Nelson 1998:13)

- (10) a. Mari            näki hänen        autonsa.  
 Mari-NOM saw s/he-GEN car-ACC-3Px  
 'Mari<sub>i</sub> saw her<sub>j</sub> (someone else's) car.'

- b. Mari            näki        autonsa.  
 Mari-NOM saw  $\emptyset$  car-ACC-3Px  
 ‘Mari<sub>i</sub> saw her<sub>i</sub> (own) car.’

Various analyses have been proposed concerning the Finnish possessive suffix and its relation to the possessive pronoun, and we briefly consider three of them here. One approach analyzes the possessive suffix as an anaphor (e.g. Vainikka (1989), Nelson (1998)). According to this view, third person possessive suffixes are anaphors which must be bound by the subject of the sentence or by a third person possessive pronoun (e.g. Nelson 1998:187-188; see Trosterud 1993 for a somewhat different account of the role of the third person possessive pronoun).

A different analysis is proposed by van Steenbergen (1991), who claims that possessive constructions without an overt possessive pronoun contain an empty element (*pro*). According to van Steenbergen’s analysis, *pro* is an empty anaphor which can only be bound by the subject and occurs whenever ‘it corefers with a c-commanding NP’ (van Steenbergen 1991:234). She claims that the possessive suffix marks nominal inflection (van Steenbergen 1991:232). (It is worth noting that in this paper, we will often refer to constructions with no overt possessive pronoun as containing a null possessive pronoun. However, the question of whether such constructions contain a null possessive that acts as a reflexive or whether it is the suffix that acts as the reflexive is not central to our aims in this paper, and our choice of terminology should not be regarded as endorsing one theory over the others.)

A third approach is presented by Toivonen (2000) within Lexical Functional Grammar (LFG). She argues that the third person possessive suffix [-nsA] is ‘a single phonological form [that] corresponds to two distinct sets of lexical features’ (Toivonen 2000:34). She claims that when the third person possessive suffix occurs without an overt possessive pronoun in a context where the subject is the possessor, the possessive suffix is a subject-bound reflexive pronoun. In contrast, when the suffix occurs in the presence of an overt possessive pronoun and with a subject disjoint in reference, she argues that the possessive suffix is an agreement marker (Toivonen 2000:30).

Despite the important differences between these accounts, it appears that they resemble one another in terms of the predictions they are expected to make regarding the factors that influence the referential properties of reflexives and pronouns. In other words, all three accounts would presumably predict that sentences with no overt possessive pronouns should be influenced by whatever factors influence the referential properties of anaphors (reflexives), and that in sentences with overt possessive pronouns, the referential properties of the possessed NP should be influenced by whatever factors influence the referential properties of pronouns.

Before moving on to the details of the experiment, let us consider another form, besides the overt possessive pronoun, that Finnish offers for indicating reference to a non-subject: the demonstrative pronoun *tämän* ‘this-GENITIVE’. In Finnish, *tämä* can be used to refer to human referents, and this form has been claimed to be used for human antecedents that are not highly salient (e.g. Varteva 1998, Kaiser & Trueswell in press). Note that use of genitive *tämä* does not permit a possessive suffix on the possessed noun.

- (10) c. Mari            näki tämän        auton.  
 Mari-NOM saw this-GEN car-ACC.  
 ‘Mari<sub>i</sub> saw her<sub>j</sub> (someone else’s) car.’

The fact that both overt pronouns and the demonstrative can be used when the possessor is not the subject raises the question of how they differ. As far as we know, this question has not been investigated in the literature in any depth, although both forms are wide-spread in Finnish language use. Thus, in addition to the aims sketched out above, we also hoped that

Experiment 1 might be able to shed light on potential differences between the overt pronoun and the demonstrative.

### 3.2 Experimental design

In this experiment, we manipulated verb type (*kertoa* ‘to tell’ vs. *kuulla* ‘to hear’) and anaphoric form. Participants (n=32) read sentences and chose whose picture was mentioned in the sentence. They were able to choose among four options: subject / object / both are possible / someone else. Sample stimuli and their glosses and translations are shown below.

- (11) a. Null/Reflexive with ‘told’  
 Mari kertoi Liisalle muotokuvastaan.  
 Mari-NOM told Liisa-ALL  $\emptyset$  portrait-ELA-3Px  
 ‘Mari<sub>j</sub> told Liisa<sub>k</sub> about her<sub>j</sub> portrait.’
- a.’ Null/Reflexive with ‘heard’  
 Mari kuuli Liisallta muotokuvastaan.  
 Mari-NOM heard-from Liisa-ABL  $\emptyset$  portrait-ELA-3Px  
 ‘Mari<sub>j</sub> heard from Liisa<sub>k</sub> about her<sub>j</sub> portrait.’
- b. Pronoun  
 Mari kertoi Liisalle (kuuli Liisalta) hänen muotokuvastaan.  
 Mari-NOM told Liisa-ALL (heard-from L-ABL) s/he-GEN portrait-ELA-3Px  
 ‘Mari<sub>j</sub> told Liisa<sub>k</sub> (heard from Liisa<sub>k</sub>) about her<sub>k,i</sub> portrait.’
- c. Demonstrative:  
 Mari kertoi Liisalle (kuuli Liisalta) tämän muotokuvasta.  
 Mari-NOM told Liisa-ALL (heard-from Liisa-ABL) this-GEN portrait-ELA  
 ‘Mari<sub>j</sub> told Liisa<sub>k</sub> (heard from Liisa<sub>k</sub>) about her<sub>k,i</sub> portrait.’

In Finnish, with both *kertoa* ‘to tell’ and *kuulla* ‘to hear’, the noun ‘portrait’ is in elative case (ELA). With *kertoa* ‘to tell’, the perceiver of information is marked with allative (ALL) case. With *kuulla* ‘to hear from’, the source of information is marked with ablative (ABL) case. According to Nikanne (1993), both ALL and ABL are semantic cases, which he distinguishes from the grammatical cases NOM, ACC, PART and GEN. Nikanne argues for the same structural analysis for both ALL and ABL.<sup>2</sup>

### 3.3 Predictions

Let us now consider the predictions that we can make based on the three different approaches mentioned above, namely the pure structural view, the pure discourse/semantic view and the interactive/modulation view (see also Table 1 below). According to the pure structural view, only structural information is relevant and thus the verb manipulation is predicted to have no effect on antecedent choice. More specifically, null possessive pronouns are predicted to refer to the subject, and overt pronouns and demonstratives to the object, regardless of verb. In contrast, the pure discourse semantic view claims that structural information is irrelevant and only source/perceiver preference matter. Thus, the prediction is that ‘reflexive-style’ null possessive pronouns will be interpreted as referring to the source of information (the subject

<sup>2</sup> Thus, Finnish allows us to sidestep the potential structural complication that at first glance seems to arise for English, namely that ‘hear from someone’ involves a preposition but ‘tell someone’ does not. Depending on what is assumed to be the syntactic position of the direct object, one could argue that in English the direct object of a verb like *tell*—unlike the object of a preposition, as with *hear from*—c-commands the RNP (see Contreras 1984, *inter alia*) and the direct object is therefore a possible antecedent for a reflexive pronoun and not a possible referent for a pronoun. However, as we show in Kaiser et al (in press), this alternative account for differences between *tell* and *hear from* does not receive support from the empirical data from our experiments on English.

with ‘tell’ and the object with ‘hear’), and that overt pronouns will refer to the perceiver of information (the object with ‘tell’ and the subject with ‘hear’). It is not clear what this approach predicts for demonstratives, since they do not fall clearly into the reflexive class or the pronoun class.

<i>Tell</i>			
	<i>Null</i>	<i>Pronoun</i>	<i>Demonstrative</i>
Syntax	Subject	Object	Object
Discourse	Subject	Object	??
Interactive	Subject	Object	Object
<i>Hear</i>			
	<i>Null</i>	<i>Pronoun</i>	<i>Demonstrative</i>
Syntax	Subject	Object	Object
Discourse	Object	Subject	??
Interactive	??	??	Object

Table 1. Predictions for Experiment 1.

Finally, let us turn to the interactive/modulation view, which claims that both structural information and discourse/semantic information interact, and that both can influence the choice of antecedent. Let us assume, for reasons of expository ease, that both structural and discourse/semantic factors are weighted equally. As Table 1 shows, according to this view, a null possessive occurring with ‘tell’ has two kinds of information pushing it towards the subject of the sentence: the binding-theoretic preference towards the sentence subject and the discourse/semantic preference for the source of information. An overt pronoun occurring with ‘tell’, on the other hand, is pushed towards the object by both Binding Theory and the discourse/semantic perceiver preference. In the case of demonstratives, structurally speaking we expect an object preference, but it is not clear what, if any, effect there will be of the source/perceiver status of potential antecedents.

The picture is more complex with ‘hear’, however, since structural information and discourse/semantic information are pitted against each other in the case of both null and overt possessive pronouns, as shown in the bottom half of Table 1. Overall, then, we might predict more object choices with null pronouns occurring with ‘hear’ than null pronouns occurring with ‘tell’, as well as more subject choices for overt pronouns occurring with ‘hear’ than overt pronouns occurring with ‘tell’. In other words, we predict that in the conditions with ‘hear’, the discourse/semantic factors will pull overt and null pronouns away from the structurally-predicted antecedents. In the case of demonstratives, as mentioned above, it is not clear what effects, if any, we expect the verb manipulation to have.

### 3.4 Results and discussion

Figure 1 illustrates the results for null possessive pronouns, overt possessive pronouns and demonstrative pronouns with the two verbs. Even a brief glance reveals a striking absence of any verb-driven effect. The pattern of responses is the same with both ‘told’ and ‘heard’ regardless of anaphoric form. Considering each anaphoric form in turn, we see that the null possessive pronoun clearly has a strong preference for the preceding subject and the demonstrative has a strong preference for the preceding object. The overt pronouns fall in between these two extremes. Although they are more likely to be interpreted as referring to the preceding object than the preceding subject, this preference is not as strong as in the case of the demonstratives.



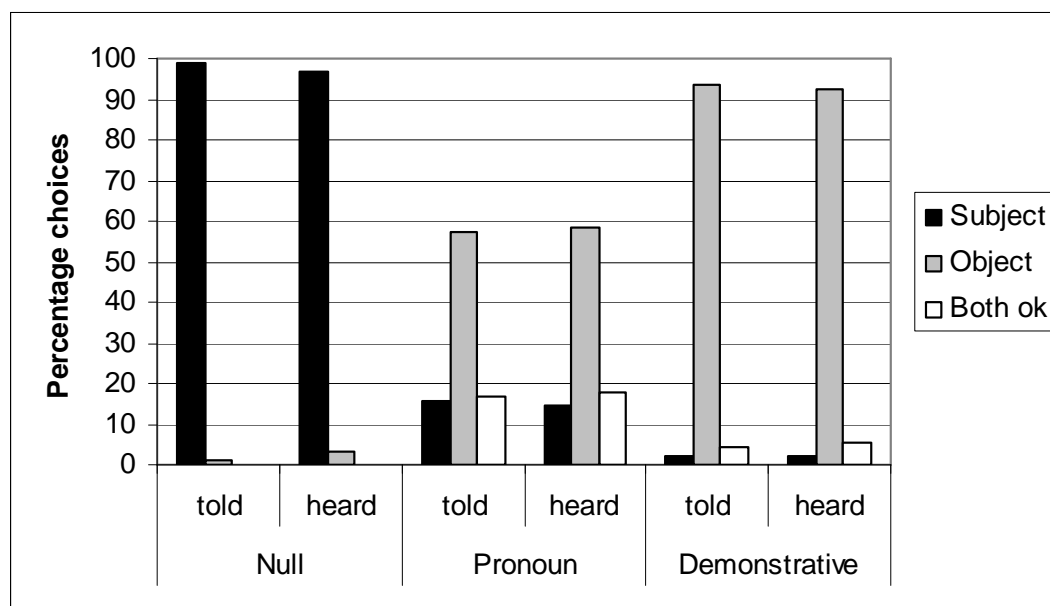


Figure 1. Percentage of antecedent choices for prenominal RNPs in Finnish

The fact that the object preference for possessive pronouns is not as strong as for demonstratives might seem rather surprising in light of the traditional claims that overt possessive pronouns cannot be interpreted as coreferential with the subject of the sentence. However, as Kaiser (2003a) notes, native speaker judgments on the referential properties of overt possessive pronouns seem to not be as clear as the literature might lead one to expect. This effect might be due to the influence of colloquial Finnish / Finnish dialects (see Paunonen 1995, see also Hakulinen et al. 2004:1240), given that in a number of Finnish dialects, it seems that an overt genitive pronoun can be interpreted as being coreferential with the subject as well as the object. (It is well-known that ‘it’ can be used in many Finnish dialects to refer to human as well as non-human referents without any derogatory connotations, in contrast to its use in Standard Finnish. Standard Finnish is the ‘official’ form of the language and used in formal writing and public/official speech (e.g. TV newscasts, speeches etc.), but virtually all Finns can speak both standard Finnish and a colloquial dialect of Finnish; they choose which register to use depending on the situation and the modality of language use.)

- (12) Liisa            kerto    Marille    sen            muotokuvasta.  
 Liisa-NOM told    Mari-ALL it-GEN portrait-ELA  
 ‘Liisa<sub>j</sub> told Mari<sub>k</sub> about her<sub>(j),k,l</sub> portrait.’ (colloquial southern urban Finnish)

As a whole, the results of Experiment 1 support the pure structural view, which posits that the referential properties of pronouns and reflexives are determined by only structural factors. In the prenominal domain in Finnish, in contrast to what was observed for RNPs in English, we see no sign of source/perceiver effects for pronouns or reflexives.

#### 4 Experiment 2: Postnominal RNPs in Finnish

In the second experiment, we turn to a different structural configuration, namely postnominal RNPs. These are structurally more parallel to the English RNPs than the Finnish prenominal RNPs investigated in Experiment 1, and thus – if it the case that different syntactic configurations differ in how impervious they are to non-structural factors – we might expect postnominal RNPs in Finnish to be more likely to exhibit source/perceiver effects.

The Finnish counterparts of ‘a picture of herself/her’ are shown in (13). Here the contrast is not between absence and presence of an overt genitive pronoun, but rather between the reflexive form *itse*+Px ‘self+Px’ (13a) and the pronoun *hänestä* ‘s/he-ELATIVE’ (13b). (The same reflexive form, *itse*+Px, with the appropriate case marking, is also used in direct object position in sentence such as “Liisa saw herself.”)

- (13) a. Liisa näki kuvan itsestään.  
 Liisa-NOM saw picture-ACC self-ELA-3Px  
 ‘Liisa<sub>j</sub> saw a picture of herself<sub>j</sub>.’
- b. Liisa näki kuvan hänestä.  
 Liisa-NOM saw picture-ACC s/he-ELA  
 ‘Liisa<sub>j</sub> saw a picture of her/him<sub>k</sub>.’

In addition to these ‘canonical’ forms, we will also consider two other post-nominal reflexive forms, which have not received as much attention in the existing literature, namely a pronoun+reflexive compound form and an emphatic reflexive form. First, let us turn to the pronoun+reflexive compound *hänestä itsestään* (she/he-ELA self-ELA-3rd.Px) ‘(about) his/her+himself/herself’. This form appears to be ambiguous between (i) a pronominal with an ‘emphatic’ reflexive, akin to English structures like *he himself*, and (ii) a reflexive preceded by an ‘emphatic’ pronoun (see also Featherston 2002 on the ambiguity of German *ihm selbst/ihn selbst*). In Experiment 2, in addition to testing whether Finnish pronouns and reflexives in postnominal RNPs are sensitive to the source/perceiver manipulation, we will also test whether the pronoun+reflexive compound patterns more like pronouns or like reflexives in its sensitivity to source/perceiver and structural information, with the aim of shedding light on the question of whether this compound form should be regarded as pronominal or reflexive.

In Experiment 2 we also investigate the referential properties of the emphatic reflexive construction *omasta itsestään* (own-ELA self-ELA-3rd.Px) ‘(about) own+himself/herself.’ This is presumably an unambiguous reflexive preceded by the emphatic marker ‘own,’ given that *omasta* cannot occur independently in post-nominal RNP constructions. Thus, the question arises whether it differs from the standard reflexive form (13a) in its sensitivity to the source status of the antecedent.

#### 4.1 Experimental design

In this experiment we manipulated verb type and anaphoric form, as illustrated in (14). A different group of participants (n=32) read sentences and indicated who the joke was about. As in Experiment 1, participants were given four choices: subject / object / both are possible / someone else.

- (14) a. *Reflexive*:  
 Mari kertoi Liisalle vitsin itsestään.  
 Mari-NOM told Liisa-ALL joke-ACC self-ELA-3Px  
 ‘Mari told Liisa a joke about herself.’
- b. *Pronoun*:  
 Mari kertoi Liisalle vitsin hänestä.  
 Mari-NOM told Liisa-ALL joke-ACC she-ELA  
 ‘Mari told Liisa a joke about her.’
- c. *Compound*:  
 ...hänestä itsestään  
 ...she-ELA herself-ELA-3rd.Px  
 ...‘{her/him} + {herself/himself}’

- d. *Emphatic reflexive*:<sup>3</sup>
  - ...omasta itsestään
  - ...own-ELA herself-ELA-3rd.Px
  - ... ‘own + {herself/himself}’

## 4.2 Predictions

In this section we consider the predictions made by the pure structural approach, the pure discourse/semantic approach and the interactive/modulation approach (Table 2). First, according to the pure structural view, we predict that pronouns will be interpreted as referring to the preceding object, regardless of the verb manipulation. Reflexives are predicted to be interpreted as referring to the subject of the sentence, again regardless of the verb, given that reflexives need to be bound by a local c-commanding antecedent. The predictions are less clear for the compound form and the emphatic reflexive. As mentioned above, the compound form seems to be ambiguous between a pronoun and a reflexive, and has not received much attention in existing work. As for the emphatic reflexive, we might expect it to show a subject preference, regardless of verb, since it is presumably a fundamentally reflexive element.

The predictions of the pure discourse/semantic view are different. According to this approach, source/perceiver preferences guide the reference resolution of referential forms in RNPs, and thus we predict that pronouns will opt for the object with *tell* (perceiver) and the subject with *hear* (perceiver), and that reflexives will be interpreted as referring to the subject with *tell* (source) and the object with *hear* (source). The emphatic reflexive might well pattern like ‘regular’ reflexives, and again the referential properties of the ambiguous compound form will presumably depend on whether it turns out to be pronominal or reflexive.

<i>Tell</i>				
	<i>Pronoun</i>	<i>Reflexive</i>	<i>Compound</i>	<i>Emphatic refl</i>
Syntax	Object	Subject	??	Subject?
Discourse	Object	Subject	??	Subject?
Interactive	Object	Subject	??	Subject?
<i>Hear</i>				
	<i>Pronoun</i>	<i>Reflexive</i>	<i>Compound</i>	<i>Emphatic refl</i>
Syntax	Object	Subject	??	Subject?
Discourse	Subject	Object	??	Object?
Interactive	??	??	??	??

Table 2. Predictions for Experiment 2.

Now, let us turn to the interactive/modulation view. According to this approach, both structural information and discourse/semantic information influence the choice of antecedent. Let us assume, as we did above, that both structural and discourse/semantic factors are weighted equally. As in the first experiment, we find that with *tell*, both syntactic and discourse factors are pushing in the same direction, but with *hear*, they are pitted against each other. As a result, we predict that if discourse/semantic factors are playing a role, we should

<sup>3</sup> Corpus example:

(a) ...sitä samaa inhoa, jota omaa moraalikäsitystään vastaan rikkonut ihminen tuntee katsoessaan peiliin ja nähdessään kuvan **omasta itsestään**... (www.virhe.org, posted 12/16/2002)  
 ‘...the same hatred that is felt by someone who has acted against his own sense of morality, as he looks into the mirror and sees a picture of **himself**...’

see more non-BT compatible responses with *hear* than with *tell* for both reflexives (perhaps also emphatic reflexives) and pronouns, since in the *hear* condition the discourse/semantic factors are pulling the referential choices towards the non-BT compatible antecedents (objects in the case of reflexives; subjects in the case of pronouns). The predictions are less clear for the compound form, since its predicted behavior depends on whether it should be analyzed as a pronoun or a reflexive.

### 4.3 Results and discussion

As Figure 2 illustrates, a perceiver preference arises with pronouns. Participants chose subjects as antecedents (i.e., go against Binding Theory) significantly more often with *hear* than *tell*. However, the pattern of responses indicates that structural factors also play a role. With *tell*, we see a clear difference between the rate of object choices and the rate of ‘both are possible’ choices, but with *hear*, the numbers are very close. As Table 2 shows, this is a pattern we would expect if both structural and discourse/semantic factors are relevant. In other words, it seems that with *hear*, the discourse/semantic factors were able to push participants away the object, but did not obliterate the effects of structural factors.

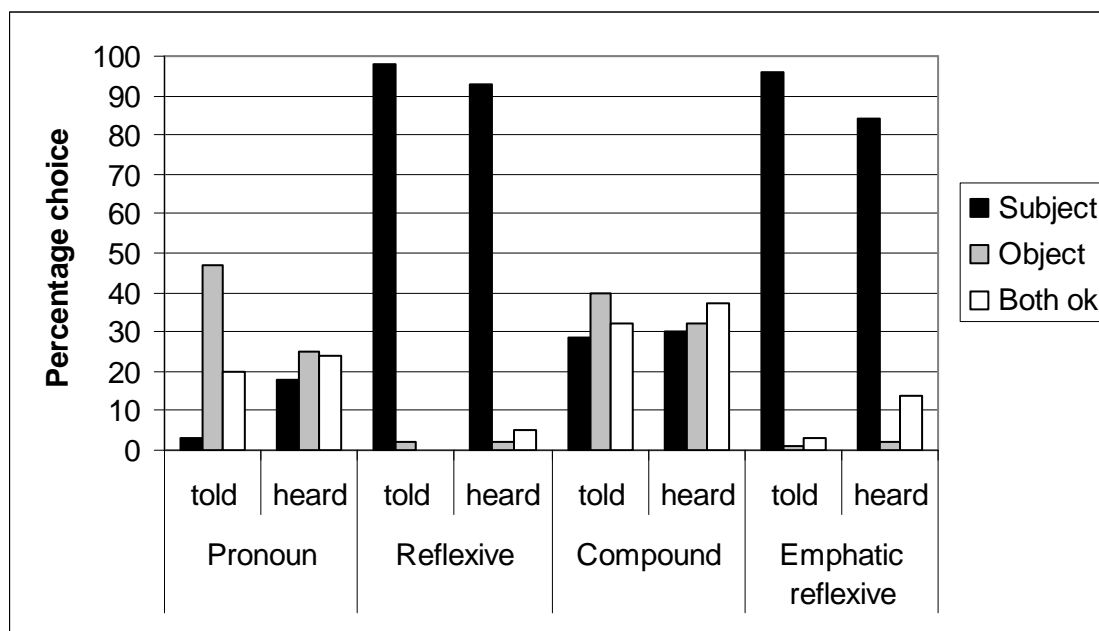


Figure 2. Percentage of antecedent choices for postnominal RNPs in Finnish

In contrast to pronouns, the reflexive and the compound pronoun+reflexive conditions show no clear verb effects. With reflexives, we see a very strong subject preference with both verbs (>90%), and no effect of the source/perceiver manipulation. Thus, it appears that reflexives, even in postnominal RNPs in Finnish, are sensitive to structural factors only. The compound form, however, is split between subject and object choices with both verbs. This, unfortunately, does not shed as much light on the status of the compound form as one might have hoped. Its referential properties show that it does not pattern like regular reflexives since it does not exhibit an overwhelming subject preference, and thus one could argue that the compound form should not be regarded as fundamentally reflexive in nature. However, its referential properties do not closely match those of pronouns either, although numerically they are in the same direction (slightly more subject choices and ‘both’ choices with *hear* than with *tell*, slightly more object choices with *tell* than with *hear*). Thus, one could argue that the compound form appears to pattern somewhat more like a pronoun than a reflexive, but further research is clearly needed.

Interestingly, the data show that the emphatic reflexive is sensitive to verb manipulation, as there are significantly more ‘both’ answers with *hear* than *tell*. In other words, participants are significantly more likely to consider both subject and object as possible antecedents with *hear* than with *tell*. That is, when the object is the source-of-information, it is more likely to be considered. However, given that the source preference shows up as an increase in the number of ‘both’ responses, rather than as an increase in the number of object responses, suggests that this effect is fairly weak. In contrast to the pronoun condition, where the number of subject choices increased significantly as a result of the verb manipulation, here it is the proportion of ‘both’ choices that increases. In other words, with the emphatic reflexive, participants are unwilling to abandon the BT-compatible subject choice, even though they are willing to consider an object choice as well if the object is the source.

The results indicate that the effect of the discourse/semantic factors is weaker with emphatic reflexives than with pronouns, which suggests that although the data support the modulation/interactive hypothesis, the structural and the discourse/semantic factors are not weighted equally for pronouns and emphatic reflexives. More specifically, it seems that discourse/semantic factors have a stronger effect on pronouns than on emphatic reflexives, even though structural factors are clearly also playing a role in both cases well. Thus, these data – like our findings for English – support Kaiser’s (2003b) and Kaiser & Trueswell’s (in press) multiple-factor model which claims that different referential forms are sensitive to different kinds of information to different degrees.

## 5 Conclusions

In this paper we reported on two experiments that were designed to investigate what kinds of information contribute to the interpretation of pronouns and reflexives in Finnish RNPs. The results show that different syntactic configurations differ in their sensitivity to non-structural factors: Experiment 1, which investigated prenominal RNPs, showed no source/perceiver effects, but such effects arose in Experiment 2, which looked at postnominal RNPs. The findings of Experiment 2 indicate that the source preference for reflexives and the perceiver preference for pronouns (discussed by Kuno (1987) and Tenny (2003), and found experimentally by Kaiser et al. in press for English) also arise in a typologically different language, i.e. these effects do not appear to be a purely English-only phenomenon.

As the results of Experiment 2 show, morphological differences in Finnish reflexives seem to correlate with interpretational differences. The different reflexive forms differ in their sensitivity to the verb manipulation, which means that a fine-grained approach is necessary for capturing the referential properties of different anaphoric forms. Such a finding is fully compatible with the multiple-factor model, which assumes that multiple factors can play a role in reference resolution, and crucially also posits that the relative contributions of these factors can be different for different anaphoric forms (Kaiser 2003b, Kaiser & Trueswell in press). This approach can also straightforwardly capture the finding that in Finnish, as in English, discourse/semantic factors contribute more to the interpretation of pronouns than to the interpretation of reflexive-type elements.

As a whole, our data from Finnish provide further support for a multiple-factor model of reference resolution. Hopefully future work can further investigate the validity of the multiple-factor model in other languages and other domains, and also shed light on whether representational NPs in languages other than Finnish and English show similar kinds of source/perceiver effects.

**References**

- Brown-Schmidt, S., Byron, D. & Tanenhaus, M.K. (2005). Beyond salience: interpretation of personal and demonstrative pronouns. *Journal of Memory and Language* 53:292-313.
- Cantrall, William R. (1974) *Viewpoint, Reflexives, and the Nature of Noun Phrases*. The Hague: Mouton.
- Chomsky, N. (1981). *Lectures on Government and Binding*. Foris. Dordrecht.
- Chomsky, N. (1986). *Barriers*. MIT Press. Cambridge, Mass.
- Contreras, H. 1984. A Note on Parasitic Gaps. *Linguistic Inquiry* 15:698-701.
- Featherston, S. 2002. Coreferential objects in German: Experimental evidence on reflexivity. *Linguistische Berichte* 192:457-484.
- Hakulinen, A., Vilkuna, M., Korhonen, R., Koivisto, V., Heinonen T. R. & Alho, I. 2004. *Iso suomen kielioppi*. SKS: Helsinki.
- Kaiser, E. 2003a. Encoding (Non)Locality in anaphoric relations. In Nelson, D. & Manninen, S. (eds.) *Generative Approaches to Finnic and Saami Linguistics*, 269-293. Stanford: CSLI Publications.
- Kaiser, E. 2003b. *The quest for a referent: A crosslinguistic look at referent resolution*. Ph.D. dissertation, University of Pennsylvania.
- Kaiser, E., Runner, J.T., Sussman, R.S. & Tanenhaus, M.K. (in press). The Interpretation of Pronouns and Reflexives in Picture Noun Phrases: Effects of Non-structural Factors. To appear in A. Alcazar, R. Mayoral Hernandez & M.T. Martinez (eds), *Proceedings of the Western Conference on Linguistics 2004*. Fresno: California State University at Fresno.
- Kaiser, E., Runner, J.T., Sussman, R.S. & Tanenhaus, M.K. 2005. *Whose picture? Reference resolution in and out of picture NPs*. Poster presented at the 18th Annual CUNY Conference on Human Sentence Processing. March 31-April 2, 2005. Tucson, AZ.
- Kaiser, E. & J.C. Trueswell (in press) Investigating the interpretation of pronouns and demonstratives in Finnish: Going beyond salience. To appear in E. Gibson & N. Pearlmuter (eds), *The processing and acquisition of reference*. MIT Press.
- Keller, F. & Asudeh, A. 2001. Constraints on linguistic coreference: Structural vs. pragmatic factors. *Proc 23rd Conf. of the Cog Sci Soc*, 483-488.
- Kuno, S. 1987. *Functional Syntax: Anaphora, discourse & empathy*. Chicago: Chicago University Press.
- Nelson, D. 1998. *Grammatical Case Assignment in Finnish*. New York: Garland
- Nikanne, U. 1993. On assigning semantic cases in Finnish. In A. Holmberg & U. Nikanne (eds.) *Case and other functional categories in Finnish syntax*, pp.75-88. Berlin/New York: Mouton de Gruyter.
- Paunonen, H. 1995. Puhesuomen muuttuva omistusjärjestelmä. *Virittäjä* 99.

- Pollard, C. & Sag, I. 1992. Anaphors in English and the scope of Binding Theory. *Linguistic Inquiry* 23:261-303.
- Reinhart, T. & Reuland, E. 1993. Reflexivity. *Linguistic Inquiry* 24:657-720.
- Runner, J.T., Sussman, R.S. & Tanenhaus, M.K. (to appear). The Influence of Binding Theory on the On-Line Reference Resolution of Pronouns, in *Proceedings of North Eastern Linguistic Society* 34.
- Runner, J.T., Sussman, R. S. & Tanenhaus, M.K. 2003. Assignment of reference to reflexives and pronouns in picture noun phrases: evidence from eye movements. *Cognition* 89(1):B1-B13.
- Runner, J. T., Sussman, R. S. & Tanenhaus, M. K. 2002. Logophors in Possessed Picture Noun Phrases. In L. Mikkelsen and C. Potts, eds., *WCCFL 21 Proceedings*, pp. 401-414. Somerville, MA: Cascadilla Press.
- Sells, P. 1987. Aspects of Logophoricity. *Linguistic Inquiry* 18 (3):445-479.
- van Steenberg, M. 1991. Long-distance binding in Finnish. *Long-distance anaphora*, ed. J. Koster and E. J. Reuland, 231-244. Cambridge: Cambridge University Press.
- Tenny, C. 1996. *Short distance pronouns and locational deixis*. LinguistList on-line conference.
- Tenny, C. 2003. *Short distance pronouns, argument structure, and the grammar of sentience*. Ms., 2003.
- Tenny, C. 2004. *Short Distance Pronouns in Representational NPs and a Grammar of Sentience*. Ms.
- Toivonen, I. 2000. The Morphosyntax of Finnish Possessives. *Natural Language and Linguistic Theory* 18(3):579-609.
- Trosterud, T. 1993. Anaphors and Binding Domains in Finnish. In A. Holmberg & U. Nikanne (eds), *Case and Other Functional Categories in Finnish Syntax*, pp.225-244. Berlin: Mouton de Gruyter.
- Vainikka, A. 1989. *Deriving Syntactic Representations in Finnish*. Doctoral dissertation, University of Massachusetts.
- Varteva, A. 1998. Pronominit hän ja tämä tekstissä. *Virittäjä* 2/1998, 202-223
- Vilkuna, M. (1996). *Suomen lauseopin perusteet*. Helsinki: Edita
- Zribi-Hertz, A. 1989. Anaphor Binding and Narrative Point of View English Reflexive Pronouns in Sentence and Discourse. *Language* 65(4): 695-727.





# A UNIFIED ANALYSIS OF PASSIVES AND ANTICAUSATIVES\*

Dalina Kallulli  
University of Vienna

[dalina.kallulli@univie.ac.at](mailto:dalina.kallulli@univie.ac.at)

## Abstract

Starting from the basic observation that, across languages, the anticausative variant of an alternating verb systematically involves morphological marking that is shared by passive verbs, the goal of this paper is to provide a uniform and formal account of these arguably two different construction types. The central claim that I put forward is that passives and anticausatives differ only with respect to the event-type features of the verb but both arise through the same operation, namely suppression by special morphology of a feature in  $v$  that encodes the ontological event type of the verb. Crucially, I argue for two syntactic primitives, namely *act* and *cause*, whereto I trace the passive/anticausative distinction. Passive constructions across languages are made compatible by relegating the differences to simple combinatorial properties of verb and prepositional types and their interactions with other event functors, which are in turn encoded differently morphologically across languages. New arguments are brought forward for a causative analysis of anticausatives. Agentive adverbials are examined, and doubt is cast on the usefulness of *by*-phrases as a diagnostic for argumenthood.

## 1 Introduction

As is well-known, across languages, the anticausative alternant of an alternating pair systematically involves morphological marking that is shared by passive predicates. For instance, in Albanian, similar to Latin and Modern Greek (MG), both the sentence in (1a) containing an anticausative and the sentence in (1b) containing a passive are rendered homomorphously as in (2).<sup>1</sup>

(1) a. The vase broke.

b. The vase was broken.

(2) Vazoja            \*(u)    thye.                                    (Albanian)

vase<sub>NOM</sub>            NACT    broke.AOR.3S

(i) ‘The vase broke.’

(ii) ‘The vase was broken.’

While both anticausatives and passives arguably lack an external argument (Marantz 1984), only the latter, but not the former, sanction *by*-phrases identifying the so-called logical subject, and can combine with purpose clauses and agent-oriented adverbs, as shown in (3) through (5).

---

\* The research for this paper was funded by the Austrian Science Fund, grant T173-G03.

<sup>1</sup> The following abbreviations are used in the glosses in the examples: AOR (for aorist), CL (for clitic), DAT (for dative case), IMP (for imperfective), NACT (for non-active voice), NOM (for nominative case), S (for singular).

- (3) a. The window was broken by Pat / the earthquake.  
 b. \*The window broke by Pat / the earthquake.
- (4) a. The boat was sunk to collect the insurance. (Roeper 1987:268)  
 b. \*The boat sank to collect the insurance. (Roeper 1987:268)
- (5) a. The ship was sunk deliberately.  
 b. \*The ship sank deliberately.

Depending on the theory, these facts have been taken to show that the external argument in the passive is still expressed in the syntax, albeit in an alternative manner (Baker, Johnson and Roberts 1989, Emonds 2000), or that the syntactically suppressed argument of a passive verb is present in argument structure (Roeper 1987, Grimshaw 1990), that is, that passives have an implicit argument. In contrast, the fact that anticausatives cannot combine with *by*-phrases, purpose clauses, or agent-oriented adverbs (Manzini 1983, Roeper 1987) is taken as evidence that the suppression of the external cause takes place in the mapping from the lexical semantic representation to argument structure (Levin and Rappaport Hovav 1995). In other words, in spite of differences of opinions concerning the proper treatment of passives, the consensual view has been that anticausatives are lexically reduced (see also Chierchia 1989, 2004 and Reinhart 1996).

In this paper, I examine certain properties of passives and anticausatives that to the best of my knowledge have hitherto not been systematically discussed in the literature, and the ensuing ramifications for a universal theory of these constructions. Specifically, I challenge the view that passives and anticausatives are formed in different modules of the grammar and offer a uniform analysis for both constructions. The paper is organized as follows. Section 2 investigates the distribution of *by*- and *from*-phrases across English, Albanian, Latin and MG and its significance for theories of passives and anticausatives. Based on a discussion of less well-known data, section 3 provides evidence for two primitives, namely *act* and *cause*, which I contend, underlie the passive/anticausative distinction. In section 4, I put forward a novel account for the distribution of purpose clauses and agent-oriented adverbs in passives.

## 2 *By*- vs. *from*-phrases and the significance of the comparison

### 2.1 English

While anticausatives in English do not sanction *by*-phrases, as Piñón (2001) notes, they can combine with *from*-phrases identifying the (external) cause of an event. This is shown in (6a) vs. (6b).

- (6) a. \*The window cracked by the pressure.  
 b. The window cracked from the pressure.

However, though *from*-phrases identifying causes are generally fine with anticausatives, they are bad when the cause is not an event, as shown in (7).<sup>2</sup>

- (7) \*The window cracked from John / the book.

The contrast between (6b) and (7) is also replicated with non-alternating unaccusatives, as in (8a) vs. (8b), though there also are unaccusatives that do not combine with a *from*-phrase introducing a cause, as in (8c).

<sup>2</sup> It follows then that animate cause(r)s are exempted from anticausatives.

- (8) a. Eva died from cancer.  
 b. \*Eva died from John / the book.  
 c. \*The refugees arrived from the invasion.<sup>3</sup>

Moreover, *from*-phrases are uniformly disallowed in passives, irrespectively of whether they introduce events, as in (9a), or non-eventive participants, as in (9b).

- (9) a. \*Eva was killed from cancer.  
 b. \*Eva was killed from John / the book.

To generalize over the data presented in this section, it seems that only what Levin and Rappaport Hovav (1995) refer to as external causation verbs can combine with a *from*-phrase identifying a cause.

## 2.2 Albanian (and Latin and MG)

Unlike in English, as we saw in (2), passives and anticausatives in Albanian, as in Latin and MG, can be formally indistinguishable. This is so for two reasons. First, these languages use two distinct conjugational paradigms, namely active versus non-active (Albanian and MG), or active versus passive (Latin), a distinction which often though not always corresponds to the transitive/unergative vs. unaccusative verb classes.<sup>4</sup> Second, like Latin and MG, Albanian collapses (the distribution of) *by*-phrases and *from*-phrases.<sup>5</sup> As this latter fact would lead us to expect, the sanctioning of *by*-phrases, which is taken to be one of the most salient properties of the passive in English and one that distinguishes passives from anticausatives, does not apply in Albanian (as in Latin and MG). To illustrate, the Albanian counterparts of the sentences in (6b) and (7) are given in (10a) and (10b), respectively. As expected then, the grammaticality contrast in the English examples in (6b) and (7) is not replicated in Albanian.

- (10) a. Dritarja u kris nga presioni.  
 window<sub>NOM</sub> NACT crack.AOR.3S from/by pressure  
 ‘The window cracked from the pressure.’  
 b. Dritarja u kris nga Xhoni / libri.  
 window<sub>NOM</sub> NACT crack.AOR.3S from/by John / book  
 ‘The window was cracked by John / by the book.’

<sup>3</sup> The sentence in (8c) is of course fine if the prepositional phrase is interpreted as locative.

<sup>4</sup> The correspondence of the active vs. non-active distinction to the transitive/unergative vs. unaccusative verb classes is rough by virtue of the fact that while transitives/unergatives are always active morphologically, some unaccusative verbs appear in this voice (i.e., are morphologically unmarked) too. Crucially, however, in all three languages unergatives cannot be formally non-active/passive, just as passives and (lexical) reflexives cannot be formally active. For details, see Kallulli (1999a,b) on Albanian, Gianollo (2000, 2005) on Latin, and Alexiadou and Anagnostopoulou (2004) on Greek.

<sup>5</sup> Alternatively, the Albanian, Latin, MG counterparts of *by*-phrases are ambiguous between *by*- and *from*-phrases. While in Latin and MG the same word is used both for *by* and *from* in passives and anticausatives, Albanian has two distinct prepositions, namely *nga* and *prej*, each meaning both *by*- and *from*. (Due to space considerations, in this article I only use *nga* throughout.) Both *nga* and *prej* phrases are always interchangeable, or have identical distribution (i.e., they entail each other). Consequently, *by*- and *from*-phrases are indistinguishable in Albanian.

Taken together, the arguments presented in this section, in particular the fact that the distribution of *by*- and *from*-phrases in English cannot be captured by appealing merely to the distinction between unaccusatives (whether anticausative or other) and passives, as well as the fact that there are languages that altogether collapse the distinction between *by*- and *from*-phrases, suggest that the significance granted to the fact that *by*-phrases are sanctioned with passives but not with anticausatives is simply not justified. It is clear that once we draw into the picture languages that do not make the distinction between *by*- and *from*-phrases, the ability to license a *by*-phrase irrespective of the ability to license a *from*-phrase cannot be granted such a theoretical status as it has in studies that focus on the English verbal passive. In other words, if the ability of a passive verb to combine with a *by*-phrase is taken as evidence for the existence of the external argument in passives (irrespective of whether this argument is syntactically expressed or implicit, depending on the theory), so should the ability of an anticausative verb to combine with a *from*-phrase identifying the (external) cause of the event. Under this view, anticausatives cannot be lexically reduced, contrary to Chierchia (1989, 2004), Levin and Rappaport Hovav (1995) and Reinhart (1996). I suggest then that *by*-phrases and *from*-phrases are more closely related than has been assumed in discussions on the sanctioning of *by*-phrases in passives in English.

Interestingly, as Clark and Carpenter (1989) note, children commonly use *from*-phrases instead of *by*-phrases in passives in English, too.

### 3 Two primitives and one account of the distribution of *by*- and *from*-phrases

The central claim of this paper is that the passive/anticausative distinction boils down to an event-based difference, namely the difference between an activity and a causative event, which I contend is syntactically relevant. In other words, while not attempting an exhaustive ontology of event types, I submit that *act* and *cause* are two syntactic primitives.

Let us first consider the evidence for the primitive status of *act* and *cause*.

Many languages share the construction in (11), in which a dative (or in some languages, a genitive) combines with a non-active (or reflexive) core yielding among other possible interpretations a reading that in previous work (Kallulli 2006) I have referred to as ‘unintended causation’.<sup>6</sup>

- (11) Benit            i-u            thye            një vazo.        (Albanian)  
       Ben<sub>DAT</sub>        him<sub>CL-NACT</sub> break.AOR.3S a vase  
       ‘Ben unintentionally broke a vase.’

On the other hand, many languages also share the construction in (12), where a dative combines with a non-active (or reflexive) core yielding among other interpretations what in previous work I have referred to as an involuntary state reading, rendered for lack of a better alternative through ‘feel like’ in the English translation.<sup>7</sup>

<sup>6</sup> The other possible readings are a possessor reading (‘A vase of Ben’s broke’), and an affected (in the sense: benefactive/malefactive) reading (‘A vase broke on Ben’). I have shown in Kallulli (2006) that the unintended causation reading is not due to pragmatic factors but is really part of the semantics of the verb (root), that is, the sentences in (11) are not vague but truly ambiguous. Therefore I will not dwell on this issue here specifically, though one argument for this view is presented further down in this section.

<sup>7</sup> Indeed the construction has sometimes been referred to as the ‘*feel-like* construction’ (Dimitrova-Vulchanova 1999, Marušič and Žaucer 2004, to appear). Marušič and Žaucer (2004, to appear) also provide an extensive survey of previous analyses of this construction across several languages.

- (12) Benit i-u hëngër një mollë. (Albanian)  
 Ben<sub>DAT</sub> him<sub>CL</sub>-NACT ate.AOR.3S an apple  
 ‘Ben felt like eating an apple.’

Formally, the sentences in (11) and (12) are identical. Yet, their interpretations vary greatly. Moreover, while the unintended causation reading is missing in (12), both the involuntary state reading and the unintended causation reading may obtain with one and the same verb, as illustrated through the Albanian examples in (13).

- (13) a. Benit i-u thye një vazò.  
 Ben<sub>DAT</sub> him<sub>CL</sub>-NACT break.AOR.3S a vase  
 (i) ‘Ben unintentionally broke a vase’  
 (ii) \*‘Ben felt like breaking a vase’
- b. Benit i thy-hej një vazò.  
 Ben<sub>DAT</sub> him<sub>CL</sub> break-NACT.P.IMP.3S a vase  
 (i) ‘Ben felt like breaking a vase’  
 (ii) \*‘Ben unintentionally broke a vase’

Formally, the Albanian sentences in (13a) and (13b) constitute a minimal pair; they differ only with respect to their grammatical aspect. As is obvious from the glosses of these sentences, Albanian has two forms for the past tense, which differ in their aspectual value: Aorist, which is aspectually perfective, and Imperfective.<sup>8</sup> Only the perfective sentence in (13a) but not the imperfective in (13b) can get an unintended causation reading. On the other hand, with imperfective aspect only the involuntary state reading but not the unintended causation reading obtains. That is, the semantic complementarity in (13a) vs. (13b) is effected solely by the choice of the aspectual morpheme. Note, however, that the verb in (13a) and (13b) is what Levin and Rappaport Hovav (1995) refer to as an external causation verb.

Consider now the Albanian examples in (14).

- (14) a. Benit i-u hëngër një mollë.  
 Ben<sub>DAT</sub> him<sub>CL</sub>-NACT ate.AOR.3S an apple  
 (i) ‘Ben felt like eating an apple’  
 (ii) \*‘Ben unintentionally ate an apple’

<sup>8</sup> In Albanian the non-active paradigm is built by employing three different linguistic means with a well-defined distribution. The definition of the distribution of non-active realization (adapted from Trommer 2005) is as in (i):

- (i) **If** the clause contains perfective:  
 express Non-active by choice of the auxiliary  
**Else: If** the clause contains Tense (Present or Imperfect) but not Admirative:  
 express Non-active by an inflectional affix  
**Else:** express Non-active by a reflexive clitic

- b. Benit i ha-hej një mollë.  
 Ben<sub>DAT</sub> him<sub>CL</sub> eat-NACT.P.IMP.3S an apple  
 (i) ‘Ben felt like eating an apple’  
 (ii)\*‘Ben unintentionally ate an apple’

Formally, (14a) and (14b) differ from each other in exactly the same way that (13a) and (13b) differ, that is, with respect to their grammatical aspect only: (14a), which is a repetition of (12), is aspectually perfective, whereas (14b), is aspectually imperfective. However, in spite of this difference, only the involuntary state reading but not the unintended causation reading obtains. That is, the semantic complementarity observed in (13a) vs. (13b) does not replicate in the examples in (14), despite the fact that morphologically (14a) is identical to (13a) and (14b) is identical to (13b). The question then arises as to why the semantic complementarity in (13a) vs. (13b) does not replicate in (14a) vs. (14b). The only possible explanation must be that non-active morphology interacts differently with different (feature) primitives. That is, the (lexical, and consequently, syntactic) feature composition make-up of *eat* must be different from that of *break*. In fact, one such difference is already argued for in Levin and Rappaport Hovav (1995), who distinguish between internal and external causation as a syntactically relevant meaning component. According to Levin and Rappaport Hovav (1995), *break* but not *eat* is an external causation verb. Capitalizing on this difference, I will assume that *break*-type verbs (or their roots) differ from *eat*-type verbs (or their roots) in that the former project a *cause* feature, whereas the latter an *act* feature in the syntax. In other words, the features [+cause] and [+act] represent two syntactic primitives that reflect an ontological event-type difference.<sup>9</sup> Note, however, that though I assumed that the features [+cause] and [+act] in *v* have the status of syntactic primitives, in principle, one could be derived from the other through morphological operations that take place before the projection of these features in the syntax. That is, under some version of the lexicalist hypothesis, one of these features could be the outcome of lexical (de)composition. A case in point here is that though the verb *break* is a cause verb and will *ceteris paribus* therefore project a [+cause] feature in *v*, due to a procedure such as event composition (Pustejovsky 1991) in the lexicon (i.e., prior to syntactic structure building), it could project a [+act] feature in the syntax instead. Specifically, if imperfective morphology is an event functor that invariably shifts the event type of a lexical item into an activity as I have argued in Kallulli (2006), then we could explain how *break* projects a [+act] and not [+cause] feature in syntax. So the idea is that re-iteration of a causative event (e.g. *breaking* events) will yield an (e.g. *breaking*) activity.<sup>10</sup> This point is crucial for the derivation of the involuntary state reading of (13b), which I will however not dwell into here. (The interested reader is referred to Kallulli (2006), where I have detailed the derivation of dyadic unaccusative constructions such as those in (13) and (14).)

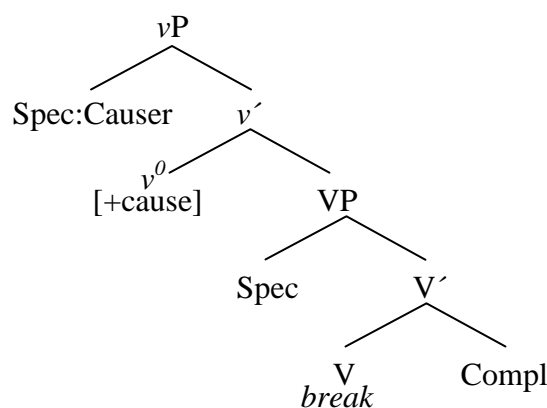
Adopting the basic structure in Chomsky’s (1995) shell theory, where the “internal” arguments of a verb occupy the positions of specifier and complement of V, with the external argument occupying Spec of *v*P, the difference between a causative predicate and an activity predicate can be depicted structurally as in (15) vs. (16). That is, unless event composition has applied previous to syntactic composition, *break*-type verbs project a [+cause] feature in *v*, as in (15), whereas *eat*-type verbs project a [+act] feature in *v*, as in (16). In other words, I contend that *v* contains at least one (lexical-semantic) feature encoding the ontological event type of the verb, and further, that it is precisely the need of this feature to be saturated, or

<sup>9</sup> See also Wunderlich (1997:56) and Doron (2003).

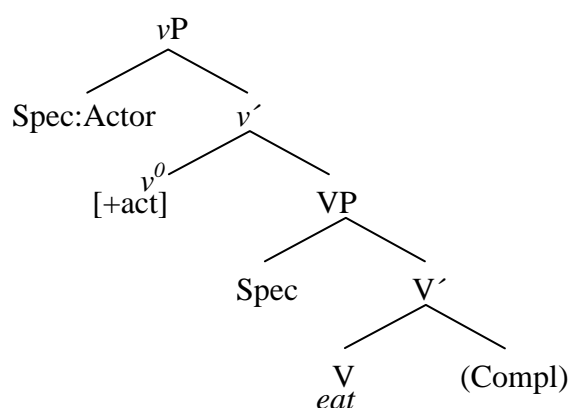
<sup>10</sup> Interestingly, Davis (1997) and Demirdache (2005) argue that in St’át’imcets all activity predicates are morphologically derived from causative predicates.

checked off, that makes Spec of  $vP$  an argumental position. Therefore, (non-oblique) argument realization proceeds because of the need to check off lexical-semantic features in a predicate structure (here:  $v$  and/or other heads involved in predication). Consequently, when  $v$  contains a [+cause] feature, the argument in Spec of  $vP$  will be interpreted as Cause(r), whereas when  $v$  contains a [+act] feature in  $v$ , the argument in Spec of  $vP$  will be interpreted as an Actor.

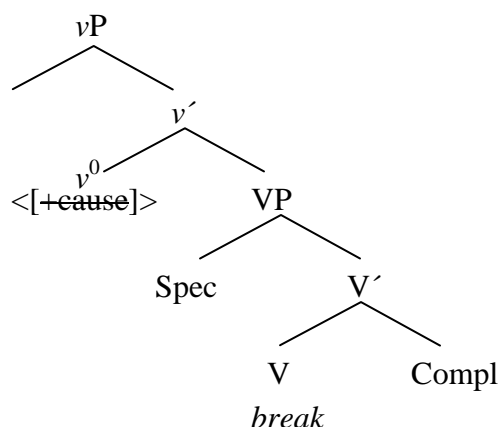
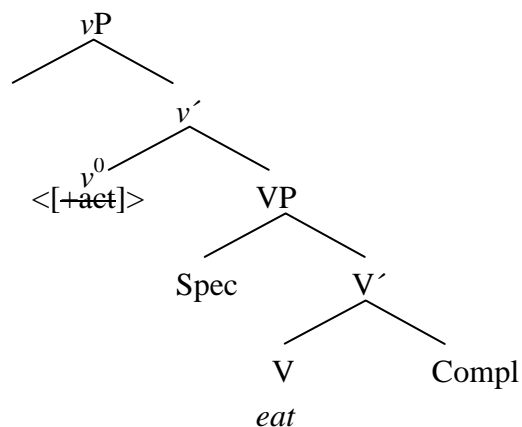
(15) The basic structure of a causative verb



(16) The basic structure of an activity verb



Abstracting away from further details, in Kallulli (2006), I define non-active (and/or reflexive) morphology as an operation that suppresses a feature in the syntactic structure of a predicate. Building on this proposal, I claim that while the passive is derived from an activity predicate through suppression by special (e.g., non-active or reflexive) morphology of a [+act] feature in  $v$ , the anticausative is derived from a causative predicate through suppression of a [+cause] feature in  $v$ . If non-active morphology suppresses the feature in  $v$  that encodes the ontological event type of the verb, as I claim, when operating on the structures in (15) and (16), it will suppress the [+cause] or the [+act] feature, respectively. If, as I suggest, (non-oblique) arguments are realized in the specifier positions of verbal projections whose heads have at least one (lexical-semantic) feature that encodes the ontological event type of the verb, it follows that no arguments can be realized in Spec of  $vP$  once the feature [+cause] or [+act] in it is stricken out by non-active morphology. That is, the resulting structures will be strictly monadic (that is, containing only one internal argument), as in (17).

(17) a. *Deriving the anticausative*b. *Deriving the passive*

However, in spite of the effect of non-active morphology, namely the suppression of the feature  $[+cause]$  or  $[+act]$  in  $v$  and the consequence that Spec of  $vP$  is in this way rendered inert, both the cause in anticausatives and the actor in passives can be realized obliquely, namely in a *from*-phrase and a *by*-phrase, respectively.

Assuming that accusative case is assigned in  $v$  (that is, that accusative case is checked in Spec of  $vP$  only) and, that the complementarity of theta-checking (here: theta-feature-checking) and case-checking is a general property of the theory (Bennis 2004), then Burzio's Generalization follows trivially: the internal argument will need to have its case features checked by a higher head, namely T, which assigns nominative.

The question however arises why languages vary with respect to whether they obfuscate the distinction between oblique actors and oblique causes, as is the case in Albanian, Latin, MG, English child language (Clark and Carpenter 1989) and Old English, or articulate this difference, as is the case in adult present-day English. One obvious difference between Albanian, Latin, MG on the one hand and adult present-day English on the other is precisely the fact that in English anticausatives and passives are always morphologically distinct, whereas, as already pointed out, in Albanian, Latin and MG passives and anticausatives are often identical morphologically. That is, there might exist some implicational relation between verbal morphology and the ability to distinguish between *by*- and *from*-phrases (i.e., oblique actors and oblique causes). Specifically, the generalization seems to be that languages that collapse the morphological distinction between passives and anticausatives also fail to differentiate between *by*- and *from*-phrases.

Consider now how the claim that the distinction passive vs. anticausative boils down to an event-based difference can accommodate the fact that *break*-type (i.e., causative) verbs can passivize, as in (18).

(18) The window was broken by Pat.

Emonds (2000) suggests that due to the fact that English lacks a verbally finite synthetic passive, both verbal and adjectival passives are in a sense "more adjectival" than in languages like Albanian, Latin and MG, which have a (partially) verbal finite synthetic passive. Indeed anticausatives are more eventive than passives in English, a point that cannot be made for Albanian, which as discussed above collapses the morphological distinction between passives and anticausatives. The idea then is that the passive in English in a sentence like (18) implies that the breaking event was more sustained, or involved an activity on Pat's part, as compared to the breaking event in an anticausative, which happens spontaneously, or all-at-once. That is, the English passive, whether or not due to its special (adjectival) morphology, induces an implicature of activity, or open-endedness, even for external causation verbs, which is obvious when comparing it to an anticausative like the one in (19).



(19) The window broke.

Note that the feature [+act] entails an actor, that is, animacy. The question then arises how to account for sentences such as (20) where a natural force, namely the earthquake combines with the preposition *by*.

(20) The window was broken by the earthquake.

I suggest that these forces are conceptualized as animate, as opposed to inanimate forces that can cause breakage such as a construction fault, which is indeed ungrammatical in a *by*-phrase. Interestingly, judgments on a sentence like (21) with a cause like pressure rising in a *by*-phrase seem to vary.

(21) (?)The window was broken by the pressure rising.

My interpretation of this fact is that a cause like the one in (21) could be seen as a very slow but nevertheless animate force, or else as a more stationary force. In the former case it would be acceptable in a *by*-phrase; in the latter it would not.

Turning to the distinction between passives/anticausatives on the one hand and middles on the other, I believe this is due to the presence of a dispositional aspectual operator in the latter. That is, the middle construction is derived when the verb in the structures in (17) is under the scope of a dispositional operator (Lekakou 2005), such as the imperfective.

#### 4 The distribution of purpose clauses and agent-oriented adverbs revisited

Let us now turn to the facts illustrated in (4) and (5), repeated again here for ease of reference, namely that passives but not anticausatives can combine with purpose clauses and agent-oriented adverbs.

(4) a. The boat was sunk to collect the insurance. (Roeper 1987:268, (3b))

b. \*The boat sank to collect the insurance. (Roeper 1987:268, (3a))

(5) a. The ship was sunk deliberately.

b. \*The ship sank deliberately.

Virtually all existing work on this distinction takes these facts to indicate: (i) the presence of an argument in the passive, which depending on the theory, is either syntactically expressed (Baker, Johnson and Roberts 1989, Emonds 2000) or implicit (Roeper 1987, Grimshaw 1990); and (ii) the lack of such an argument in unaccusatives (Levin and Rappaport Hovav 1995 and references therein).

However, all that purpose clauses and so-called agent-oriented adverbs do is identify an intention-bearing (i.e., animate) event participant as the source or initiation of the event named by the verb. Passives, but not anticausatives, control into purpose clauses and combine with agent-oriented adverbs because purpose clauses and agent-oriented adverbs simply make reference to participants capable of intentionality (i.e., actors). And as was stated earlier, unlike [+cause], the feature [+act] implies an actor, that is, a participant capable of wilful agency. However, this does not entail that the animate participant in passives is a non-oblique argument. One obvious alternative is that the animate participant here is not introduced by a non-oblique argument, but by a *by*-phrase, and this may in turn be either overt or implicit. If, as established in section 3.1, animate causers are disallowed with from-phrases in English and, anticausatives only license from-phrases but not *by*-phrases, then the inability of anticausatives to combine with purpose clauses and agent oriented adverbs follows straightforwardly without further stipulations. Further evidence for the view that it is the animate participant in an overt or implicit *by*-phrase that controls into the purpose clause involves the fact that whenever a purpose clause is licit, a *by*-phrase can be inserted overtly.

Note in this context that agent-oriented adverbs are not incompatible with unaccusative syntax. The Italian examples in (22) show that the unaccusative verbs *cadere* ‘fall’ and *rotolare* ‘roll’ continue to exhibit the characteristic *essere* ‘be’ (vs. *avere* ‘have’) selection, even in the presence of an adverb like “on purpose”.

- (22) a. Gianni é caduto / \*ha caduto apposta. (Folli and Harley 2004: 47)  
 John is fallen / has fallen on purpose.
- b. Gianni é rotolato / \*ha rotolato giu apposta.  
 John is rolled / has rolled down on purpose.

The example in (23) shows that the same fact holds in German, as witnessed by the fact that the auxiliary *sein* ‘be’ and not *haben* ‘have’ is selected.

- (23) Peter ist / \*hat absichtlich eingeschlafen.  
 Peter is / has deliberately fallen asleep  
 ‘Peter fell asleep on purpose’

To account for the facts in (22) and (23), I suggest that the so-called agent-oriented adverbs here do not necessarily tell anything about whether the event participants that they modify really act agentively (i.e., intentionally). These adverbs are rather interpreted at the pragmatic interface, that is, they merely provide information on the beliefs of the utterer of the sentences in which they occur.

## 5 Conclusion

In this article I have discussed a variety of – to my knowledge – new empirical arguments, which show that the picture depicted for the passive in English is quite idiosyncratic, and that the properties that have attained the status of identificational criteria of the passive are simply not revealing or even maintainable when looking at other languages. In particular, unlike generally assumed, neither *by*-phrases nor purpose clauses or agent-oriented adverbs witness the presence of a non-oblique argument (either implicit or syntactically encoded, depending on the theory). In contrast, the analysis that I have laid out here derives the properties of the passive and anticausative both in Albanian and English uniformly. The main conclusion here is that universally anticausatives and passives differ only with respect to the ontological event type feature in *v* which can be affected by morphological operations in the syntax. The distinction between *by*- and *from*-phrases in English is a simple reflection of this feature: a *by*-phrase introduces an oblique actor upon suppression of the *act* feature in *v*, whereas a *from*-phrase introduces an oblique causer upon suppression of the *cause* feature in *v*. I have shown that the English verbal passive can be made more compatible with its Albanian (or Latin and MG) cousin by relegating the differences to simple combinatorial properties of verbs and prepositional types and their interactions with other event functors, which are in turn encoded differently morphologically across these languages.

## References

- Alexiadou, A., Anagnostopoulou, E. and Everaert, M.: 2004, *The Unaccusativity Puzzle*. Oxford: Oxford University Press.
- Alexiadou, A. and Anagnostopoulou, E.: 2004, Voice morphology in the causative-inchoative alternation: evidence for a non-unified structural analysis of unaccusatives, in A. Alexiadou et al. (eds.), 114-136.

- Baker, M., Johnson, K., and Roberts, I.: 1989, Passive arguments raised. *Linguistic Inquiry* 20: 219-252.
- Bennis, H.: 2004, Unergative adjectives and psych verbs, in A. Alexiadou et al. (eds) 84-113.
- Chierchia, G.: 1989. A semantics for unaccusatives and its syntactic consequences. Ms., Cornell University, Ithaca, N.Y.
- Chierchia, G.: 2004, A semantics for unaccusatives and its syntactic consequences, in A. Alexiadou, E. Anagnostopoulou and M. Everaert (eds.) *The Unaccusativity Puzzle* 22-59. Oxford: Oxford University Press.
- Chomsky, N.: 1995, *The Minimalist Program*. Cambridge, MA: MIT Press.
- Clark, E.V. and Carpenter, K.L.: 1989, On children's uses of *from*, *by*, and *with* in oblique noun phrases. *Journal of Child Language* 16, 349-364.
- Davis, H.: 1997, Deep unaccusativity and zero syntax in St'at'imcets, in A. Mendikoetxea and M. Uribe-Extebarria (eds.) *Theoretical Issues on the Morphology Syntax Interface: Supplements of the International Journal of Basque Linguistics and Philology (ASJU)* Vol XXVIII. Donostia, Spain.
- Demirdache, H.: 2005, What do pieces of words "name"? Talk given at the workshop The Role of Morphology in Argument Expression and Interpretation, Vienna, 11-12 June.
- Dimitrova-Vulchanova, M.: 1999, *Semantics, Diathesis and Aspect*. München/Newcastle: Lincom Europa.
- Doron, E.: 2003, Agency and voice: the semantics of the semitic templates. *Natural Language Semantics* 11, 1: 1-67.
- Emonds, J.: 2000, *Lexicon and Grammar: The English Syntacticon*. Berlin: Mouton de Gruyter.
- Folli, R. and Harley, H.: 2004, Waltzing Matilda around and around: On the licensing of directed-motion resultatives. Manuscript, University of Cambridge and University of Arizona.
- Gianollo, C.: 2005, Middle voice in Latin and the phenomenon of split intransitivity, in G. Calboli et al. (eds.) *Proceedings of the XII Colloquium on Latin Linguistics* 97-109. Roma: Herder.
- Gianollo, C. 2000. *Il medio in latino e il fenomeno dell'intransitività scissa*. Master Thesis. University of Pisa.
- Grimshaw, J.: 1990, *Argument Structure*. Cambridge, MA: MIT Press.
- Kallulli, D.: 2006, Unaccusatives with dative causers and experiencers: a unified account, in D. Hole, A. Meinunger and W. Abraham (eds.) *Datives and Other Cases: Between argument structure and event structure* 271-301. Amsterdam: John Benjamins
- Lekakou, M.: 2005, In the Middle, Somewhat Elevated: *The semantics of middles and its crosslinguistic realization*. Doctoral dissertation. University College London.

- Levin, B. and Rappaport Hovav, M.: 1995, *Unaccusativity*. Cambridge, MA: MIT Press.
- Marantz, A.: 1984, *On the Nature of Grammatical Relations*. Cambridge, MA: MIT Press.
- Marušič, F. and Žaucer, R.: 2004, A reanalysis of the FEEL-LIKE dative-reflexive construction in Slovenian, in O. Arnaudova, W. Browne, M.-L. Rivero, and D. Stojanović (eds.) *Formal Approaches to Slavic Linguistics* 12. The Ottawa Meeting 2003, 293-311. Ann Arbor: Michigan Slavic Publications.
- Marušič, F. and Žaucer, R.: To appear, On the Intensional FEEL-LIKE Construction in Slovenian: A Case of a Phonologically Null Verb. *Natural Language and Linguistic Theory*.
- Piñón, C.: 2001, A finer look at the causative-inchoative alternation. *SALT Proceedings*.
- Pustejovsky, J.: 1991, The syntax of event structure. *Cognition* 41: 47-81.
- Reinhart, T.: 1996, Syntactic effects of lexical operations: Reflexives and unaccusatives. *OTS Working Papers in Linguistics*.
- Roeper, T.: 1987, Implicit arguments and the head-complement relation. *Linguistic Inquiry* 18:267-310.
- Trommer, J.: 2005, Closest c-command in Albanian Non-active Constructions. Presentation at the workshop The Role of Morphology in Argument Expression and Interpretation. University of Vienna, 11-12 June.
- Wunderlich, D.: 1997, Cause and the Structure of Verbs. *Linguistic Inquiry* 28, 1: 27-68.

# A UNIFIED SEMANTIC ANALYSIS OF FLOATED AND BINOMINAL *EACH*

Mana Kobuchi-Philip  
UiL-OTS, Utrecht University

mana.kobuchi@let.uu.nl

## Abstract

This paper discusses a semantic analysis of three syntactic types of English *each*, namely, floated *each*, binominal *each*, and prenominal *each*. It is argued that floated *each* consists of two parts, a quantifier and an inaudible element which functions as its restrictor, which together form a tripartite quantificational structure when they compose with the predicate. Binominal *each* and an associated NP such as *two topics* (which is generally called the ‘distributive share’) are syntactically analyzed as forming a subject-predicate relation within a DP in which the NP undergoes so-called ‘predicate inversion’. Semantically, binominal *each* is analyzed as having the same semantic value as floated *each*, while prenominal *each* is shown to have a different logical type from floated and binominal *each*. As can be seen from analogous constructions in some Romance languages, it does not lexically contain its restrictor.

## 1 Three types of *each*

English *each* can occur in several distinct syntactic contexts, three of which are exemplified in (1):<sup>1</sup>

- (1) a. Prenominal *each*  
[*Each* student] picked two topics.  
b. Floated *each*  
The students have [*each* picked two topics].  
c. Binominal *each*  
The students picked [two topics *each*].

*Each* exemplified in (1a) occurs in a prenominal position and forms a syntactic constituent with the following NP, whose head noun must be singular. *Each* exemplified in (1b) occurs in a preverbal position on the surface. This is a so-called floated quantifier (FQ), like floated *all* and floated *both*. In the syntax literature (e.g. Sportiche 1988), an FQ construction such as (1b) has generally been taken to be related to the prenominal quantifier construction in (1a) via a transformation. Under such a hypothesis, the FQ is underlyingly a determiner, only it is dislocated in the surface form.<sup>2</sup> On the other hand, in the semantics literature FQs have generally been analyzed as adverbial elements (e.g. Link 1983, Dowty and Brodie 1984, Roberts 1986, Junker 1990). *Each* exemplified in (1c) always occurs right-adjacent to an NP, which almost always contains a numeral. This *each* is generally referred to as binominal *each* (sometimes also as shifted *each*) (e.g. Safir and Stowell 1987, Choe 1987, Moltmann 1991, Zimmermann 2002a,b). In the syntax literature it has been shown that binominal *each* forms a syntactic constituent with the NP left adjacent to it.

---

<sup>1</sup> In this paper we do not discuss other types of *each* such as that in reciprocal *each other*.

<sup>2</sup> Under Sportiche’s (1988) stranding account, the quantifier and its associating NP are generated as a DP in the VP-internal subject position (Spec VP), and in an FQ sentence the quantifier remains in this position when the NP moves to spec IP position so that EPP feature may be checked.



In (3a), the FNQ *san-nin* ‘three persons’ is construed with the subject ‘witness’, but it is coordinated with the adverb *tashikani* ‘certainly’. We might literally translate (3a) as “Witnesses three and certainly witnessed the accident.” To capture its meaning with a grammatical English sentence, however, we must say something like “three witnesses certainly witnessed the accident.” In (3b), the FNQ *san-bai* ‘three bowls’ is construed with the direct object ‘soup noodles’ and this FNQ is coordinated with an adverb *kireini* ‘completely’. Again, literally, this sentence means “Mary ate up soup noodles three and completely.” In sum, the fact that an FNQ can be coordinated with an adverb strongly suggests that the FNQ is itself an adverb.

Next, observe that the classifier in the Japanese FNQ is semantically significant in that it functions as the restrictor for the preceding numeral. Consider (4):

- (4) a. *gakusei-ga, go-nin kita.* → 5: the number of persons  
 student-NOM 5-CL came  
 ‘Five **individual** students came.’
- b. *gakusei-ga, go-kumi kita.* → 5: the number of groups  
 student-NOM 5-CL came  
 ‘Five **groups** of students came.’

The sentences in (4a) and (4b) form a minimal pair in which the only difference is the classifier. In (4a), the classifier is *nin*, a unit for counting people, and the sentence means that five individual students came. In contrast, in (4b), the classifier is *kumi*, a unit for counting groups, and the sentence means that five groups of students came. The NQ *go-nin* refers to five persons, and the NQ *go-kumi* refers to five groups. This shows that what the numeral counts is precisely what the classifier refers to. Our claim, then, is that the classifier actually denotes a set of objects, just like an ordinary noun, and functions as the restrictor for the numeral.

Next, we will show that the nuclear scope for the numeral in Japanese FNQ quantification is the predicate denotation. Consider the sentence in (5a):

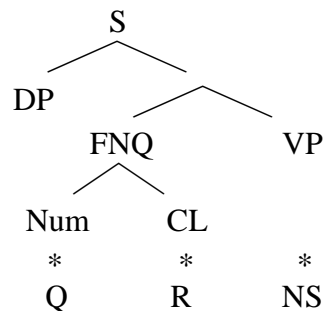
- (5) a. [narande hashitteita **suu-dai-no** torakku]<sub>DP-ga</sub>  
 in a row running several-CL-*NO* truck-NOM  
 (prenominal NQ)  
 [**san-dai** gaadoreeru-ni butsukatta]<sub>VP.</sub> (Inoue, 1978)  
 3-CL guardrail-to hit  
 (FNQ)  
 ‘Three of the several trucks that were driving in tandem hit the guardrail.’
- b. Conservativity test  
 Three *dai*-objects (i.e. machines) are *dai*-objects that hit the guardrail.

(5a) is an example of a special construction in which a prenominal NQ and an FNQ appear in the same clause.<sup>3</sup> The classifier in both NQs is *dai* which is a unit for counting machines. *San-dai* ‘three dai’, refers to three machines. Now, consider what the numeral 3 of the FNQ is counting. This sentence can be translated into English as “three of the several trucks that were driving in tandem hit the guardrail.” Thus, ‘three’ counts the number of machines that hit the

<sup>3</sup> Note that the co-occurrence of a prenominal NQ and an FNQ in a single clause cannot be accounted for under the stranding account of the FQ, since under this account the quantifier appears either in the stranded position or the prenominal position (in case it moves along with the associating NP), but never both at the same time.

guardrail. That is, ‘three’ is the number of things that have the properties of being a machine and being a guardrail hitter. The classifier denotation and the predicate denotation intersect with each other, and the numeral of the FNQ indicates the number of elements in this intersection. Thus, the predicate denotation is the nuclear scope for FNQ quantification. This analysis is supported by the conservativity test in (5b). Note that the subject, ‘several trucks that were driving in tandem’, is not part of the meaning of ‘three’ at all. FNQ quantification has nothing to do with the material outside the verbal domain. To summarize, the Japanese FNQ is an adverb, and the three components of FNQ quantification are as shown in (6):

(6) Quantificational Analysis (Q=Quantifier, R=Restrictor, NS=Nuclear Scope)



The numeral, the classifier, and the predicate, function as the quantifier, the restrictor and the nuclear scope, respectively. Note that under this analysis the quantificational structure is directly mapped from the surface syntactic structure, strictly adhering to the principle of compositionality.

One point that calls for some elaboration is the observation that the classifier must denote a set of atoms. In other words, it must be a singular term. That the denotation of the restrictor is a set of atoms is a basic logical requirement for counting or enumeration in general (e.g. Kratzer 1989, Chierchia 1998, Landman 2000). Consider the verification of an English sentence such as (7a) with respect to a context containing boys *a*, *b*, *c* and *d*.<sup>4</sup> Under the traditional analysis of numeral quantification, for (7a) to be true there must be (at least) three elements in the set of boys which are also elements in the set of individuals who jumped. Now, assuming that the denotation of *boys* is as shown in (7b), which includes atoms and sums, consider two hypothetical verifications of (7a), namely (7c) or (7d):

- (7) a. *Three boys jumped.*  
 b.  $[[\text{boys}]] = \{a+b+c+d, a+b+c, a+b+d, a+c+d, b+c+d, a+b, a+c, a+d, b+c, b+d, c+d, a, b, c, d\}$   
 c.  $[[\text{boys}]] \cap [[\text{jumped}]] = \{a+b+c+d, c+d, d\}$   
 d.  $[[\text{boys}]] \cap [[\text{jumped}]] = \{c+d, c, d\}$

In both (7c) and (7d), there are three elements, thus numeral quantification yields truth. However, if we count the number of boys in these three elements, we find that in (7c) there actually are four of them, and in (7d) there are only two, rather than three. The discrepancy between the number of elements and the number of individuals are summarized in (8):

- (8) 7c → number of quantified elements = 3 (namely  $a+b+c+d$ ,  $c+d$  and  $d$ )  
 number of boys = 4 (namely  $a$ ,  $b$ ,  $c$  and  $d$ )

<sup>4</sup> Here we use a plus sign to represent the sum symbol. This corresponds to the plus sign within a circle in Link (1983), and the square union sign in Landman (2000).



7d	→	number of quantified elements	=	3	(namely c+d, c and d)
		number of boys	=	2	(namely c and d)

The problem is that all sentences of the form [three boys X-ed], where X is any predicate, are wrongly predicted to be true of any situation as long as the number of the elements is three, regardless of the number of boys involved. In order for the noun phrase *three boys* to have its true meaning, the numeral *three* must count only individual boys, not any collection of boys. For this to happen, we must have a model in which x-many elements entail x-many individuals in them. In short, what is required is to exclude sums from the restrictor. Let us call this the ‘atomicity condition’ (on the restrictor of the numeral quantifier). In order to satisfy the atomicity condition, we must have an analysis of numeral quantification in which the restrictor includes only atoms, i.e. a denotation such as (9):

(9) { a, b, c, d }

In conclusion, the Japanese FNQ quantification has the following semantic properties:

- (10) The semantic properties of Japanese FNQ quantification
- Japanese FNQs are adverbs of type  $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$ .
  - FNQs contain a classifier, which functions as the restrictor, and form a tripartite quantificational structure with the predicate.
  - The restrictor denotes a set of atoms.
  - FNQ quantification is computed within the verbal domain.

### 3 Floated *each*

Adopting the above account of Japanese numeral quantification, let us now consider English *each*. If we assume that the Japanese FNQ has the properties that it has because it is an ordinary sub case of FQs in general, as assumed in the literature, then we might expect the basic semantic properties of the Japanese FNQ to be found in all FQs. In other words, rather than treating the Japanese FNQ as an exception, let us consider the possibility that it is the norm. As with any norm, we expect to find marked exceptions in one language or another, but, generalizing from (10) above, we obtain the following hypotheses as to the general semantic properties of the FQ:<sup>5</sup>

- (11) The hypothetical general semantic properties of FQ quantification
- FQs are adverbs of type  $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$ .
  - FQs contain a nominal element that functions as the restrictor and forms a tripartite quantificational structure with the predicate.
  - The restrictor denotes a set of atoms.
  - FQ quantification is computed within the verbal domain.

The first claim of the hypotheses in (11a), which is taken for granted in much of the semantics literature, has abundant empirical motivation not only from Japanese but also from English and other Indo-European languages (e.g. Doetjes 1997). The second claim in (11b) calls for

<sup>5</sup> For example, in a language such as Straits Salish an adverbial quantifier occurs as a morpheme attached to a verb (Jelinek 1995). The precise quantificational mechanism of such a language must be examined and considered in comparison to other languages. Here, however, we limit the scope of our examination to English floated *each*.

some independent motivation, a matter we will address shortly. The third claim in (11c) is simply the atomicity condition discussed above. Finally, (11d) is a corollary of (11a-c).<sup>6</sup>

Let us now consider how English FQ *each* can be analyzed in accordance with (11b). Since there is no overt classifier adjacent to *each* in (12a) below, we must assume that element denoting the restrictor is phonetically null. Given this auxiliary assumption, (12a) is analyzed as (12c), on a par with the analysis of a Japanese FNQ, as schematically represented in (12b).

(12) a. The students each picked two topics.

b. Host NP [ Floated NQ Predicate ] (Japanese)

```

      /  \
     n    CL
     |    |
     Q    R
     |    |
     NS
  
```

c. The students [ each [picked two topics]].

```

      /  \
     each one
     |    |
     Q    R
     |    |
     NS
  
```

Under this analysis, *each* is taken to be semantically a combination of a quantifier and its restrictor.<sup>7</sup> The inaudible element is taken to mean something like *one*. Thus, literally, *each* literally means ‘each one’, in accordance with Vendler’s intuition. This analysis receives some indirect support from the following Romance language data:

(13) a. Les enfants ont *chacun* acheté deux bonbons. (French)  
 the children have each+one bought two candies  
 ‘The children each bought two candies.’

b. Los estudiantes escogieron *cada uno* dos temas. (Spanish)  
 the students picked each one two topics  
 ‘The students each picked two topics.’

As shown here, in these languages the lexical element corresponding to English floated *each* is associated with an overt nominal element meaning ‘one’. Assuming, then, that these two elements correspond to the first two components of quantification, it is reasonable to assume that they form a tripartite quantificational structure with the predicate, with the predicate functioning as the nuclear scope.

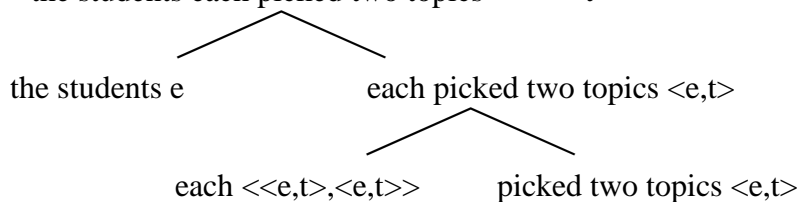
Pursuing this line of analysis, the constituent structure of an FQ sentence such as *the students each picked two topics* would form the semantic tree shown in (14a). For concreteness, we propose that the semantic value of *each* is as shown in the second line of (14b). The complete interpretation yields a distributive reading, as shown in (14c):

<sup>6</sup> We speculate that (11d) is the defining property of the FQ in general. That is, the FQ is distinct from the quantifier which composes syntactically with a nominal element (e.g. prenominal and/or determiner quantifier) in that it composes directly with the predicate.

<sup>7</sup> Note that so-called adverbs of quantification such as *always* and *sometimes* can also be taken to consist of morphological combination of a quantifier and its restrictor:

(i) all + ways	(ii) some + times
Q R	Q R

(14) a. the students each picked two topics t



- b. *picked two topics*:  $\lambda x_e [ p2t(x) ]$   
*each*:  $\lambda P_{\langle e,t \rangle} \lambda x_e \exists K [ K \subseteq (AT \cap P) \wedge +K=x ]$   
 |/  
 (AT = the set of atomic individuals)  
*each picked two topics*:  $\lambda x \exists K [ K \subseteq (AT \cap p2t) \wedge +K=x ]$   
*the students*:  $\sigma(*student)$  ( $\sigma$ ='supremum')  
 |/  
*the students each picked two topics*:  $\exists K [ K \subseteq (AT \cap p2t) \wedge +K=\sigma(*student) ]$

- c. If a, b, and c are the students in the domain of discourse,  
 then  $\sigma(*student)=a+b+c$ ,  
 thus,  $\exists K [ K \subseteq (AT \cap p2t) \wedge +K=\sigma(*student) ] = \exists K [ K \subseteq (AT \cap p2t) \wedge +K=a+b+c ]$ ,  
 i.e. a = an individual two-topic picker  
 & b = an individual two-topic picker  
 & c = an individual two-topic picker

In the proposed semantic value of *each* in (14b), P represents an  $\langle e,t \rangle$  element which denotes a set containing both atoms and sums. Here P picks up the value of the predicate *picked two topics*, i.e. the set of two-topic pickers. This could include two-topic pickers who are not students, but it also includes both the individual two-topic pickers and all their sums. AT, which represents a set of atomic individuals, intersects with this set and this intersection is the set which contains only the atomic individuals which are two-topic pickers. Thus, if a, b, and c are the students in the domain of discourse, and if the sentence is true, then these three elements are in the intersection. The formula in (14c) states that there is a set K which is a subset of the intersection. Thus, if we designate K to contain precisely a, b, and c, then the sum of the elements of this K turns out to be identical with the supremum denoted by *the students*. When the sentence is true, this is how its truth conditions are satisfied. Note here that AT is part of the lexical value of *each*, rather than being introduced by an additional operator. Under this analysis, the restrictor is part of the lexical content of the quantifier *each*. Its function is to form a singular term denotation out of a plural term denotation.

#### 4 Binominal *each*

Next, let us consider binominal *each*, an example of which is shown in (15):

(15) The students picked [ two topics each ]<sub>DP</sub>.  
 distributive key distributive share

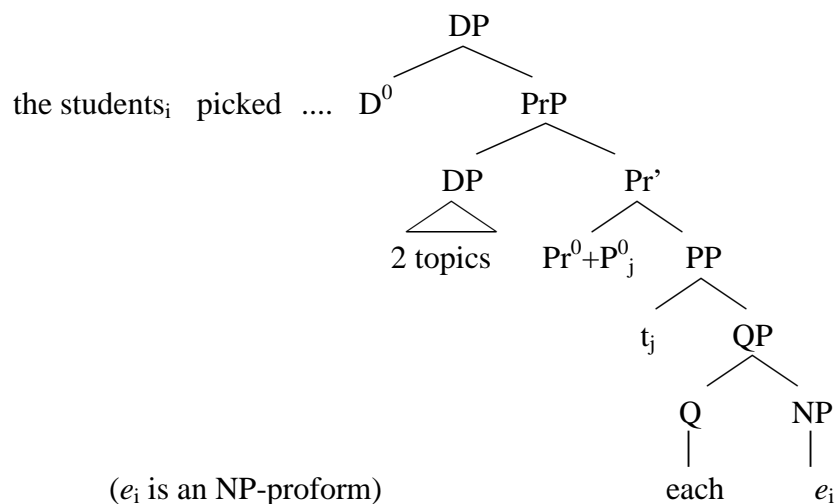
In such a sentence, the subject DP *the students* is generally called the ‘distributive key’ and the NP containing a numeral, namely *two topics*, is called the ‘distributive share’ (Choe 1987). In one of the few syntactic analyses of this construction, Safir and Stowell (1987) show that the NP containing the distributive share forms a syntactic constituent with *each*. Semanticists have handled binominal *each* in various ways (e.g. Choe 1987, Moltmann 1991, Zimmermann 2002a,b). Let us consider the most recent analysis, i.e., that of Zimmermann

(2002a,b). Here the nominal constituent containing the distributive share and *each* is analyzed as a DP as shown in (16a). The proposed syntactic analysis is as shown in (16b):

(16) Zimmermann (2002a,b)

a. The students picked [two topics each]<sub>DP</sub>.

b.



c. Each student picked two topics.

According to Zimmermann, there is a small clause inside the DP *two topics each*, represented as a Predicate Phrase, and its subject is *two topics*. The predicate, on the other hand, is taken to be *each*, which has the proform complement *e*. This proform is coindexed with the distributive key, i.e. the subject *the students*. In this way, *each* and the distributive key are semantically related. Thus, Zimmermann basically treats the binominal *each* sentence (16a) as semantically equivalent to the corresponding prenominal *each* sentence in (16c).

It seems reasonable to assume that the nominal constituent *two topics each* is a DP, given that a verb such as *picked* is a transitive verb. Furthermore, the small clause analysis is certainly plausible. In the syntax literature, there is a substantial amount of research devoted to so-called ‘predicate inversion’ within DP, which assumes the presence of a small clause within DP. This line of analysis has proved to be quite useful in accounting for data in languages such as English and Dutch (Kayne 1994, Den Dikken 1995, 1998, Bennis, et al 1998, Corver 1998, 2001). Thus, Zimmermann’s approach is attractive in principle. Nevertheless, we propose a modification.

First, consider the subject-predicate relation inside the small clause. If the subject is *two topics* and the predicate is *each*, then what would a maximally simple representation of this subject-predicate relation be? Consider (17):

(17) The underlying proposition in [two topics each] (according to Zimmermann)

Subject	two topics
Predicate	each
Proposition 1	Two topics are each.
Proposition 2	Two topics are (for) each (of the students)

Proposition 1 is incomplete. Including the proform *e* co-indexed with the distributive key, we arrive at Proposition 2. However, here we have to provide a significant meaning component,

namely ‘for’ in order to make sense of Proposition 2. What we wish to claim here is that a much more natural and empirically sound analysis would be as follows:

(18) The underlying proposition in [two topics each] (according to our analysis)

Subject	each (one)
Predicate	two topics
Proposition	Each one is (a set of) two topics.

The basic intuition in (18) is that *each* is not directly related to the distributive key *the students*. Rather, *each* is again analyzed as containing a hidden lexical component meaning *one*, so that the meaning of binominal *each* is analogous to ‘each one’. The motivation again comes from the French and Spanish data, where the binominal *each* construction overtly contains the meaning component ‘one’:

- (19) a. Les enfants ont acheté deux bonbons *chacun*. (French)  
 the children have bought two candies each+one  
 ‘The children bought two candies each.’
- b. Los estudiantes escogieron dos temas *cada uno*. (Spanish)  
 the students picked two topics each one  
 ‘The students picked two topics each.’

The idea we are pushing here is that *each* understood literally as ‘each one’ refers to the unit of the distributive share which is distributed over the distributive key. The predication relation between *each* and the NP containing a numeral, then, is a proposition about the quantity of objects in the distributive share. This is quite distinct from Zimmermann’s underlying proposition in (17). In (17), the distributive share is taken to be the subject, and the predicate is *are (for) each (of the students)*. This proposition is about the distribution itself and what the distributive share is distributed over.

Let us now consider more closely the claim that a binominal *each* sentence such as (19a) is semantically equivalent to a prenominal *each* sentence such as (19b):

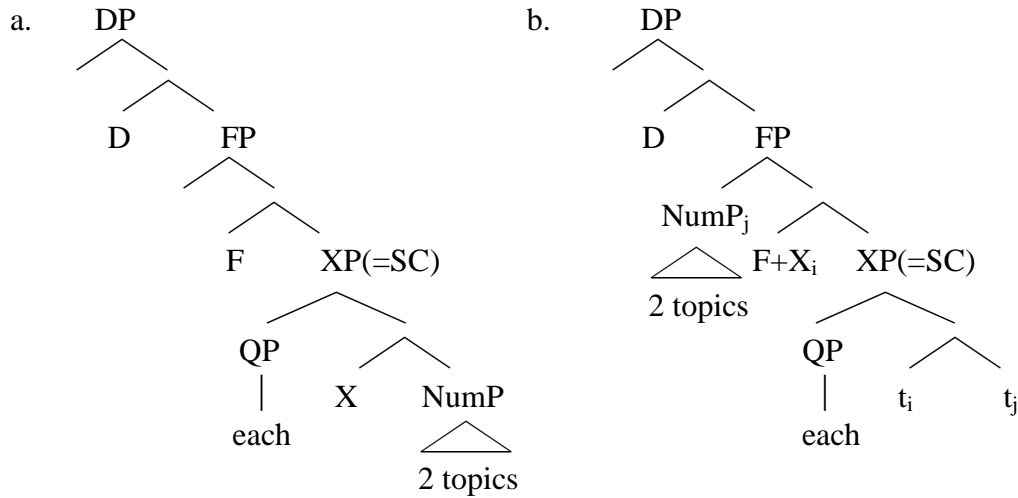
- (19) a. The boys bought three sausages each.  
 b. Each boy bought three sausages.

This equation results precisely from the syntactic analysis in which *each* is associated with the distributive key by coindexation. Putting aside the fact this coindexation seems rather ad hoc and inconsistent with a strict interpretation of the principle of compositionality, the hypothetical equivalence of (19a) and (19b) clashes with native speaker intuitions that there is some difference between these two sentences.<sup>8</sup> Our analysis captures this intuition because we argue that, just as the surface forms suggest, prenominal *each* composes first with *student* while the binominal *each* composes first with *two topics*. Pursuing this line of reasoning, we are all the more motivated to formulate distinct semantic analyses for the two syntactic constructions.

In view of these considerations, we suggest that the syntactic structure of the binominal *each* construction is as shown in (20):

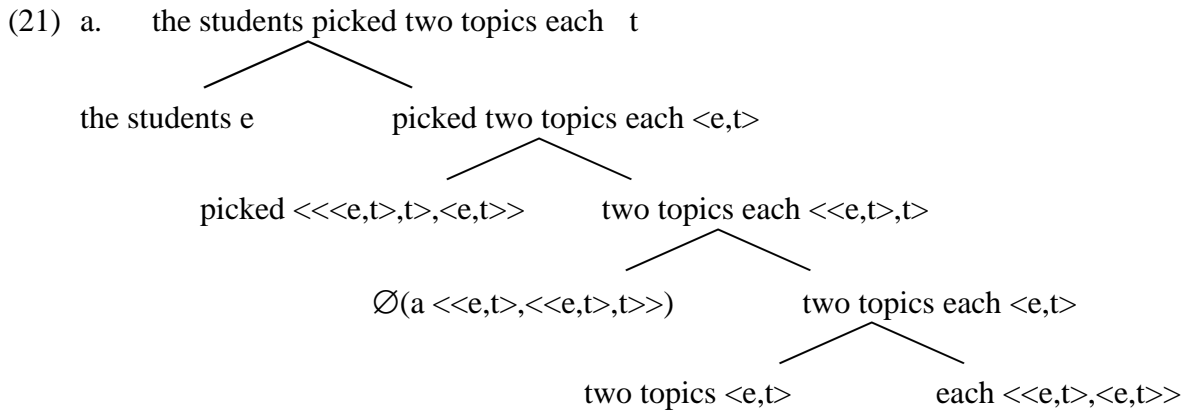
<sup>8</sup> One difference that can be identified is that the domain presupposition of *each* is already set by *the boys* in (19a) before interpreting *each*, whereas in (19b) quantification and presupposition accommodation must occur simultaneously (thanks to Bill Philip p.c. for pointing this out).

(20) Predicate inversion analysis : e.g. Kayne 1994, Den Dikken 1995, Corver 1998, Kobuchi-Philip 2004



Here, *each* is the subject and *2 topics* is the predicate in the small clause within DP, as shown in (20a). Subsequently, the predicate NumP is raised over the subject as an instance of predicate inversion, as shown in (20b).

When the syntactic structure in (20b) is semantically interpreted, the only structure visible to the interpretation mechanisms is the basic constituent structure shown in (21a). Here, we assume the presence of an inaudible determiner whose position corresponds to the head D position in (20b). Assuming the same denotation of *each* as floated *each*, we obtain the interpretation of the binominal *each* sentence as shown in (21b):



- b. *two topics*:  $\lambda x_e [ 2t(x) ]$   
 | *each*:  $\lambda P_{\langle e,t \rangle} \lambda y_e \exists K [ K \subseteq (AT \cap P) \wedge +K=y ]$   
 |/  
*two topics each*:  $\lambda y \exists K [ K \subseteq (AT \cap 2t) \wedge +K=y ]$   
 | *a*:  $\lambda P_{\langle e,t \rangle} \lambda Q_{\langle e,t \rangle} \exists x_e [ P(x) \wedge Q(x) ]$   
 |/  
 (a) *two topics each*:  $\lambda Q \exists x [ \exists K [ K \subseteq (AT \cap 2t) \wedge +K=x ] \wedge Q(x) ]$   
 | *picked*:  $\lambda T_{\langle \langle e,t \rangle, t \rangle} \lambda v_e [ T(\lambda s_e [ (picked(s))(v) ]) ]$   
 |/

$$\begin{array}{l}
 \text{picked two topics each: } \lambda v[\exists x[(AT \cap 2t) \wedge +K=x] \wedge (\text{picked}(x))(v)] \\
 \left| \begin{array}{l} \text{the students: } \sigma(*\text{student}) \\ / \end{array} \right. \\
 \text{the students picked two topics each:} \\
 \exists x[\exists K[K \subseteq (AT \cap 2t) \wedge +K=x] \wedge (\text{picked}(x))(\sigma(*\text{student}))]
 \end{array}$$

- c. If a, b, and c are the students in the domain of discourse, and  $\alpha$  is a set of two topics and  $\beta$  is another set of two topics in the set K, then  $\sigma(*\text{student})=a+b+c$ , and  $x = \alpha+\beta$ , thus,  $\exists x[\exists K[K \subseteq (AT \cap 2t) \wedge +K=\alpha+\beta] \wedge (\text{picked}(x))(\sigma(*\text{student}))]$   
 $= \exists K[K \subseteq (AT \cap 2t) \wedge +K=\alpha+\beta] \wedge (\text{picked}(\alpha+\beta))(a+b+c)$

An example verification of the logical representation in the last line of (21b) is partially shown in (21c). The last line of (21c) can be described as follows: Suppose student a picked a set of two topics  $\alpha$ , student b picked a set of two topics  $\alpha$ , and student c picked a set of two topics  $\beta$  (e.g.  $\alpha$  represents the Civil War and the slavery,  $\beta$  represents Vietnam War and the Hippie movement). Thus, K can be determined to contain  $\alpha$  and  $\beta$ . Then,  $(\text{picked}(\alpha+\beta))$  denotes a set containing every  $\alpha$ -picker and  $\beta$ -picker, and all their sums, which then include the sum  $a+b+c$ .

Note that, under this analysis, binominal *each* is of type  $\langle\langle e,t \rangle, \langle e,t \rangle\rangle$ , just like floated *each*. In both cases, the quantifier is assumed to contain a hidden lexical component which denotes a set of atoms and which functions as the restrictor. However, while floated *each* syntactically composes with a verbal predicate, binominal *each* syntactically composes with an NP. This allows a unified analysis which is more strictly compositional since semantic interpretation is closely related to the surface form. In the next section we examine prenominal *each*, which turns out to be quite distinct from the two types of *each* we have discussed so far.

### 5 Prenominal *each*

Let us now consider prenominal *each*. Since we have shown how floated and binominal *each* can be taken to have identical semantic value, we might attempt to extend the analysis to cover prenominal *each* as well. However, prenominal *each* in fact looks quite distinct from floated and binominal *each*. Again, the clue comes from the Romance languages. Consider (22):

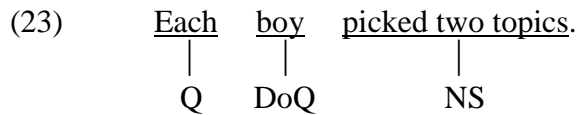
(22) Three types of *each* in French, Spanish and English

	Floated/Binominal	Prenominal
French	chacun	chaque (N)
Spanish	cada uno	cada (N)
English	each	each (N)

As we observed earlier, in French and Spanish, the lexical elements which correspond to English floated and binominal *each* are *chacun* and *cada uno*, respectively, which include the overt meaning component ‘one’. However, this component disappears in the prenominal use of the same lexical item. This suggests a sharp distinction between floated and binominal *each*, on one hand, and prenominal *each*, on the other. Specifically, it seems to be the case that prenominal *each* does not contain a hidden lexical component denoting a set of atoms that functions as the restrictor. Recall now that the original reason for positing a hidden classifier-like element for floated *each* follows from our hypothesis that FQ *each* needed this restrictor in order for the three components of FQ quantification to apply within the verbal

domain. Thus, if prenominal *each* does not contain a restrictor, an immediate question is what functions as the restrictor and the nuclear scope.

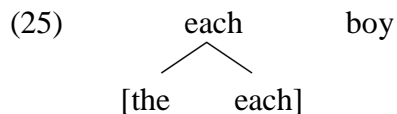
In fact, prenominal *each* must be followed by a singular noun. This is also the case in French and Spanish and a singular noun denotes a set of atoms (Link 1983, Landman 2000). This suggests that, in accordance with the traditional analysis, the singular noun adjacent to it functions as the restrictor for prenominal *each*. Assuming that prenominal *each* and the singular noun adjacent to it are a quantifier and its restrictor, the predicate must be the nuclear scope, as shown in (23):



If this is the case, prenominal *each* does indeed seem to be a determiner. This explains why prenominal *each* cannot co-occur with a determiner, as illustrated in (24a), and this constraint applies to the analog of *each* in the Romance languages as well, as illustrated in (24b,c):

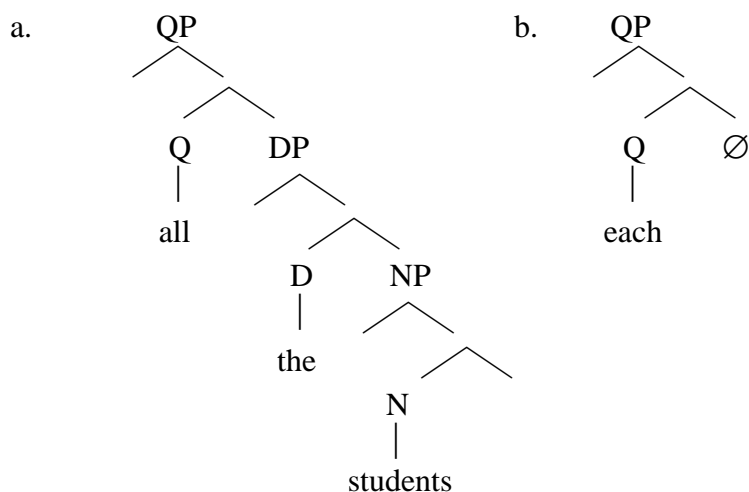
- (24) a. \*the each N  
 b. \*le chaque N  
 c. \*de cada N

To account for the determiner status of prenominal *each*, we hypothesize that here *each* the quantifier has incorporated into the definite determiner, as shown in (25):



In the syntax literature, a quantifier such as *all* has been argued to occupy the head position of QP, which is generally assumed to be generated above DP as the top-most maximal projection within the nominal domain, as shown in (26a) below. Such a structure accounts for the word order of the phrase such as *all the students*:

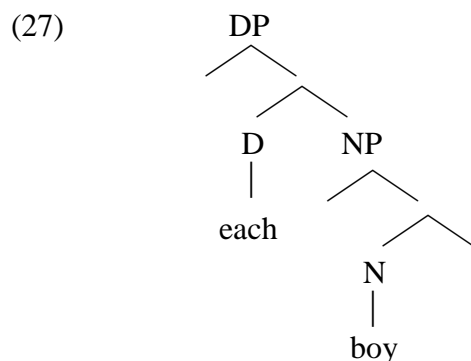
(26) The internal structure of the nominal domain (Giusti 1991, Shlonsky 1991, etc.)



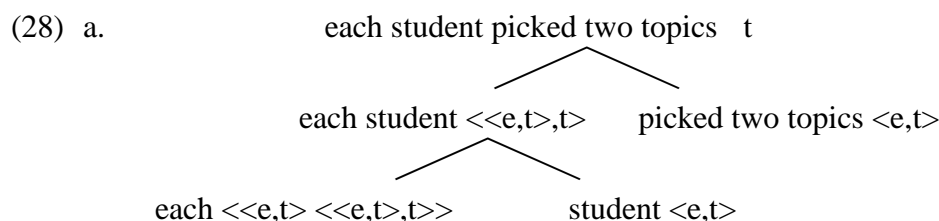
We could assume that floated and binominal *each* occupy the same Q-head position as shown in (26b) and that this QP is inserted in the appropriate positions in the sentence structure (a



VP-adjoined adverbial position for FQ *each*, and subject position within DP for binominal *each*). However, since prenominal *each* combines with a noun and has lexically merged with the definite determiner, we suggest that prenominal *each* is not a Q-element but a D-element, as shown in (27):



The semantic tree for a sentence with prenominal *each* would look like (28a) below. We suggest that the denotation of prenominal *each* is as shown in the first line of (28b). The outcome is as shown in (28c):



- b.
- $$\begin{array}{l}
 \textit{each}: \lambda P_{\langle e,t \rangle} \lambda Q_{\langle e,t \rangle} [ P \subseteq Q ] \\
 | \\
 \textit{student}: \lambda x_e [ \textit{student}(x) ] \\
 | / \\
 \textit{each student}: \lambda Q [ \textit{student}(x) \subseteq Q ] \\
 | \\
 \textit{picked two topics}: \lambda x_e [ p2t(x) ] \\
 | / \\
 \textit{each student picked two topics}: \lambda x [ \textit{student}(x) ] \subseteq \lambda x [ p2t(x) ]
 \end{array}$$

- c.
- |  |   |  |
|--|---|--|
| student  | : | { a, b, c }  |
| $\lambda x [ \textit{student}(x) ] \subseteq \lambda x [ p2t(x) ]$ | : | a = an individual two-topic picker<br>& b = an individual two-topic picker<br>& c = an individual two-topic picker |

Prenominal *each* first combines with a singular noun, in this case *student*. This denotes a set containing only atoms. If there are three students in the domain of discourse, then it denotes {a, b, c}. This singular noun functions as the restrictor and it intersects with the predicate denotation, though the intersection is itself the set denoted by the singular noun. That is, it is a subset of the predicate denotation. Thus, each member of the set denoted by the singular noun, namely a, b, and c, is an atom and has the property of having picked two topics.

## 6 Summary and further questions

In this paper, we have examined three manifestations of the English lexical element *each*, namely, floated *each*, binominal *each* and prenominal *each*. On the basis of a general mechanism of FQ quantification induced from a recent semantic analysis of Japanese floated

numeral quantifier, we have proposed that English floated *each* lexically contains an inaudible nominal element which denotes a set of atoms and which functions as the restrictor. As for binominal *each*, we modified the syntactic analysis suggested by Zimmermann (2002a,b) by means of a predicate inversion analysis. That allows for a simpler unified account of floated and binominal *each* that is more strictly compositional than previous accounts and that accords with native speaker intuitions. Prenominal *each*, however, turned out to be distinct from the other two types of *each* in the sense that, as suggested by Romance data, it does not contain the restrictor as a lexical component. Instead, prenominal *each* was analyzed as a determiner quantifier in the traditional sense except that, under our analysis it derives morphologically from FQ *each*. This derivation, which is probably historical rather than synchronic, is possible because the right-adjacent noun is singular and therefore can be a proper restrictor (satisfying atomicity condition).

The analysis given here is based on some novel assumptions. Obviously, these assumptions themselves require more thorough examination. Furthermore, under our analysis the denotations of floated and binominal *each* are very different from that of prenominal *each*. The syntax and the syntax-semantics interface issues of prenominal *each* must be investigated further. Specifically, future research questions posed by our analysis are: How can determiner *each* be analyzed as deriving from the internal components of floated *each*? What properties of UG makes this possible or obligatory? These are entirely new questions since in all prior research it was assumed, without question, that FQs derive from determiners.

## References

- Bennis, H., Corver, N., Den Dikken, M.: 1998, Predication in nominal phrases, *The Journal of Comparative Germanic Linguistics* **1**, 85-117.
- Chierchia, G.: 1998, Reference to kinds across languages, *Natural Language Semantics* **6**, 339-405.
- Choe, J.-W.: 1987, *Anti-quantifiers and a theory of distributivity*. Ph.D. Diss. University of Massachusetts, Amherst.
- Corver, N.: 1998, Predicate movement in pseudopartitive constructions, in A. Alexiadou and C. Wilder (eds), *Possessors, predicates, and movement in the determiner phrase*. Amsterdam: John Benjamins, pp. 215-257.
- Corver, N.: 2001, On predicate numerals, in T. van der Wouden and H. Broekhuis (eds), *Linguistics in the Netherlands 2001*. Amsterdam: John Benjamins, pp. 65-76.
- Den Dikken, M.: 1995, Copulas, *GLOW Newsletter* **34**, 20-21.
- Den Dikken, M.: 1998, Predicate inversion in DP, in A. Alexiadou and C. Wilder (eds), *Possessors, predicates, and movement in the determiner phrase*, Amsterdam: John Benjamins, pp. 177-214.
- Doetjes, J.: 1997, *Quantifiers and selection: on the distribution of quantifying expressions in French, Dutch and English*. Ph.D. Diss. Leiden University.
- Dowty, D. and B. Brodie: 1984, The semantics of 'floated' quantifiers in a transformationless grammar, in M. Cobler, S. Mackaye, and M. T. Westcoat (eds), *WCCFL* **3**, 75-90.
- Fukushima, K.: 1991, *Generalized floating quantifiers*. Ph.D. Diss. University of Arizona.

- Giusti, G.: 1991, The categorial status of quantified nominals, *Linguistische Berichte* **136**, 438-454.
- Inoue, K.: 1978, *Nihongo-no bunpookisoku*, Tokyo: Taishuukan.
- Jelinek, E.: 1995, Quantification in Straits Salish, in E. Bach, E. Jelinek, A. Kratzer and B. Partee (eds), *Quantification in natural languages*, Dordrecht: Kluwer, pp. 487-540.
- Junker, M-O.: 1990, Floating quantifiers and Georgian distributivity, in M. Ziolkowski, M. Noske, and K. Deaton (eds), *CLS* **26**, 211-219.
- Kayne, R.: 1994, *The antisymmetry of syntax*. Cambridge, MA: MIT Press.
- Kobuchi-Philip, M.: 2003, *Distributivity and the Japanese floating numeral quantifier*. Ph.D. Diss. CUNY Graduate Center.
- Kobuchi-Philip, M.: 2004, Syntactic and semantic licensing condition of the floating (numeral) quantifier, a talk at Linguistic Perspectives on Numerical Expressions Workshop, Utrecht.
- Kratzer, A.: 1989, An investigation of the lumps of thought, *Linguistics and Philosophy* **12**, 607-653.
- Landman, F.: 2000, *Events and plurality*, Dordrecht: Kluwer.
- Link, G.: 1983, The logical analysis of plural and mass terms: A lattice-theoretical approach, in R. Bäuerle, C. Schwarze, and A. von Stechow (eds.) *Meaning, use, and interpretation of language*, Berlin: de Gruyter, pp. 303-323.
- Link, G.: 1987, Generalized quantifiers and plurals, in P. Gärdenfors (ed.) *Generalized quantifiers. linguistic and logical approaches*. Dordrecht: Reidel, pp. 151-180.
- Moltmann, F.: 1991, On the syntax and semantics of binary distributive quantifiers, *NELS* **22**, 279-292.
- Roberts, C.: 1986, *Modal subordination, anaphora and distributivity*. Ph.D. Diss. University of Massachusetts at Amherst.
- Safir, K. and T. Stowell: 1987, Binominal *each*, *NELS* **18**, 426-450.
- Shlonsky, U.: 1991, Quantifiers as functional heads: A study of quantifier float in Hebrew, *Lingua*. **84**, 159-180.
- Vendler, Z.: 1966, *Linguistics in Philosophy*. NY: Cornell University Press.
- Zimmermann, M.: 2002a, A compositional analysis of anti-quantifiers as quantifiers, in B. Jackson (ed.) *SALT* **12**, 322-338.
- Zimmermann, M.: 2002b, *Boys buying two sausages each*. Ph.D. Diss. University of Amsterdam.



# YOU ONLY NEED A SCALAR *ONLY*

Sveta Krasikova & Ventsislav Zhechev,  
Seminar für Sprachwissenschaft  
Eberhard-Karls Universität Tübingen

svetlana.krasikova@student.uni-tuebingen.de  
vzhechev@sfs.uni-tuebingen.de

## Abstract

We propose a compositional analysis for sentences of the kind “You only have to go to the North End to get good cheese”, referred to as the *Sufficiency Modal Construction* in the recent literature. We argue that the SMC is ambiguous depending on the kind of ordering induced by *only*. So is the exceptive construction – its cross-linguistic counterpart. *Only* is treated as inducing either a ‘comparative possibility’ scale or an ‘implication-based’ partial order on propositions. The properties of the ‘comparative possibility’ scale explain the absence of the prejacent presupposition that is usually associated with *only*. By integrating the scalarity into the semantics of the SMC, we explain the polarity facts observed in both variants of the construction. The sufficiency meaning component is argued to be due to a pragmatic inference.

## 1 Introduction

Adverbial *only* has been recently argued to require special treatment when occurring in sentences expressing sufficient condition. The following sentence, first discussed in (von Fintel and Iatridou 2005), proved to be problematic for the existing analyses of *only*:

- (1) To get good cheese you only have to go to the North End.

According to the observation in (Bech 1955/57), sentences like (1) are equivalent to:

- (2) To get good cheese it suffices to go to the North End.

This suggests that *only* can ‘reverse’ the relation of necessity, expressed by the embedded *have to*, giving rise to the sufficiency reading.

Another striking fact about (1) and others of its kin is that they do not entail the truth of the prejacent, the propositional complement of *only*. In other words, in uttering (1), we do not convey that the embedded anankastic conditional in (3) is true.

- (3) To get good cheese you have to go to the North End.

In other cases with *only* the prejacent is true, which is derived in one way or another from the meaning of the adverb. Interestingly, the absence of the prejacent presupposition in the sufficiency modal construction (SMC), as (von Fintel and Iatridou 2005) call (1), is limited to the positive cases, i.e. the negation of (1) does imply (3).

According to (von Fintel and Iatridou 2005)’s cross-linguistic survey of the morphosyntax of the SMC, a set of languages, like French, Modern Greek, etc., employs a negative adverb and an exceptive phrase instead of *only*:

- (4) Si tu veux du bon fromage, tu n’as qu’à aller à North End.  
if you want of good cheese you NEG have except go to North End

The goal of this paper is to develop a compositional analysis for “only have to” sentences and their “neg+except” counterparts. We claim that the data in question can involve scalar uses of *only* and *except*, which enables us to account for the lack of the prejacent entailment/presupposition and derive the sufficiency meaning. In the literature on *only* the term

‘scalar’ is used to describe the fact that *only* triggers an ordering on the alternative propositions it operates on. This can be either an ordering based on logical implication, or one based on a contextually salient scale. We reserve the term ‘scalar’ for the cases that are not implication-based. We argue that both kinds of orderings can occur in the SMC as it is the case in simple sentences with *only*. *Except* and the scalar version of *only* appear to be polarity sensitive, which receives a pragmatic explanation in our approach.

Further, we show that the choice of the modal in the SMC depends on the ordering in question and on the properties of the modal itself. Thus, embedding an existential modal in the SMC gives meaningful results only if we use the implication-based ordering. The *can*-variant in (5) does not seem to have a scalar reading:

- (5) You can only take your wife to Italy to please her.

Finally, our analysis predicts that (2) is not equivalent to (1) and (4) but rather is a pragmatic inference from them.

The structure of the paper is the following: section 2 gives a brief overview of the existing analyses of the SMC and their problems; in section 3 we make a new proposal and give precise semantics and pragmatics for *only* and *except*; section 4 deals with the polarity issues and section 5 addresses the choice of modals in the SMC.

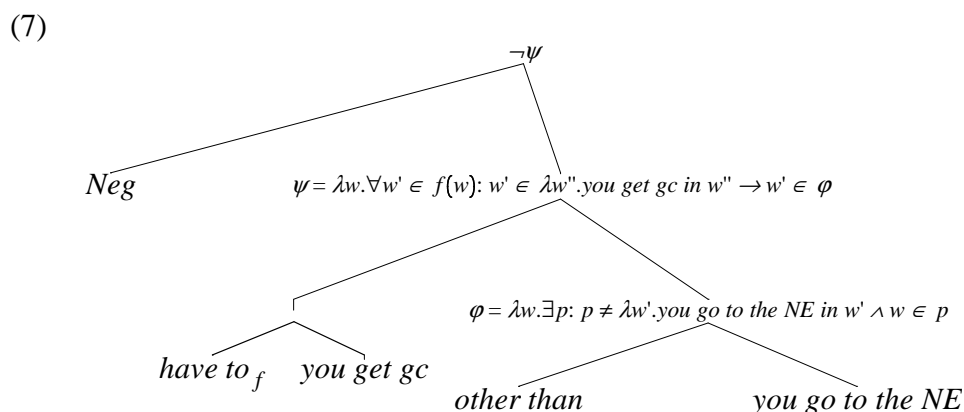
## 2 Problems with Previous Analyses

We will discuss two recent proposals for the analysis of the SMC – (von Fintel and Iatridou 2005) and (Huitink 2005) – and we will show what problems they run into while struggling to solve the “prejacent problem”.

To solve the “prejacent problem” (von Fintel and Iatridou 2005) pursue a lexical decomposition alternative, assuming that *only* splits into the negation and *except*, drawing on the parallel to the “ne que” construction in French. Moreover, they allow the modal to intervene between the two operators:

- (6) Splitting only hypothesis:  
“only have to VP” = Neg > have to > other than VP

These assumptions would result in the LF in (7).



Thus, (von Fintel and Iatridou 2005) derive the following truth conditions for (1):

- (8) In some of the good cheese worlds you don’t do anything other than going to the North End.

This truth condition combined with the presupposition in (9) does not entail the prejacent. (9) is an existential presupposition triggered by *only*, as assumed in (Horn 1996).

- (9) In all of the good cheese worlds you do something.

The SMC is thus predicted to express the possibility to achieve the goal expressed by the subordinate clause if the condition in the matrix clause is fulfilled. However, this semantics appears too weak to account for those sentences that involve sufficiency in the logical sense:

(10) For the bomb to explode, you only have to press the button.

The condition in (8) would wrongly predict that (10) is true in a world in which pressing the button does not trigger an explosion. (von Fintel and Iatridou 2005) are aware of this fact, but claim that this is the desired result.

There are another two aspects in their theory that we find problematic. The first one concerns the observation that the negated SMC sentence does imply its prejacent.

(11) You don't only have to go to the North End to get good cheese.

→ You have to go to the North End to get good cheese.

Adding a negation on top of the LF in (7) fails to explain (11).

Finally, by ignoring the scalarity of the construction, (von Fintel and Iatridou 2005) predict that (1) comes out true if you can get good cheese in the North End, regardless of the other possibilities for getting good cheese, i.e. even if there are easier ways.

Another proposal, due to (Huitink 2005), is to analyse *only* as a universal modal with reversed order of arguments and to use the notion of modal concord to dispense with the semantic contribution of *have to*. The truth condition she arrives at is:

(12) In all North End worlds you get good cheese.

which renders (1) equivalent to (2). This, similar to (von Fintel and Iatridou 2005)'s analysis, makes wrong predictions in case there are easier ways for obtaining good cheese than going to the North End. If you can as well get good cheese in the nearest shop, (1) is predicted true contrary to our intuitions. The general problem with the modal analysis is that it fails to capture the fact that the SMC does not only introduce a sufficient condition, but also ranks it as the easiest possible.

We can conclude that it is crucial to integrate the notion of 'scale' into the semantics of the SMC, which we will turn to in the next section.

### 3 Scalar Meaning of SMC

We saw that it is important to take into account the scalarity of the construction. It seems natural to assume that the presence of a scale is due to the semantics of *only*. Two major inferences associated with (1) are that:

- none of the ways of achieving the goal ranked higher on an effort scale than the one that appears in the sentence (  $\llbracket ne \rrbracket$  ) are necessary
- none of the ways of achieving the goal ranked lower on an effort scale than  $\llbracket ne \rrbracket$  are sufficient

Intuitively, the effort scale is constructed based on the comparative difficulty of actions described by different propositions. According to an observation of (von Fintel and Iatridou 2005), the scale consists not only of ways of achieving the goal, but may also include other propositions.

#### 3.1 The Scale

The effort scale ranks propositions according to the degrees of difficulty they are assigned in the world of evaluation. To define the scale, we suggest that the degree of difficulty of a

proposition corresponds to its possibility in the actual world. Thus, we take the comparative possibility relation from (Lewis 1973) and use it for ranking:

$$(13) \quad \forall p, q, w: p \text{ is at least as difficult as } q \text{ in } w \text{ iff} \\ q \preceq_w p \text{ (i.e. } p \text{ is at most as possible as } q \text{ in } w)$$

In the degree talk:

$$(14) \quad \forall p, q, w: p \text{ is at least as difficult as } q \text{ in } w \text{ iff } D(w)(p) \leq D(w)(q), \\ \text{where } D(w) \text{ is a function from propositions to their possibility degrees in } w.$$

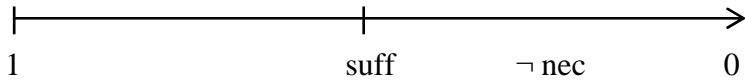
We can also define the relations of sufficiency and necessity between a degree and a proposition based on the corresponding relations holding between propositions:

$$(15) \quad \forall q \in D_{st}, d \in D_d, w \in D_s \text{ (} d \text{ is sufficient for } q \text{ in } w) \Leftrightarrow \\ (\exists p \in D_{st}: p \text{ is } d\text{-possible in } w \wedge \textit{sufficient}_w(p, q))$$

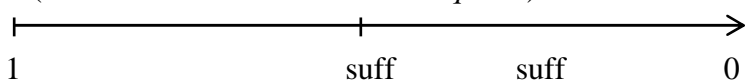
$$(16) \quad \forall q \in D_{st}, d \in D_d, w \in D_s \text{ (} d \text{ is necessary for } q \text{ in } w) \Leftrightarrow \\ (\exists p \in D_{st}: p \text{ is } d\text{-possible in } w \wedge \textit{necessary}_w(p, q))$$

Informally, for a degree  $d$  to be sufficient for a proposition  $q$  in a world  $w$ , there has to be another proposition  $p$  corresponding to  $d$ , which is sufficient for  $q$  in  $w$ . The same holds for necessity.

Further on, we assume that in the scalar context necessity and sufficiency are related in a certain intuitive way. We say that a degree  $d$  is sufficient for some proposition  $q$  in a world  $w$  iff any smaller degree  $d'$  is not necessary for  $q$  in  $w$ . This relation between sufficiency and necessity is formally defined in (17). It should be noted, that according to (14) greater degrees correspond to less effort on the scale, as can be seen on the diagram in (17). Here, the degree ‘1’ corresponds to the propositions that are true in the world of evaluation, i.e. propositions that require zero effort to be fulfilled. The degree ‘0’, on the other hand, corresponds to the propositions that are impossible in the world of evaluation, i.e. they cannot be fulfilled.

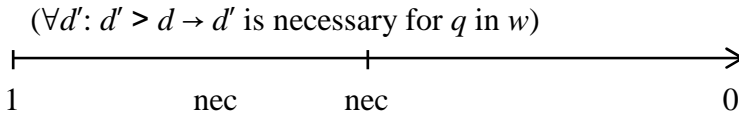
$$(17) \quad \forall q \in D_{st}, d \in D_d, w \in D_s \text{ (} d \text{ is sufficient for } q \text{ in } w) \Leftrightarrow \\ (\forall d': d' < d \rightarrow d' \text{ is not necessary for } q \text{ in } w)$$


Using (17) we can derive the monotonicity properties of sufficiency and necessity, formalised in (18) and (19). (18) states that if a degree  $d$  is sufficient for a proposition  $q$  in a world  $w$ , then all smaller degrees are also sufficient for  $q$  in  $w$ , i.e. sufficiency is *monotone decreasing* in its degree argument. According to (19) if a degree  $d$  is necessary for a proposition  $q$  in a world  $w$ , then all greater degrees are also necessary for  $q$  in  $w$ , i.e. necessity is *monotone increasing* in its degree argument.

$$(18) \quad \forall q \in D_{st}, d \in D_d, w \in D_s \text{ (} d \text{ is sufficient for } q \text{ in } w) \Rightarrow \\ (\forall d': d' < d \rightarrow d' \text{ is sufficient for } q \text{ in } w)$$




(19)  $\forall q \in D_{st}, d \in D_d, w \in D_s$  ( $d$  is necessary for  $q$  in  $w$ )  $\Rightarrow$



Having defined the scale and formalised the behaviour of ‘sufficient’ and ‘necessary’ with respect to it, we can now turn to the meaning of *only* in the SMC.

### 3.2 The Meaning of Scalar *Only* in the SMC

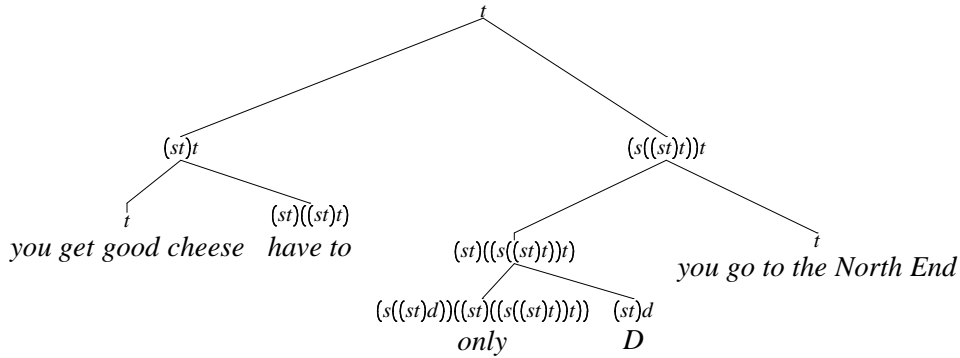
We assume that *only* can operate on a proposition and a modal operator. It can additionally take as an argument a function  $D$  from worlds into functions from propositions to degrees, which is determined by the context and can change its range accordingly. In the case of the SMC,  $D(w)$  will assign each proposition its probability degree in  $w$  and will thus have the range from 0 to 1. *Only*, applied to its arguments, asserts that the modal does not hold of any proposition for which  $D(w)$  returns a smaller degree than the one it returns for the propositional argument. We follow (Horn 1996) in assuming a weak existential presupposition for *only*, i.e. that there is a proposition of which the modal holds. We, however, leave it open for now, whether the latter condition is strong enough to be empirically adequate.

Formally, the meaning we propose for *only* is the following:

$$(20) \quad \llbracket \text{only} \rrbracket = \lambda w. \lambda D \in D_{s((st)d)}. \lambda p \in D_{st}. \lambda M \in D_{s((st)t)}: \exists r \in D_{st} [M(w)(r)]. \\
 \forall q \in D_{st} [D(w)(q) < D(w)(p) \Rightarrow \neg M(w)(q)]$$

The LF corresponding to (1) is the following:

$$(21) \quad (( \llbracket \text{only} \rrbracket (D) ) ( \llbracket \text{ne} \rrbracket )) ( \llbracket \text{have to} \rrbracket ( \llbracket \text{gc} \rrbracket ) )$$



According to (20) we derive the following meaning:

- (22) A: You don’t have to do anything that is more difficult than going to the North End.  
 P: There is something that you have to do to get good cheese.

Formally, this is represented as follows:

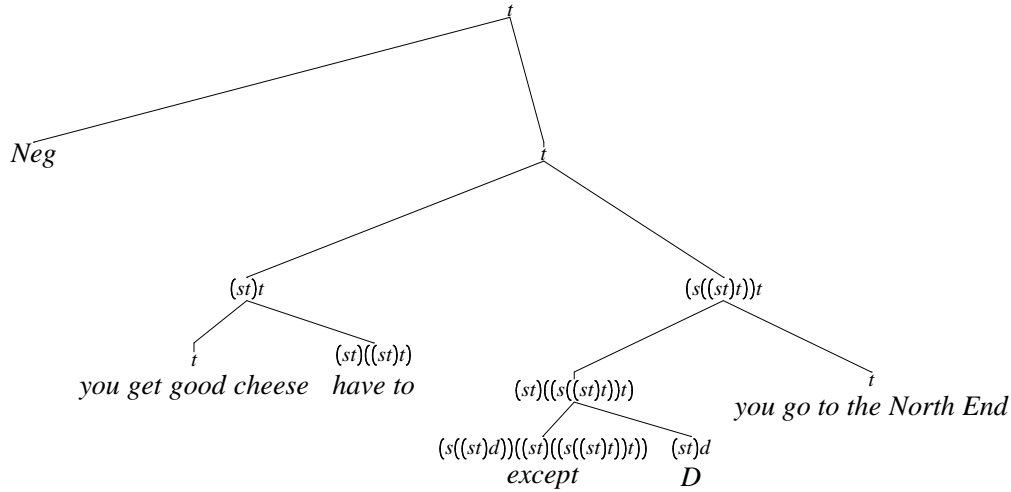
$$(23) \quad \text{A: } \lambda w. \forall q \in D_{st} [D(w)(q) < D(w)( \llbracket \text{you go to the North End} \rrbracket )] \Rightarrow \\
 \neg \llbracket \text{have to} \rrbracket ( \llbracket \text{you get good cheese} \rrbracket )(w)(q) \\
 \text{P: } \lambda w. \exists r \in D_{st} [ \llbracket \text{have to} \rrbracket ( \llbracket \text{you get good cheese} \rrbracket )(w)(r) ]$$

By analogy, we analyse the French *except* as a scalar operator with the meaning in (24):

$$(24) \quad \llbracket \text{except} \rrbracket = \lambda w. \lambda D \in D_{s((st)d)}. \lambda p \in D_{st}. \lambda M \in D_{s((st)t)}: \exists r \in D_{st} [M(w)(r)]. \\
 \exists q \in D_{st} [D(w)(q) < D(w)(p) \wedge M(w)(q)]$$

By putting *except* under negation, we will get the meaning for the French example in (4) that is equivalent to the meaning of its ‘only have to’ counterpart, cf. (22)/(23):

(25) Neg ((( [except] (D))( [ne] ))( [have to] ( [gc] )))



As to the question, why we cannot use *except* without negation, we will try to give an answer to it in section 4.

### 3.3 Strengthening by Implicature

As we have observed in connection with the scalar inferences of the SMC, we have to make sure that sentences like (1) cannot be true or felicitous in scenarios in which there are easier alternatives for achieving the goal. To account for the non-sufficiency of easier alternatives, we need to strengthen the meaning by the requirement that any possibility degree greater than the one assigned to [ne] is necessary. In our set up, the strengthening can be derived as a scalar implicature.

Suppose that we have the following scenario: going to the nearest shop (ns) is easier than going to the North End (ne), which in turn is easier than going to Italy (it). The presence of ordered alternatives in the context allows us to build alternative assertions of the type ‘You only have to  $x$  to get good cheese.’ The alternative assertions are ordered according to their informational strength, as in (26). This ordering is the result of the monotonicity of *only*.

(26)  $\lambda w. \forall q \in D_{st} [D(w)(q) < D(w)([ns]) \Rightarrow \neg [\text{have to}] ([gc])(w)(q)] \subseteq$   
 $\lambda w. \forall q \in D_{st} [D(w)(q) < D(w)([ne]) \Rightarrow \neg [\text{have to}] ([gc])(w)(q)] \subseteq$   
 $\lambda w. \forall q \in D_{st} [D(w)(q) < D(w)([it]) \Rightarrow \neg [\text{have to}] ([gc])(w)(q)]$

Following standard Gricean reasoning, we assume that all alternative assertions that are informationally stronger than the uttered one are believed to be false. Thus, we derive the following implicature:

(27)  $\lambda w. \forall q \in D_{st} [D(w)(q) > D(w)([ne]) \Rightarrow$   
 $\exists r \in D_{st} [D(w)(r) < D(w)(q) \wedge [\text{have to}] ([gc])(w)(r)]$

This implicature states that there exists a proposition, whose possibility degree is less than or equal to the degree of [ne] and is necessary for getting good cheese. According to (19), this means that all degrees greater than the one of [ne] are necessary.

Finally, we combine this implicature with the meaning of (1) and we derive the expected results: that the degree of going to the North End is sufficient for getting good cheese and that it is the lowest degree which is necessary for getting good cheese.

However, we still haven't derived the fact, that going to the North End itself is sufficient for getting good cheese. We assume that the sufficiency inference is also a result of pragmatic strengthening: if the speaker had known that going to the North End is not sufficient, he would have chosen another alternative with the same degree of possibility to make a relevant statement. So the sufficiency can be considered a conversational implicature – according to the maxim:

(28) *Be relevant!*

#### 4 Polarity

In this section we are going to discuss two issues related to the polarity sensitivity of *only* and *except*: the ambiguity of the 'only have to' sentences and the restriction of scalar *only* and *except* to positive and negative contexts respectively.

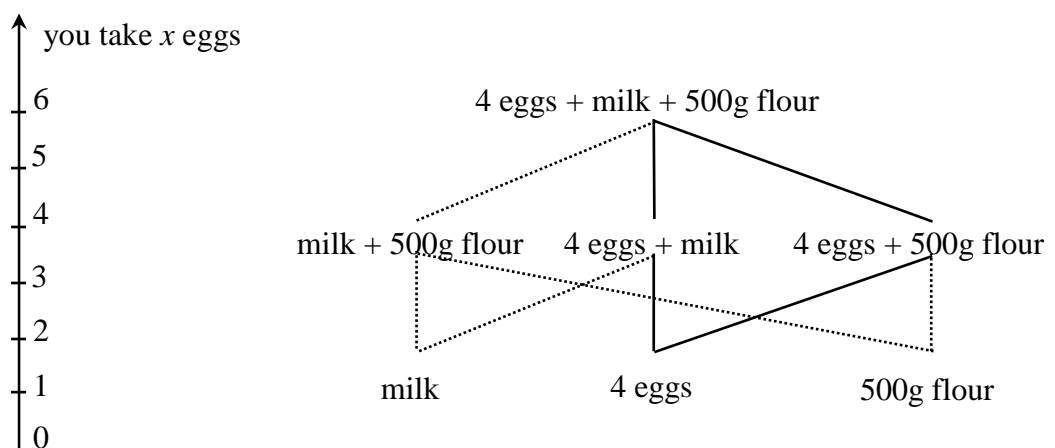
##### 4.1 Ambiguity

If we look at different examples of 'only have to' sentences, we can find some that can be interpreted in different ways depending on what kind of alternatives they are associated with. Consider the following sentence:

(29) You only have to take four eggs in order to bake this cake.

On one of its readings (29) implies that you don't need more than four eggs to bake the cake. However, it can also mean – in a less natural scenario – that you can make the cake out of four eggs. In other words, in the first case the alternatives are of the form *you take x eggs* and therefore any two of them can be compared to each other. In the second case, we seem to build alternatives by taking various ingredients and combinations thereof: *you take a cup of milk, you take four eggs and 500g of flour, etc.* Here a total ordering of the alternatives is impossible. Schematically, we can represent these two cases in the following way:

(30) Possible orderings of alternatives:



a) total order based on comparative possibility

b) partial order based on logical implication

In (30a) we have a situation, which can be dealt with using the semantics for *only* we presented above, i.e. it is more possible that you take three eggs than four eggs in a given state

of affairs. On the contrary, in (30b) it is not immediately clear how to derive the comparative possibility order, required by the ‘scalar’ *only* analysis.

The implication-based case is usually difficult to come up with. For our initial sentence (1) for example, we would need a scenario with the following alternatives:

- (31) you go to the North End and find the Italian shop;  
 you go to the North End and call your Italian friend;  
 you go to the North End, find the Italian shop and call your Italian friend

Another observation is that under negation we seem to always choose the implicature-based readings. Compare (32a) and (32b):

- (32) You don’t only have to take four eggs to bake this cake...  
 a) ...you need to take four eggs and a cup of milk.  
 b) #...you need to take five eggs.

This suggests that the ‘scalar’ *only* is polarity sensitive, akin to its counterpart *except*, with the difference that it requires a positive licensing environment.

## 4.2 Deriving Polarity

To account for the absence of the scalar reading of *only* under negation and the restriction that *except* can only occur in the scope of negation, we treat *only* and *except* as a PPI and an NPI respectively, drawing on (Condoravdi 2002)’s analysis of *until<sup>P</sup>/erst*. We give a pragmatic explanation for their polarity sensitivity, in the spirit of (Krifka 1995)’s analysis of weak NPIs.

Let us consider the negated version of (1):

- (33) You don’t only have to go to the North End to get good cheese.

Applying our analysis to this sentence gives us the following truth conditions:

- (34) A:  $\lambda w. \exists q \in D_{st} [D(w)(q) < D(w)(\llbracket \text{you go to the North End} \rrbracket)] \wedge$   
 $\llbracket \text{have to} \rrbracket (\llbracket \text{you get good cheese} \rrbracket)(w)(q)$   
 P:  $\lambda w. \exists r \in D_{st} [\llbracket \text{have to} \rrbracket (\llbracket \text{you get good cheese} \rrbracket)(w)(r)]$

This leads to a reversal of the informativeness order over alternative assertions:

- (35)  $\lambda w. \exists q \in D_{st} [D(w)(q) < D(w)(\llbracket \text{it} \rrbracket)] \wedge \llbracket \text{have to} \rrbracket (\llbracket \text{gc} \rrbracket)(w)(q) \subseteq$   
 $\lambda w. \exists q \in D_{st} [D(w)(q) < D(w)(\llbracket \text{ne} \rrbracket)] \wedge \llbracket \text{have to} \rrbracket (\llbracket \text{gc} \rrbracket)(w)(q) \subseteq$   
 $\lambda w. \exists q \in D_{st} [D(w)(q) < D(w)(\llbracket \text{ns} \rrbracket)] \wedge \llbracket \text{have to} \rrbracket (\llbracket \text{gc} \rrbracket)(w)(q)$

If we again follow the strategy of pragmatic strengthening, we will derive the following implicature:

- (36)  $\lambda w. \forall q \in D_{st} [D(w)(q) > D(w)(\llbracket \text{ne} \rrbracket)] \Rightarrow$   
 $\nexists r \in D_{st} [D(w)(r) < D(w)(q) \wedge \llbracket \text{have to} \rrbracket (\llbracket \text{gc} \rrbracket)(w)(r)]$

We can now prove that adding (36) to the assertion in (34) leads to a contradiction.

Assume that the truth conditions are satisfied in world  $w$ . Therefore, there is at least one proposition that is higher on the scale than  $\llbracket \text{ne} \rrbracket$  and is necessary, say  $r$ :

- (37)  $\exists r \in D_{st} [D(w)(r) < D(w)(\llbracket \text{you go to the North End} \rrbracket)] \wedge \llbracket \text{have to} \rrbracket (\llbracket \text{gc} \rrbracket)(w)(r)$

From the fact that we use a dense scale it follows that:

$$(38) \quad \forall p \in D_{st} [\exists q \in D_{st} [D(w)(p) < D(w)(q) < D(w)(\llbracket \text{you go to the North End} \rrbracket )]]$$

From (37) and (38) it follows that:

$$(39) \quad \exists p \in D_{st} [D(w)(p) < D(w)(\llbracket \text{you go to the North End} \rrbracket )] \wedge \\ \exists q \in D_{st} [D(w)(q) < D(w)(p) \wedge \llbracket \text{have to} \rrbracket (\llbracket \text{gc} \rrbracket )(w)(q)]$$

This, however, contradicts the implicature in (36). Therefore, it is impossible to satisfy both the truth conditions and the implicature.

To sum up, the scalar interpretation of *only* is limited to positive contexts because of the conflict that arises during the process of pragmatic strengthening of the negated sentences. The same holds for the positive sentences with *except*, rendering it an NPI.

## 5 Other Modals with *Only*

Our analysis predicts that *only* can take different modals as its arguments. However, only very few modals can participate in the SMC. With respect to the universal modals in particular, the paradigm for English looks as follows:

- (40) a) To get good cheese you only **need** to go to the North End.  
 b) #To get good cheese you only **must** go to the North End.  
 c) #To get good cheese you only **should** go to the North End.

(von Stechow and Iatridou 2005) offer a very neat generalisation for the pattern in (40): a universal modal can participate in SMC if it scopes under negation. Whatever is responsible for the behaviour of modals with respect to negation, if it is not based on purely structural considerations, then (von Stechow and Iatridou 2005)'s generalisation is compatible with our analysis of *only*, as the modal ends up in the scope of semantic negation.

As far as existential modals are concerned, an SMC with an embedded *can* is grammatical:

- (41) You can only take your wife to Italy to make her happy.

It seems that a scalar interpretation is not available here. (41) merely states that taking your wife to Italy is the only way to make her happy. This interpretation can be derived if we use the implication-based version of *only*, but we will not pursue this here. We restrict ourselves to explaining why *can* cannot be selected by the 'scalar' *only*.

Let us see what would happen if we embedded *can* under the 'scalar' *only*. We would have the following LF:

$$(42) \quad ((\llbracket \text{only} \rrbracket (D))(\llbracket \text{ne} \rrbracket ))(\llbracket \text{can} \rrbracket (\llbracket \text{gc} \rrbracket ))$$

If we adopt standard semantics for *can*, the LF in (42) will be interpreted as: "Any proposition *q* that is less possible than going to the North End in a world *w* is not compatible with getting good cheese in *w*." Formally:

$$(43) \quad \lambda w. \forall q \in D_{st} [D(w)(q) < D(w)(\llbracket \text{you go to the North End} \rrbracket )] \Rightarrow \\ \neg \llbracket \text{can} \rrbracket (\llbracket \text{you get good cheese} \rrbracket )(w)(q)]$$

Here we can again construct alternative assertions and, due to the monotonicity of the universal quantifier, order them according to their informational strength:

$$(44) \lambda w. \forall q \in D_{st} [D(w)(q) < D(w)(\llbracket ns \rrbracket) \Rightarrow \neg \llbracket can \rrbracket (\llbracket gc \rrbracket)(w)(q)] \subseteq$$

$$\lambda w. \forall q \in D_{st} [D(w)(q) < D(w)(\llbracket ne \rrbracket) \Rightarrow \neg \llbracket can \rrbracket (\llbracket gc \rrbracket)(w)(q)] \subseteq$$

$$\lambda w. \forall q \in D_{st} [D(w)(q) < D(w)(\llbracket it \rrbracket) \Rightarrow \neg \llbracket can \rrbracket (\llbracket gc \rrbracket)(w)(q)]$$

If we proceed with standard pragmatic strengthening by negating the informationally stronger alternative assertions, we derive the following implicature:

$$(45) \lambda w. \forall q \in D_{st} [D(w)(q) > D(w)(\llbracket ne \rrbracket) \Rightarrow$$

$$\exists r \in D_{st} [D(w)(r) < D(w)(q) \wedge \llbracket can \rrbracket (\llbracket gc \rrbracket)(w)(r)]]$$

This, together with the assertion in (43), implies that going to the North End is compatible with getting good cheese, as the reader can verify, i.e.

$$(46) \lambda w. \llbracket can \rrbracket (\llbracket gc \rrbracket)(w)(\llbracket ne \rrbracket)$$

We will assume that logically stronger propositions correspond to lower possibility degrees, as stated in (47):

$$(47) \forall p, q, w [(p(w) \Rightarrow q(w)) \Rightarrow (D(w)(p) < D(w)(q))]$$

This assumption lets us derive (48) from (43):

$$(48) \lambda w. \forall q \in D_{st} [(q(w) \Rightarrow \llbracket ne \rrbracket(w)) \Rightarrow \neg \llbracket can \rrbracket (\llbracket gc \rrbracket)(w)(q)] \Leftrightarrow$$

$$\lambda w. \exists q \in D_{st} [(q(w) \Rightarrow \llbracket ne \rrbracket(w)) \wedge \llbracket can \rrbracket (\llbracket gc \rrbracket)(w)(q)]$$

On the other hand, (46) is equivalent to:

$$(49) \lambda w. \exists q \in D_{st} [(q(w) \Rightarrow \llbracket ne \rrbracket(w)) \wedge (q(w) \Rightarrow \llbracket gc \rrbracket(w))]$$

$$(50) \lambda w. \exists q \in D_{st} [(q(w) \Rightarrow \llbracket ne \rrbracket(w)) \wedge \llbracket can \rrbracket (\llbracket gc \rrbracket)(w)(q)]$$

From (49) we derive (50), which obviously contradicts (48). Thus, we have shown that embedding *can* under ‘scalar’ *only* leads to a contradiction after the computation of the scalar implicature.

## 6 Conclusions

Under the scalar analysis of *only* in SMC, the Prejacent Problem does not arise as a consequence of the use of a weak presupposition. At the same time, by utilising the scalar behaviour of necessity and sufficiency relations, we can derive the desired sufficiency inference in the form of sufficiency between a degree and a proposition, strengthened by a conversational implicature.

The oddity of “only have to” sentences in scenarios with easier ways for achieving the goal is explained as a scalar implicature violation.

Scalarity is also responsible for the negative/positive polarity of *except* and *only*, respectively.

It remains an open issue how to explain the restrictions on the modals that can be embedded under *only*. So far we have shown that the use of *can* leads to inconsistency.

## Acknowledgments

We are very grateful to our colleagues and teachers at the SfS, especially Arnim von Stechow, Doris Penka and Hedde Zeijlstra, for the instructive discussions and the support. Special thanks go to Magdalena Schwager for her critical and helpful comments. We also thank the participants of SuB 10 (Berlin, October 2005) and the 15th Amsterdam Colloquium (Amsterdam, December 2005) for the discussion.

## References

- Bech, G.: 1955/57, *Studien über das deutsche verbum infinitum*, Det Kongelige Danske Akademie av Videnskaberne, København.
- Condoravdi, C.: 2002, Punctual 'Until' as a Scalar NPI, in S. Inkelas and K. Hanson (eds.), *The Nature of the Word*, MIT Press, Cambridge, Mass.
- von Fintel, K. and Iatridou, S.: 2005, *Anatomy of a Modal*, MIT.
- Horn, L.: 1996, Exclusive Company: Only and the Dynamics of Vertical Inference, *Journal of Semantics*, vol. **13**(1): pp 1-40.
- Huitink, J.: 2005, *Analyzing Anankastic Conditionals and Sufficiency Modals*, presented at SOLE 13.
- Krifka, M.: 1995, The Semantics and Pragmatics of Polarity Items, *Linguistic Analysis*, vol. **25**: pp 209-58.
- Lewis, D.: 1973, *Counterfactuals*, Basil Blackwell, Oxford.





# FUNCTIONS OF ENGLISH *Man* \*

Eric McCready  
Osaka University/Aoyama Gakuin University

mccready@lang.osaka-u.ac.jp

## Abstract

This paper discusses the semantics of the English particle *man*. It is shown that this particle does different things when used sentence-initially and sentence-finally. The sentence-initial use is further shown to separate into two distinct intonational types with different semantic content. A formal semantics is proposed for these types.

Particles are usually taken to mark the pragmatic status of the information conveyed by a sentence; for instance, the German particle *ja* has been analyzed as marking hearer-old information, an idea which has been discussed in various frameworks (cf. Kratzer 1999, Zeevat 2003, Kaufmann 2004, Potts 2005). This paper shows that particles can have purely semantic effects as well, and in some cases even show locality effects in modification. The particular particle I consider here is English *man*. This particle can appear both sentence-initially and sentence-finally. In what follows I will call the sentence in which *man* appears the *host* sentence of the particle.

- (1) Sentence-initial: *Man*, I know that.
- (2) Sentence-final: I know that, *man*.

In this paper I will concentrate on sentence-initial *man*, mostly for reasons of space: since the particle shows quite different semantic and pragmatic effects in sentence-initial and sentence-final position, it is difficult to give a full picture of both in a brief paper. I will, however, provide data that shows the two are distinct, in section 1. I will then move, in section 2, to providing data relating to the semantics of sentence-initial *man* that gives a picture of the semantics of the particle. A formalization of this picture, or at least steps toward such a formalization, will be provided in section 3. Section 4 summarizes and discusses how *man* compares with other particles in English, and with similar particles in other languages.

## 1 Differences between the ‘men’

Here I will discuss some characteristics of sentence-final *man* that serve to distinguish it from its sentence-initial counterpart. The end of the section will briefly discuss one way in which it can be formalized.

The first thing to note is that *man*, when used sentence-finally, produces a sense of insistence. In the imperative sentences in (3a), for instance, the speaker seems relatively neutral about how he guesses the hearer will react to his instruction, where in (3b), he seems to anticipate that the hearer will resist carrying out the commanded action. Intuitively, *man* here makes the command stronger.

---

\*I would like to thank Nicholas Asher, Rajesh Bhatt, Hans Kamp, Bernhard Schwarz, and audiences at SuB 10 and CSSP 2005 for helpful comments and discussion.

- (3) a. Go buy some beer.  
b. Go buy some beer, man.

When testing this claim, it is important that the intonation of the two examples be kept as constant as possible.<sup>1</sup> There is a tendency to increase the range of pitch variations in (3b), probably because *man* is associated with informal speech. This should be avoided because pitch variation of this sort usually marks emotion. Thus, when stress is increased or pitch peaks made higher, a sense of insistence appears anyway, so the point at issue is not resolved. Even when intonation is kept constant, however, the sense of insistence remains.

This situation is not limited to imperatives. In declaratives also, sentence-final *man* seems to try to force acceptance on the hearer, as shown by the following minimal pairs.

- (4) a. You don't need that.  
b. You don't need that, man. (insistent/pushy)
- (5) a. John came to the party.  
b. John came to the party, man. (assumes doubt on part of hearer)

The situation can be clarified further by considering dialogues like the following. Here speaker A makes a statement which is contradicted by speaker B. Speaker A then repeats her first statement in hopes of getting speaker B to accept it. In this last utterance, it seems to me, use of *man* is much more natural than not. The same goal could also have been accomplished by use of emphatic focus in the second sentence; the second utterance by A seems odd with neither the particle nor any kind of special focus, as if A didn't care whether B accepted her statement, despite having taken the trouble to repeat it.

- (6) a. A: John came to the party.  
b. B: No he didn't.  
c. A: John came to the party, man.

Another property of sentence-final *man* is perhaps its most puzzling in view of the previous discussion, which makes it look very much like it has a purely pragmatic function: It licenses modal subordination.<sup>2</sup> Modal subordination is a discourse phenomenon in which an anaphoric expression is dependent for its meaning on an antecedent which is in an ordinarily inaccessible position. As the name suggests, this position is canonically in the scope of a modal, as in the examples in (7), modelled after examples by Roberts (1989).

- (7) a. A wolf might come in. # It is big and hairy.  
b. A wolf might come in. It would be big and hairy.

In English licensing of modal subordination by sentence-final *man* requires futurate *will*, probably for tense reasons; but *will* by itself clearly does not license modal subordination without the particle.

- (8) a. A wolf might walk in. ? It will eat you first.

<sup>1</sup>Since the particle adds an extra syllable, intonation will of course change to some degree, however.

<sup>2</sup>See Siegel (2002) for formal semantic work on the English particle *like* that shows it also can have an impact on purely semantic content.

- b. A wolf might walk in. It will eat you first, man.

McCready (2005) gives an account of the above facts using SDRT (Asher and Lascarides 2003) and a dynamic modal semantics. The basic idea is that sentence-final *man* has an underspecified meaning, the realization of which depends on the discourse connection between the *man*-hosting sentence and its attachment point in previous discourse. In contexts like that in (8b), *man* receives a modal-like meaning, which does not arise elsewhere; in other contexts *man* serves to strengthen the assertion (or command), with the effect of forcing the hearer to accept its content. Such an analysis, however, is not appropriate for sentence-initial *man*, which has a very different semantics. To see this, note first that while sentence-final *man* can license modal subordination, sentence-initial *man* cannot. As the following example shows, the tense of the sentence that hosts the particle does not make a difference here.

- (9) A wolf might walk in. # Man, it eats/ate/will eat you first.

Second, it is not clear that sentence-initial *man* is associated with any kind of insistence. While (10a), which contains a sentence-final occurrence of the particle, expresses a kind of insistence, (10b) does not when intonation is kept constant. Again, one must take care here not to add new stresses and pitch contrasts.

- (10) a. John didn't come to the party, man.  
b. Man, John didn't come to the party.

I conclude that a story like that needed for sentence-final *man* is not right for the sentence-initial counterpart. But what is the right semantics for sentence-initial *man*? To answer this question, we must look at some more data; this will be the task of the next section.

## 2 What does sentence-initial *man* mean?

This section will show that sentence-initial *man* actually does multiple things, and that what exactly it does in a given sentence is dictated in large part by phonology, though in a different way than one might think given the above discussion. I will claim that sentence-initial *man* expresses both surprise and some emotion with respect to the proposition denoted by the sentence. Further, with the right intonation, it also strengthens the interpretation of some gradable predicate within the host sentence, in much the way that adverbials like *very* do. Thus, the meaning of the particle is complex; and, at least with one intonational pattern, is also clearly part of the extensional semantic content of the utterance.

First, the emotional content. Sentence-initial *man* expresses some emotion, positive or negative, about the content of the sentence that hosts it.

- (11) Positive  
a. Man, I got an A on my calculus test!!

- (12) Negative  
a. Man, I wrecked my car this morning.

Exactly what emotion SI *man* expresses depends on the propositional content of the host sentence. Thus, where (11a) is interpreted as positive because the content is (ordinarily) understood pragmatically as being good—since it’s ordinarily good to get good grades in calculus—the emotion expressed in (12a) is negative, since ordinarily wrecking one’s car is bad for a variety of reasons. Of course, intonation must be kept constant here as well.

However, the conditioning of the emotion *man* expresses is not always just based on world knowledge. It can also depend on the speaker. In the following example, for instance, if the sentence is uttered by a rabid Republican supporter, it feels positive, while if it’s uttered by someone who leans leftward politically, the hearer interprets *man* as expressing a negative emotion.

(13) Man, George Bush won again.

There are still other factors that can influence the interpretation of *man*. We have seen already that SI *man* is speaker- and content-dependent. As it turns out, it is also world-dependent:

(14) Man, I just won a million dollars in the lottery!

- (15) a. Scenario A: lump sum payment, one-time tax of 40%.  
 b. Scenario B: payment over 20 years, total tax payout of 120% after inflation.

On scenario A, the hearer will understand the expressed emotion as positive, and on scenario B, as negative, illustrating that the content also varies depending on the world of evaluation.

Of course, propositions are presumably understood as bad or good in the absence of particles too. One might think that the particle actually doesn’t have much to do with this aspect of how the sentence is understood. But this is not quite right. What the particle does is make this emotion into a true part of the sentence meaning, by making it overt in the logical form. The emotional content is no longer implicit. Thus, sentence-initial use of *man* ensures that the hearer understands that the speaker has made the relevant judgement.

Now I would like to introduce intonation into the picture. I will continue, however, to avoid use of the kind of intonation that expresses emotion. Instead, I will focus on how the particle relates phonologically to the rest of the sentence. Sentence-initial *man* has, as it turns out, two possible intonations. It can be kept separate from the host sentence, forming a separate phonological or intonational phrase,<sup>3</sup> a use which I will call *comma intonation*. It can also be phonologically integrated into the rest of the sentence, which I will refer to hereafter as *integrated intonation*.

Interestingly, there are restrictions on which of these intonational patterns can be used with certain host sentences. Some host sentences, like (16a), are good with both comma and integrated intonation, though the meaning is different, as discussed in detail below. Some sentences, however, like (16b), are good with comma intonation only. There do not seem to be sentences which require integrated intonation, again for reasons that will become clear in the ensuing discussion.

- (16) a. Man, this water is hot! (comma or integrated)  
 b. Man, John came to the party last night. (comma only)

To clarify the picture it is useful to look at some more data.

<sup>3</sup>I don’t want to take a position here about the phrasal status of the particle in terms of phonology. The terms ‘phonological phrase’ and ‘intonational phrase’ here are purely descriptive.

(17) OK with both intonational patterns:

- a. Man, it's hot.
- b. Man, that's a cool shirt.

(18) Bad with integrated intonation:

- a. Man, over 70,000 people were killed by the tsunami in Asia.
- b. Man, George Bush was reelected.

What do these examples have in common? The host sentences in (17) all express the speaker's judgement in the sense that they involve gradable predicates. In contrast, the host sentences in (18) do not include gradable predicates: they simply describe past events. Based on these and similar examples, the right generalization seems to be that *man* can be intonationally integrated only if the host sentence contains a gradable predicate. In this case, what is expressed by the particle is that the gradable predicate holds to a high degree: for instance, *Man, it's hot* with integrated intonation means something roughly similar to *Man, it's really hot* with comma intonation. From this we should conclude that *man* has two distinct semantic contents, one which appears when it is used with integrated intonation and one which appears when it is phonologically separate.

It is easy, however, to find examples that look problematic for the generalization just stated. For instance, the following examples describe past events and are not obviously gradable (when compared to predicates like *long* or *red*, at least); nonetheless, integrated intonation is fine with them.

- (19) a. Man, we drank beer last night.  
 b. Man, George Bush won the election.

However, when one considers the interpretation of the sentences the generalization can be seen to hold. (19a) means that we drank *a lot* of beer last night; (19b) means that George Bush *really* won the election, for instance by a vast margin (meaning that it is literally false). However, these interpretations only arise when *man* is phonologically integrated with the host sentence. Thus we seem to get coercion of *drink beer* and *win the election* into something gradable when integrated intonation is used. Not so when we use comma intonation, however; in this case, the particle merely comments on the fact expressed by the host sentence. Examples like these therefore ultimately support the generalization that integrated *man* requires a gradable predicate. Note though that the mere presence of a gradable predicate is not enough. The gradable predicate must retain its 'covert comparative' status, where it measures the degree of the property it denotes against some other salient degree (to anticipate the analysis).

- (20) Man, that's the bluest shirt I've ever seen. (comma only)

Here the use of a superlative precludes degree modification.

There is more to be said about intonation. Sentence-initial *man* can have at least two distinct tones in isolation, based on analysis using the Macquiner program.<sup>4</sup> Each tone can appear with both comma and integrated intonation. Descriptively they are the following.

- A low tone that rises (R).

<sup>4</sup>There may be additional possibilities, but I will restrict myself to these two in the present paper.

- A low tone that rises, then falls again (RF).

These two tones are associated with particular semantic content as follows.

- R: surprise
- RF: exasperation (= negative emotion)

These then are the basic lexical semantic phenomena our analysis must account for. I will now turn to giving a formal analysis. We will see later, however, that there are complications that will entail some revision of the first version I will give.

### 3 Formal semantics

Nearly everything we will do in this first attempt at a semantics will survive unchanged into the second. I will start out with defining the emotional expression part of *man*'s meaning. I first define a function  $E$  from (Kaplanian) contexts to propositions to emotional predicates.

- A context is a tuple  $c = \langle c_A, c_T, c_W, c_P \rangle$ , where  
 $c_A$  is the agent of  $c$ ,  
 $c_T$  is the time of  $c$ ,  
 $c_W$  is the world of  $c$ ,  
and  $c_P$  is the place of  $c$ .
- $E : c \mapsto \wp(W) \mapsto A$ , where  $A \in \{\mathbf{bad}, \mathbf{good}\}$ .

Here **bad**, **good** are of type  $\langle \langle s, t \rangle, t \rangle$ : functions from propositions into truth-values. Thus  $E$  maps contexts to functions from propositions into emotion-describing predicates.

We can now take sentence-initial *man* to be defined as follows, as a first step. What this definition does is to apply an emotion-expressing predicate determined by context and the propositional content of the host sentence to that propositional content.

- $\llbracket \mathit{man} \rrbracket = \lambda p. [p \wedge E(c)(p)(p)]$

This lexical entry is designed so that  $P(\varphi)$ ,  $P$  an emotive particle, entails  $\varphi$ . The formula  $A(\varphi)$  that the particle semantics outputs should be read 'the agent of the utterance context holds the attitude  $A$  to  $\varphi$  in  $w$ .'

The next step will be to add surprise to this picture. We can make use of a standard scale of likelihood, as do Guerzoni (2003) and McCready (2004).

- $\varphi >_{L_c} \psi$  iff  $\Gamma \models \mathit{Likelihood}(\varphi) > \mathit{Likelihood}(\psi)$ , where  $\Gamma$  is a set of contextually relevant facts in  $c$ .

In words,  $\varphi$  is more likely than  $\psi$  in a context  $c$  iff, given a contextually relevant set of facts, the likelihood of  $\varphi$  is greater than that of  $\psi$ .

Recall that R(ising) intonation was associated with an expression of surprise. We can express this surprise in the following way, given the scale of likelihood defined immediately above. Here  $C$  is a contextually determined set with respect to which the likelihood of  $p$  is evaluated.

- $\llbracket R \rrbracket = \lambda p. [\mathit{MOST}_q (q \in C \wedge q \neq p)(q >_{L_c} p)]$

In words, the proposition  $p$  is less likely than most other propositions in some contextually determined set: that is, of all possibilities that are comparable to  $p$ ,  $p$  was the least likely one to happen.<sup>5</sup>

This formula is of type  $\langle\langle s, t \rangle, t\rangle$ , similar to sentence-initial *man*. I therefore assume that it combines with the particle via functional composition, yielding

- $[[man_R]] = \lambda p. [p \wedge E(c)(p)(p) \wedge MOST_q(q \in C \wedge q \neq p)(q >_{L_c} p)]$

Given this, the semantics of (21a) will be as in (21b), which is as desired.

- (21) a. *Man, it's raining outside.*  
 b.  $raining(w, t) \wedge E(c)(raining(w, t))(raining(w, t))$   
 $\wedge MOST_q(q \in C \wedge q \neq raining(w, t))(q >_{L_c} raining(w, t))$

That is, it is raining, the speaker holds some attitude, good or bad, toward that fact, and it was unlikely that it would rain (according to the speaker at least).

There is one more type of intonation to deal with: rising-falling intonation. Recall that this tone indicates a kind of exasperation. I will assume that this amounts to a simple indication that the speaker takes the propositional content of the host sentence to be negative.

- $[[RF]] = \lambda p. [bad(p)]$

Combined with the semantic frame for the particles, this will yield the following:

- $[[man_{RF}]] = \lambda p. [p \wedge E(c)(p)(p) \wedge bad(p)]$

This semantics yields a prediction about what sorts of sentences are compatible with rising-falling intonation. Specifically, it predicts that if  $E$  returns a positive emotion wrt a given sentence, it should be incompatible with RF intonation (on the natural assumption that it is incoherent for a speaker to simultaneously hold positive and negative attitudes toward a single proposition). This seems to be right. Since being rich can be assumed to (ordinarily) be a positive trait,  $E$  will return **good** when applied to the sentence *I'm rich*, yielding an incoherent result when rising-falling intonation is used. And, indeed, sentences like (22) are rather unnatural.

- (22) # *Man, I'm rich!*  
 RF

- (23) a.  $[[22a]] =$   
 $rich(i) \wedge E(c)(rich(i))(rich(i)) \wedge bad(rich(i))$   
 b.  $[[22a]] =$   
 $rich(i) \wedge good(rich(i)) \wedge bad(rich(i))$

The above picture seems right for *man* in its phonologically separate form. However, integrated intonation must be different, for it involves a notion of comparison. Further, this notion is not derivable (as far as I can see) from any of the above semantics. We thus must take the particle to be ambiguous. I turn my attention now to formulating the semantics of the integrated form.

<sup>5</sup>There are subtle issues here that relate to the evaluation time of likelihood. Certainly once something happens it is no longer unlikely that it happened; still, it perhaps *was* unlikely that it would happen before it did. I will ignore this complication in this paper.

In order to talk formally about degrees to which properties hold, I want to introduce some notions from the semantics of gradable adjectives and comparatives. Here I'll assume a scalar theory of such adjectives (Kennedy 1999) on which they denote relations between individuals and degrees, which are a kind of measure of the extent to which a property is held. According to this theory, the logical form of a sentence with an adjectival predicate in the absolute construction,<sup>6</sup> like that in (24), is as shown below in simplified form.

(24) This salsa is hot.

(25)  $\llbracket(24)\rrbracket = \text{hot}(\text{this\_salsa})(d_s)$

In this formula,  $d_s$  refers to a degree which comprises the 'standard' for the property in question, here hotness;  $d_s$  thus denotes the degree of spiciness above which a taste can be truly stated to be spicy. In this particular instance,  $d_s$  is contextually determined. The first argument of *hot*, *this\_salsa*, here denotes an individual. degree. In the model theory, degrees are treated as points in a scale, modelled as a (dense) partial order. Each gradable predicate is associated with a scale. Whether a predicate applies truly to a particular individual depends on the position of the degree associated with that individual on the scale. Kennedy assumes a function  $\delta$  that maps individuals to the degree associated with them;  $\delta$  is relativized to predicates, so there are actually a family of  $\delta$  functions, one for each predicate:  $\delta_{\text{spicy}}$ ,  $\delta_{\text{tall}}$ , and so on.<sup>7</sup>  $\delta$  maps the individual argument to a point on the scale: in the present case, it maps the salsa to the degree of spiciness that the salsa has. If the degree associated with an individual  $x$ ,  $\delta_P(x)$ , is greater than the standard  $d_s$  (i.e. if  $\delta(x) \geq d_s$ ), then  $P(x)$  is true.

Given this background, we can think about the contribution of sentence-initial *man* with integrated intonation. In (26), the particle indicates that the salsa is spicy to a high degree.

(26) Man, this salsa is spicy.

We can understand this as meaning that the *degree* of its spiciness is greater than the degree of spiciness of most other spicy things; in this sense, it can be said to raise the standard of comparison (cf. (Klein 1980) on *very*).

(27)  $\text{spicy}(\text{this\_salsa})(d_s) \wedge \text{most}_y(\text{spicy}(y)(d_s))(\delta_{\text{spicy}}(y) \ll \delta_{\text{spicy}}(\text{this\_salsa}))$

Abstracting, we get the following:  $x$  the individual denoted by the subject,  $S$  the gradable property ('spicy'),  $P$  a restrictor ('salsa').

(28)  $\lambda x. [\lambda P. [\lambda S. [P(x) \wedge S(x)(d_s) \wedge \text{most}_y(S(y)(d_s) \wedge x \neq y)(\delta_S(y) \ll \delta_S(x))]]]]$

Note that it is in no way straightforward to make this work out compositionally, since the particle is located at the left edge of the clause and has no access to the meaning constructors corresponding to the gradable property or the subject. Thus, if we want to adopt this semantics, we have to make assumptions about the combinatorics, such as raising the various elements or abstracting away from the tree as is done in, for instance, glue semantics (Dalrymple, Lamping, Pereira and Saraswat 1997).

We also must add the emotional content previously discussed to the representation in (28). I will ignore the contribution of intonation for now, but note that in order to add it we also must assume that intonation is associated with a polymorphic type or that it is straightforwardly type-shifted, which seems anyway to be a natural move.

<sup>6</sup>Absolute constructions are those in which a statement is made about the applicability of some gradable adjective to an individual. This construction should be set against e.g. comparatives, in which the applicability of the adjective is stated with reference to other individuals.

<sup>7</sup>For some predicates, these scales may be identical, however.



(29) Integrated particles (minus tone):

- a.  $[[man_i]] = \lambda x. [\lambda P. [\lambda S. [P(x) \wedge S(x)(d_s) \wedge most_y(S(y)(d_s) \wedge x \neq y)(\delta_S(y) \ll \delta_S(x)) \wedge E(c)(S(x)(d_s) \wedge most_y(S(y)(d_s) \wedge x \neq y)(\delta_S(y) \ll \delta_S(x)))(S(x)(d_s) \wedge most_y(S(y)(d_s) \wedge x \neq y)(\delta_S(y) \ll \delta_S(x)))]]]]$

Very messy, but this seems to be what we need if we are going to go with this sort of account.

But, in fact, this account does not seem to be quite the right way to go (though the pieces are all more or less correct). We can see this by looking at some more data. The way the semantics is set up now, there are no restrictions put on what predicate the particle modifies. This is too permissive, as we will now see.

So far we have worked with VP predicates. Object-internal predicates are also possible (in predicative positions).

(30) *Man*, this is spicy salsa.

One then wonders whether gradable predicates in *any* position can serve as input to the particle. The answer is a definite no.

Sentence-initial *man* cannot modify gradable predicates within embedded sentences (thanks here to Bernhard Schwarz).

- (31) a. *Man*, John thinks Bill ate some spicy salsa.  
 b. *Man*, Jimmy knows Fred has a beautiful girlfriend.  
 c. *Man*, it's too bad this data is so complicated.

Here, the particle can only modify the ‘embedders’—*think*, *know*, *be too bad*. The gradable predicates in the complements of these verbs are not available at all.

These restrictions suggest that a semantics for the particles like the one proposed above, on which no (non-stipulative) restrictions are put on what the particle modifies, cannot be correct. I want now to explore an alternative that preserves the insights of the above while avoiding (I think) most of its problems.<sup>8</sup>

The idea is that, rather than pulling out all the elements of the sentence and modifying them separately, the particle modifies rather a set of degrees. In order for this to work, it is necessary to modify the semantics given above, changing it to an object of type  $\langle\langle d, \langle s, t \rangle \rangle, \langle s, t \rangle\rangle$ , i.e. to a function that maps functions from sets of degrees to propositions, to propositions. Effectively we need the semantics of a modifier which however changes the type of its argument. This can be given as follows.

- $\lambda D_{\langle d, \langle s, t \rangle \rangle} \exists d [D(d) \wedge most_{d'}(D(d') \wedge d \neq d')(d' \ll_{S(D)} d) \wedge E(D(d) \wedge most_{d'}(D(d') \wedge d \neq d')(d' \ll_{S(D)} d))(D(d) \wedge most_{d'}(D(d') \wedge d \neq d')(d' \ll_{S(D)} d))]$

Note that this semantics in effect presupposes that a gradable predicate is contained in its argument, for if it is not, the expression will be undefined.

This semantics preserves the intuitions of what we had before, but is stated in a form that does not require the complicated combinatorics that the previous version did. Further, it allows us to derive the restriction on what gradable predicate the particle can modify, with a single stipulation. We must assume that an operation of existential closure of degree arguments takes

<sup>8</sup>I want to thank Hans Kamp (p.c.) for suggesting this line of attack.

place at a node earlier than that at which modification by *man* happens. What exactly this node may be is open to question, because there is what looks at first glance like conflicting evidence about the exact syntactic position of *man*. Two likely candidates are Spec of CP and Spec of IP. Support for the first is provided by examples like these.

- (32) a. Man, what did you buy?  
 b. Man, if you do that, what do you think is going to happen?  
 c. If you do that, man, then there's going to be some trouble.

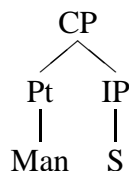
Here *man* clearly precedes elements in C: the WH-element *what* and the conditionalizer *if*. Note however that all of these examples involve a comma intonation on the particle. Integrated intonation is not possible here. It is also possible to find what looks like evidence that *man* is in Spec of IP, as in the following example, in which the particle follows *then*, which is in C. This example, conversely, does not allow comma intonation; only integrated intonation is possible.

- (33) If he comes tonight, then man there is going to be some trouble.

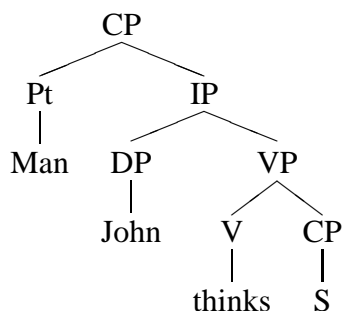
I conclude that there are two distinct positions for the particle. When it has comma intonation, it appears in Spec of CP; when it has integrated intonation, it appears in Spec of IP.<sup>9</sup>

Now, given that integrated *man* performs its modification at IP and existential closure of degrees takes place at CP (if needed), it makes sense that gradable predicates in embedded clauses are not available for modification: the degree argument associated with them has been closed off, and is no longer visible to particles in the higher clause. The same holds for superlatives like (20); again, the degree argument is existentially closed, and cannot be modified. In fact we have a type mismatch. The two cases are as follows (with somewhat schematic syntax).

- (34) Good case:



- (35) Bad case:



A further prediction of the analysis is that gradable predicates in relative clauses are not available for modification due to the presence of an intervening CP node. This prediction seems to be correct.

- (36) a. Man, John ate a piece of cake that was big.

<sup>9</sup>There is a possible issue here in that this analysis seems to allow sentences like *What man did you eat such a big piece of cake for?*, on the reading where *man* modifies the predicate *big*, since *man* is in Spec of IP. I think there must be additional syntactic reasons for this. For now, I will put it aside.

- b. Man, John ate some salsa that was spicy.

*Man* in these sentences can only modify the main verb, not the embedded adjective.

Let me now mention some other restrictions, which I will not however deal with in this paper. Let's start with a consideration of DP-internal predicates. It appears that whether a particular predicate can be modified depends greatly on what the head of the DP is; in particular, it appears that predicates in the scope of indefinites can be modified, and those in the scope of definites cannot. (The examples that follow should all be understood as involving integrated intonation.)

- (37) a. Man, John ate some spicy salsa.  
b. \* Man, John ate the spicy salsa.

In fact, the set of determiners that allow this kind of modification seems to be fairly small. I have manipulated the NP content in these examples to allow for determiners that prefer mass and count nouns.

- (38) Possible:  
a. Man, John ate a big piece of cake.  
b. Man, John ate two big pieces of cake.

- (39) Impossible:  
a. \* Man, John ate many big pieces of cake.  
b. \* Man, John ate few big pieces of cake.  
c. \* Man, John ate most big pieces of cake.  
d. \* Man, John ate all the big pieces of cake.  
e. \* Man, John ate {more than/less than}two big pieces of cake.  
f. \* Man, John ate every big piece of cake.

All the determiners in (38), as well as *some*, are indefinite, whereas all the determiners in (39) and also *the* are definite. Clearly there is a correlation to be found between indefiniteness and the possibility of NP-internal modification. However, it is not clear to me at present exactly how it should be characterized within the present theory, and so I will leave the problem for future work.<sup>10</sup>

Another interesting issue is that there is some freedom as to what predicate the particles modify. In examples in which there is more than one (potentially) gradable predicate, it seems that either can be modified.

- (40) Man, George Bush won a hard election.

Here either the extent of the victory or the hardness of the election can be modified. One has the intuition that intonational prominence on a particular predicate influences which predicate is chosen. Therefore, it might be that focus should play a role in selecting *S*. I cannot resolve this question here, and leave this issue also for the future.

<sup>10</sup>A first idea is that the function of the predicate is different in the definite DPs than it is in the indefinite ones. Perhaps in definite DPs adjectives work more to pick out a referent than to say something about it, and therefore are not further modifiable. Formally we might say that there is existential quantification over the degree argument at, say DP level in definite but not indefinite DPs. The consequences of this proposal are not completely clear to me at present and so I will leave this as a speculation.

#### 4 Conclusion

In this paper I have given a semantic characterization of the behavior of sentence-initial *man* in English. We have seen that it involves degree modification on one use, and that intonation plays a large role in its meaning. I have left some issues unsettled, but I think the present framework is well suited to handle them.<sup>11</sup>

There are a number of particles in English and other languages that behave much like *man*. In English we find *dude*, *boy* (%), *girl* (%), *G*, *bro*, and many others. Interestingly, there are differences between these particles and *man*: *dude* can be used only with independent intonation, and *boy* only with integrated intonation. The reasons for these differences remain unclear.

- (41) a. Man, this water is hot. (independent or integrated)  
 b. Dude, this water is hot. (independent only)  
 c. Boy, this water is hot. (integrated only)

In other languages, it is quite common to find particles of this sort. In Japanese, for instance, there are the particles *yo* and *zo* (McCready In press), which are semantically similar to sentence-final *man*. There do not seem to be any particles corresponding to the sentence-initial use: though there are several which are related to the comma use, none of these can be used with integrated intonation. The same seems to hold true for Spanish *güey* ‘dummy/dude’ and *tío* ‘uncle’ and French *merde* ‘shit’ and *putain* ‘whore’. It may be that the reasons for this lie in independent intonational facts about these languages, but this must be explored further.

#### References

- Asher, N. and Lascarides, A.: 2003, *Logics of Conversation*, Cambridge University Press.
- Dalrymple, M., Lamping, J., Pereira, F. and Saraswat, V.: 1997, Quantifiers, anaphora and intensionality, *Journal of Logic, Language and Information* **6**, 219–273.
- Guerzoni, E.: 2003, *Why Even Ask?*, PhD thesis, MIT. Draft of July 2003.
- Kaufmann, S.: 2004, A modal analysis of expressive meaning: German *ja* under quantifiers. Handout of talk presented at Kobe Shoin.
- Kennedy, C.: 1999, *Projecting the Adjective*, Garland. 1997 UCSC dissertation.
- Klein, E.: 1980, A semantics for positive and comparative adjectives, *Linguistics and Philosophy* **4**, 1–45.
- Kratzer, A.: 1999, Beyond ouch and oops: How descriptive and expressive meaning interact. Available from Semantics Archive.
- McCready, E.: 2004, Two Japanese adverbials and expressive content, *Proceedings of SALT XIV*.
- McCready, E.: 2005, *The Dynamics of Particles*, PhD thesis, UTexas-Austin.
- McCready, E.: In press, Japanese *yo*: Its semantics and pragmatics, *Sprache und Datenverarbeitung*.

<sup>11</sup>It may turn out that a translation into alternative semantics will be needed to deal with the focus facts, though.

- Potts, C.: 2005, *The Logic of Conventional Implicatures*, Oxford University Press. Revised version of 2003 UCSC dissertation.
- Roberts, C.: 1989, Modal subordination and pronominal anaphora in discourse, *Linguistics and Philosophy* **12**, 683–721.
- Siegel, M.: 2002, Like: the discourse particle and semantics, *Journal of Semantics* **19**, 35–71.
- Zeevat, H.: 2003, Particles: presupposition triggers, context markers, or speech act markers, in R. Blutner and H. Zeevat (eds), *Optimality Theory and Pragmatics*, Palgrave-MacMillan.



# ON TEMPORALLY BOUNDED QUANTIFICATION OVER EVENTUALITIES

Telmo Mória,  
Faculdade de Letras da Universidade de Lisboa / ONSET-CEL

tmoia@netcabo.pt

## Abstract

This paper focuses on different subtypes of constructions involving temporally bounded quantification, e.g. sequences like *David visited Rome three times* followed by temporal phrases as different as (i) *last year*, which defines a time interval; (ii) *in less than two months*, which defines an amount of time; and (iii) *per month*, which refers to a time unit. As for the first two types of temporal phrases, data will be presented which shows that they have specific linguistic properties in these quantifying contexts, and do not behave exactly as the locating or duration adverbials they are superficially identical with. The third type of phrases will receive special attention. Structures with frequency adverbials like *n times per month* will be analysed compositionally, separating the quantified component *n times* from the temporally binding phrase *per month* (whose role is comparable to that of adverbials (i) and (ii) in the relevant constructions). The data presented is mainly from Portuguese, although the issues at stake – the linguistic properties of temporally bounded quantification – are obviously relevant to parallel constructions in other languages.

## 1 Introduction

This paper concentrates on a subclass of temporal constructions with quantification over eventualities, namely those where the quantification is relative to a time parameter – either a time interval, an amount of time, or a time unit –, as in the following examples:

- (1) O David visitou Roma *três vezes* {o ano passado / em menos de dois meses / por ano}.  
“the David visited Rome three times {the year past / in less of two months / per year”  
David visited Rome *three times* {last year / in less than two months / per year}.

The structure of the paper is as follows. In section 2, the analysis will focus only on constructions where the temporal frame for quantification is an interval of the time axis (like e.g. the one expressed by *last year*). Data from Portuguese will be used to distinguish linguistically these constructions from those where unquantified events are described, like:

- (2) O David visitou Roma o ano passado.  
“the David visited Rome the year past”  
David visited Rome last year.

Still in section 2, a formal semantic characterisation of temporally bounded quantification structures is provided, which evinces the differences between these structures and those expressing simple (inclusive) temporal location, like (2). In section 3, a broader view of temporally bounded quantification is offered, extending it to the wider range of adverbials exemplified in (1). Temporal phrases associated with the expression of pure frequency – like the Portuguese counterparts of English *per year* – will be analysed in some detail; a compositional analysis of frequency phrases like [n-times *per* unit-of-time] will be defended, according to which the phrase [*per* unit-of-time] in those sequences is distinguished, and its role compared to the role of the other types of adverbials exemplified in (1) (as expressions that set time frames for quantification).

## 2 Temporal circumscription of quantification vs. temporal location

### 2.1 The distribution of Portuguese *desde*-adverbials

In previous work (cf. Mória 2000, 2001), I showed that Portuguese *desde*-adverbials – as, for that matter, the Spanish, French and Italian counterparts of English *since*-adverbials – are dependent on the presence of event quantification in the clause to which they apply, namely when telic events are involved<sup>1</sup>. Observe the contrast in grammaticality between the following two sentences, which differ only in the absence or presence of an explicit quantifier over events:

- (3) \*O David visitou a mãe desde Janeiro.  
 “the David visited the mother since January”  
 David has visited his mother since January.
- (4) <sup>OK</sup>O David visitou a mãe *cinco vezes* desde Janeiro.  
 “the David visited the mother five times since January”  
 David has visited his mother *five times* since January.

Furthermore, I showed in that work that the relevant licensing quantification (in the matrix clause) need not be explicit quantification over events, via a phrase like *n times*, as in (4). It may as well be indirect quantification over events (cf. e.g. Krifka 1990, Schein 1993, Eberle 1998), associated with different types of quantification, as illustrated in (6) through (12), below.

#### (i) distributive quantification over discrete objects

- (5) \*Este urso morreu no zoo de Lisboa desde Janeiro.  
 “this bear died in-the zoo of Lisbon since January”  
 This bear has died in the zoo of Lisbon since January.
- (6) <sup>OK</sup>*Cinco ursos* morreram no zoo de Lisboa desde Janeiro.  
 “five bears died in-the zoo of Lisbon since January”  
*Five bears* have died in the zoo of Lisbon since January.
- (7) <sup>OK</sup>O David restaurou o altar da igreja matriz de *cinco cidades* desde Janeiro<sup>2</sup>.  
 “the David restored the altar of-the church matrix of five towns since January”  
 David has restored the altar of the parish church of *five towns* since January.

#### (ii) measure quantification over discrete objects or massive entities

- (8) <sup>OK</sup>*Oitenta por cento deste edifício* foi restaurado desde Janeiro.  
 “eighty per cent of-this building was restored since January”  
*Eighty per cent of this building* has been restored since January.

<sup>1</sup> The combination of Romance counterparts of *since*-adverbials with descriptions of atelic eventualities is not subject to the same restrictions. When this combination occurs, sentences involve typically a **durative** – rather than an **inclusive** – location reading (i.e. the situation is said to hold throughout the whole location interval – cf. e.g. Vlach 1993, Mória 2000):

- (i) O David mora em Lisboa desde 1974.  
 “the David lives in Lisbon since 1974”  
 David has been living in Lisbon since 1974.

The durative location reading is irrelevant for the issues addressed in this paper and will be ignored henceforth. However, provided the right context, a temporal quantification structure of the type under analysis in this paper is also possible with atelic predicates – cf. (13) below.

<sup>2</sup> Notice that the quantifying element can occur in very deeply embedded positions, as this example shows.



- (9) <sup>OK</sup>Esta máquina reciclou *cinco toneladas de detritos* desde Janeiro.  
 “this machine recycled five tons of wastes since January”  
 This machine has recycled *five tons of waste* since January.
- (iii) temporal measure quantification over atelic eventualities:
- (10) <sup>OK</sup>O David trabalhou neste projecto *durante cerca de duzentas horas* desde Janeiro.  
 “the David worked on-this project for around of two-hundred hours since January”  
 David has worked on this project *for about two hundred hours* since January.
- (iv) quantification via exclusive operators, like *só*, the Portuguese counterpart of *only* (whose omission in the following sentence would yield ungrammaticality)
- (11) <sup>OK</sup>O David *só* escreveu este artigo desde Janeiro.  
 “the David only wrote this paper since January”  
 David has *only* written this paper since January.
- (v) conjunction associated with an implicature of exhaustive enumeration (of the relevant entities), as in the following sentence which is grammatical only under the interpretation where the set of all relevant towns visited during the mentioned period is being listed
- (12) <sup>OK</sup>O David visitou *Londres, Paris e Berlim* desde Janeiro.  
 “the David visited London, Paris and Berlin since January”  
 David has visited *London, Paris and Berlin* since January.

Other types of licensing quantification structures, besides these five, have been identified in Mória (2000, 2001), but they will be ignored here, for the sake of simplicity.

The examples above involve a combination of *desde*-phrases with descriptions of telic events. Similar structures, however, can be obtained with atelic eventualities, if (i) the same type of quantification structure occurs and (ii) the tense of the main verb expresses anteriority to the temporal perspective point (as is the case, for instance, with the “pretérito perfeito simples” or the “pretérito mais-que-perfeito”):

- (13) <sup>OK</sup>O David morou em Lisboa *três vezes* desde 1974.  
 “the David lived<sub>PERFECTIVE SIMPLE PAST</sub> in Lisbon three times since 1974”  
 David has lived in Lisbon *three times* since 1974.

The difference between the grammatical and the ungrammatical structures above can be described as follows. Structures that refer to single episodic (telic) events – like (3) or (5) – yield ungrammaticality when combined with *desde*-phrases. Conversely, all grammatical examples with *desde*-phrases refer to **sets of events made up of possibly discontinuous subevents** (happening within the time frame set by the adverbial). Furthermore, one may note that ungrammaticality arises whenever – in similar examples – the interpretation of possibly discontinuous events is blocked. This may result from the use of an explicit expression – like the counterpart of *all at once*, in (14) – or from an inference based on world knowledge – as in (15), with the counterpart of *a bomb*, but not with the counterpart of *a bulldozer*.

- (14) \*Esta máquina reciclou cinco toneladas de detritos *de uma só vez* desde Janeiro.  
 “this machine recycled five tons of wastes of one only time since January”  
 This machine has recycled five tons of waste *all at once* since January.
- (15) a. \*Uma bomba destruiu trinta por cento deste edifício desde Janeiro.  
 “a bomb destroyed thirty per cent of-this building since January”  
 A *bomb* has destroyed thirty per cent of this building since January.
- b. <sup>OK</sup>Um buldózer destruiu trinta por cento deste edifício desde Janeiro.  
 “a bulldozer destroyed thirty per cent of-this building since January”  
 A *bulldozer* has destroyed thirty per cent of this building since January.

Likewise, it may be observed that group – contrary to distributive – NPs with cardinal quantifiers do not license the use of *desde*-adverbials, because they are associated with single events rather than with sets of (possibly) distinct events. Thus, the following sentence, with a single-event group reading, is ungrammatical:

- (16) \*O David ofereceu este quadro a *três amigos* desde Janeiro. [group reading]  
 “the David offered this painting to three friends since January”  
 David has offered the painting to *three friends* since January.

## 2.2 Distinguishing temporal circumscription of quantification from temporal location

In order to explain the distributional facts observed in section 2.1, I have argued that structures where temporal adverbials are associated with (explicit) quantification over eventualities – like (4), (6)-(12) or (13) above – are of a semantically distinct type from those where temporal adverbials merely provide a frame for locating (non-quantified) eventualities. In sum, two distinct constructions have to be taken into account:

- **Temporal circumscription of quantification, or temporally bounded quantification**  
*(full-scanning construction, in Mória 2000)*

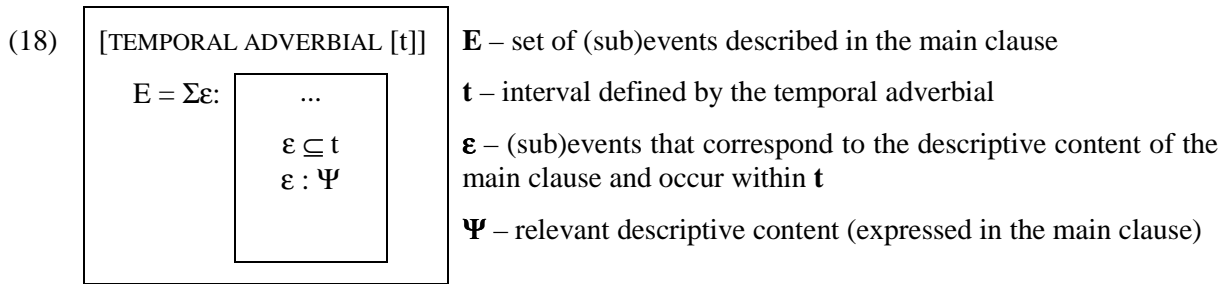
- **Temporal location**

The peculiarity of Portuguese *desde*-adverbials – or, more generally, of the Romance counterparts of *since*-adverbials – is that they are particularly sensitive to this distinction: they may define temporal boundaries for quantification, but they may not simply provide a frame for inclusive location<sup>3</sup>. Many other adverbials, however, readily occur in both types of constructions – cf. e.g. *em Janeiro* (‘in January’):

- (17)a. <sup>OK</sup>O David visitou a mãe em Janeiro. [temporal location]  
 “the David visited the mother in January”  
 David visited his mother in January.
- b. <sup>OK</sup>O David visitou a mãe *cinco vezes* em Janeiro. [circumscription of quantification]  
 “the David visited the mother five times in January”  
 David visited his mother *five times* in January.

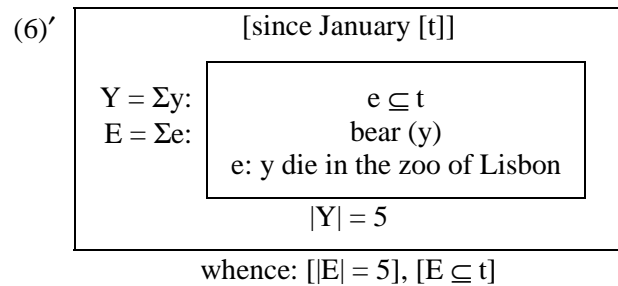
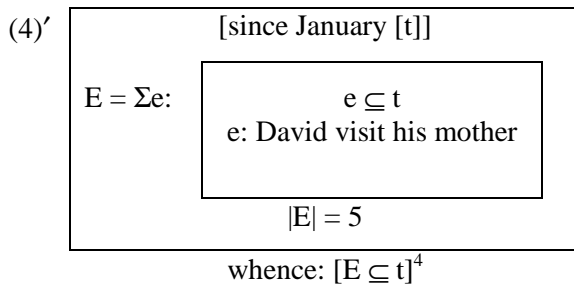
Temporal circumscription of quantification can be easily characterised within the framework of Discourse Representation Theory (DRT) defined in Kamp & Reyle (1993). With regard to the data under analysis, the main point to note is that all the grammatical structures with *desde*-adverbials above involve **abstraction over eventualities contained in the time frame set by the temporal adverbial**. See the schematic representation, in the language of DRT, in (18), and the two illustrative DRS-representations – for sentences (4) and (6) – in (4’) and (6’) right afterwards, where Portuguese lexical items are translated for the sake of simplicity (cf. Mória 2000, for details):

<sup>3</sup> However, as said in fn. 1, they may provide a frame for durative location. The common fact between durative location and temporal circumscription of quantification is that, in both cases, the whole interval defined by the temporal adverbial is relevant (and this seems to be the requirement imposed by the Romance counterparts of *since*-adverbials): in sentences with a durative reading (like (i) in fn. 1), the described atelic eventuality is said to hold at all subintervals of the mentioned interval; in sentences with temporally bounded quantification, a reference is made to the sum of all the events of the mentioned type that occur within the relevant interval (whence, the whole interval has to be taken into account). In Mória (2000), I termed this construction *full-scanning* (inclusive location) in order to underline this idea (since, metaphorically speaking, it is as if the whole interval is scanned in order to gather the relevant events happening within it).



*o David visitou a mãe cinco vezes desde Janeiro (David has visited his mother five times since January)*

*cinco ursos morreram no zoo de Lisboa desde Janeiro (five bears have died in the zoo of Lisbon since January)*



The representation in (18) evinces the **maximality requirement** that distinguishes the structures under consideration. In fact, the relevant sentences refer to sets of events (**E**), more precisely the set of **all subevents**  $\epsilon$  that, on the one hand, correspond to the descriptive content in the matrix clause ( **$\Psi$** ) and, on the other hand, happen within the time frame defined by the adverbial (**t**). This representation also evinces the peculiar role of temporal adverbials in these constructions: as can be seen, although they may appear in relatively high syntactic positions, temporal adverbials act here as true **event modifiers**, inasmuch as inclusion in the time frame set by them (**t**) is a defining property of the elements assembled in the sum represented by the main clause (**E**) (witness the presence of the discourse referent **t** inside the sub-DRS!).

Temporal circumscription of quantification has several linguistic properties that set it apart from simple inclusive temporal location. Let us consider an outstanding one, by comparing the English sentences in (19) – which involve simple inclusive temporal location – with those in (20) – which involve temporally bounded quantification :

- (19) a. David has visited his mother since January.  
 b. David visited his mother in January.  
 c. David offered this painting to (exactly) three friends in May 1995. [group reading]

- (20) a. David has visited his mother five times since January.  
 b. David visited his mother five times in January.  
 c. David wrote (exactly) three essays in May 1995.

First, let us note that in (19), the events described in the main clause (David’s visit to his mother or his offering of the mentioned painting) are defined independently of the locating interval. Differently, in the temporally bounded quantification structures of (20), as was underlined, the interval provided by the adverbial plays a role – as a kind of modifier – in defining the (complex) event represented in the main clause. A direct consequence of this

<sup>4</sup> Although these temporal adverbials may locate the complex event (E) as a whole –  $[E \subseteq t]$  – this function is, as it were, subsidiary, since its primary function is (arguably) to provide the frame for temporal quantification over eventualities – [...  $[e \subseteq t]$ ...] (cf. Mória 2000).

difference is that, if the temporal frame associated with the adverbial is widened, truth preservation is not guaranteed in temporally bounded quantification structures, though it is – *caeteris paribus* – in (inclusive) temporal location ones. See (22) and (21), where *three* is to be interpreted in all cases as a non-monotonic exact quantifier:

- (21) a. David offered this painting to (exactly) three friends in May 1995. [group reading]  
 b. David offered this painting to (exactly) three friends in 1995.
- (22) a. David wrote (exactly) three essays in May 1995.  
 b. David wrote (exactly) three essays in 1995.

From (21a), which involves simple inclusive location (in the group reading), it is possible to infer (21b). Conversely, from (22a), which involves temporally bounded quantification, the parallel inference, in (22b), is invalid. Sentences (23) and (24) below contain yet another interesting contrast, distinguishing the duration of telic and atelic eventualities:

- (23) a. David prepared this project in (exactly) ten hours last Saturday.  
 b. David prepared this project in (exactly) ten hours last weekend.
- (24) a. David worked on this project for (exactly) ten hours last Saturday.  
 b. David worked on this project for (exactly) ten hours last weekend.

From (23a) it is possible infer (23b). Conversely, (24a) does not allow the inference (24b). In the first case, the sentence refers to a single episodic event (David preparing the project in a given amount of time) that is located anywhere within the frame provided by *last Saturday*, i.e. the sentence involves simple inclusive location. In the second case, the sentence refers to the duration of the sum of all the (possibly discontinuous) subevents of David working on the project that happened within the temporal boundaries set by *last Saturday*, i.e. the sentence involves a “full-scanning” of the interval, or temporal circumscription of quantification. Thus, if the boundaries are different, the sum may be different as well.

Marginally, one may note a particular characteristic of the structures with temporally bounded quantification that possibly constitutes a pragmatic restriction. These structures are somewhat odd, or very odd, if the time boundaries are excessively vague (cf. Alves 2003):

- (25) Este rio transbordou cinco vezes {desde 1980 / <sup>??</sup>desde antes de 1980}.  
 “this river overflowed five times {since 1980 / since before of 1980}”  
 This river has overflowed its banks five times {since 1980 / since before 1980}.

Curiously, no parallel contrast in grammaticality is observed (26), where (durative) temporal location is involved:

- (26) Este rio está gravemente poluído {desde 1980 / desde antes de 1980}.  
 “this river is gravely polluted {since 1980 / since before 1980}”  
 This river has been seriously polluted {since 1980 / since before 1980}.

In connection with the type of pragmatic effect observed in (25), it may be noted that (non-echo) interrogatives where temporal adverbials – as *wh*-constituents – are used to define temporal boundaries for quantification are also very odd:

- (27) {<sup>?</sup>Quando / \*Desde quando} é que este rio transbordou cinco vezes?  
 “{when / since when} is that this river overflowed five times?”  
 {When did this river overflow / Since when has this river overflowed} its banks five times?

At this point, an issue must be stressed: temporally bounded quantification structures may arise with virtually any kind of (so-called) locating adverbial and not only with *desde*-adverbials. In fact, I assume that the event abstraction which distinguishes this construction

(cf. (18)) is triggered by quantifying elements in the matrix structure and not by the temporal adverbials. Therefore, whenever these quantifying elements are present – together with an adverbial that identifies a time interval – the temporal circumscription construction may emerge. The specificity of the Portuguese *desde*-adverbials is thus merely that, when combined with descriptions of telic events, they may set boundaries for quantification, but they may not simply locate, whereas most other temporal adverbials may play both roles. (28) below contains several examples of the construction at stake with different time adjuncts<sup>5</sup>; (29) contains parallel examples involving simple (inclusive) temporal location:

- (28) Foram descobertas *trinta e cinco novas crateras de impacto*  
 {entre 1980 e 1985 / o ano passado / na década de 80 / desde Janeiro passado}.  
 “were found thirty and five new craters of impact  
 {between 1980 and 1985 / the year past / in-the decade of 80 / since January past}”  
 Thirty five new impact craters were (have been) found  
 {between 1980 and 1985 / last year / in the 80’s / since last January}.
- (29) Esta cratera de impacto foi descoberta  
 {entre 1980 e 1985 / o ano passado / na década de 80 / \*desde Janeiro passado}.  
 “this crater of impact was found  
 {between 1980 and 1985 / the year past / in-the decade of 80 / since January past}”  
 This impact crater was (has been) found  
 {between 1980 and 1985 / last year / in the 80’s / since last January}.

### 3 A broader view of temporal circumscription of quantification

#### 3.1 Temporal circumscription of quantification with different types of adverbials

All the examples given in section 2 contain adverbials that are traditionally classified as **temporal locating (or frame) adverbials**, since they define **intervals of the time axis**. Let us consider again two of these cases:

- (30) a. O ministro falou com o presidente cinco vezes *desde Janeiro*.  
 “the minister spoke with the president five times since January”  
 The minister has spoken with the president five times *since January*.
- b. O ministro falou com o presidente cinco vezes *a semana passada*.  
 “the minister spoke with the president times the week past”  
 The minister spoke with the president five times *last week*.

However, adverbials traditionally classified in other classes can also occur in constructions that involve temporally bounded quantification. First, we can mention a subset of adverbials, that might be classified as **duration adverbials** in some grammars, since they refer to **amounts of time** rather than to intervals of the time axis – e.g. Portuguese *em mês e meio* or *em menos de três semanas*, and its English counterparts *in a month and a half* or *in less than three weeks*, respectively:

<sup>5</sup> Cf. also the following English examples (involving different adverbials) from the British National Corpus:

G2F 9 And, on average, we each do it five times in our life. | CH3 4927 Colin resents the notion that he doesn't carry a big punch and this could be a chance for him to try to prove otherwise as Palacio admits to having been knocked out four times in his 58-fight career. | CB2 1513 Roebuck revealed that his ankle dislocated no less than four times during the World Cup final. | ECH 396 I have done the route a dozen or more times since that distant autumn, and (...) I have never set off across that huge ceiling without a feeling of apprehension. | FR5 1234 I only saw Stephen a few times before I went back to prison. | K1U 305 They plan to build another 40 houses over the next 10 years.

- (31) a. O ministro falou com o presidente cinco vezes *em mês e meio*.  
 “the minister spoke with the president five times in month and half”  
 The minister spoke with the president five times *in a month and a half*.
- b. *Em menos de três semanas*, o ministro falou com o presidente cinco vezes<sup>6</sup>.  
 “in less of three weeks, the minister spoke with the president five times”  
*In less than three weeks*, the minister spoke with the president five times.

These constructions are to be distinguished from those expressing simple duration, like:

- (32) O ministro escreveu este livro *em mês e meio*.  
 “the minister wrote this book in month and half”  
 The minister wrote this book *in a month and a half*.

Secondly, we can mention temporal adverbials that are often classified as **frequency adverbials**, or as **adverbs of temporal quantification** (cf. Kamp & Reyle 1993), like Portuguese *todos os fins-de-semana* or its English counterpart *every weekend*:

- (33) O ministro falou com o presidente cinco vezes *todos os fins-de-semana*.  
 “the minister spoke with the president five times all the weekends”  
 The minister spoke with the president five times *every weekend*.

This construction involves temporally bounded quantification over events (expressed in the matrix structure), unlike the following parallel structure (that expresses simple temporal quantification, in the sense of Kamp & Reyle 1993):

- (34) O ministro falou com o presidente *todos os fins-de-semana*.  
 “the minister spoke with the president all the weekends”  
 The minister spoke with the president *every weekend*.

Finally, we can observe temporally bounded quantification structures – of a comparable nature, I will argue – with adverbials that express **pure frequency**, like Portuguese *cinco vezes por mês* or its English counterpart *five times a month* (or *per month*):

- (35) O ministro falou com o presidente cinco vezes *por mês*.  
 “the minister spoke with the president five times per month”  
 The minister spoke with the president five times *per month*.

A specificity of constructions like (35) is that they do not have counterparts without quantification over eventualities. In other words, sequences like *por mês* / *per month* do not seem to combine with structures that do not involve explicit quantification:

- (36) \*O ministro falou com o presidente *por mês*.  
 “the minister spoke with the president per month”  
 \*The minister spoke with the president *per month*.

The consideration of all the different examples presented in this section offers a broader view of temporally bounded quantification than the one sketched in section 2<sup>7</sup>. My contention is

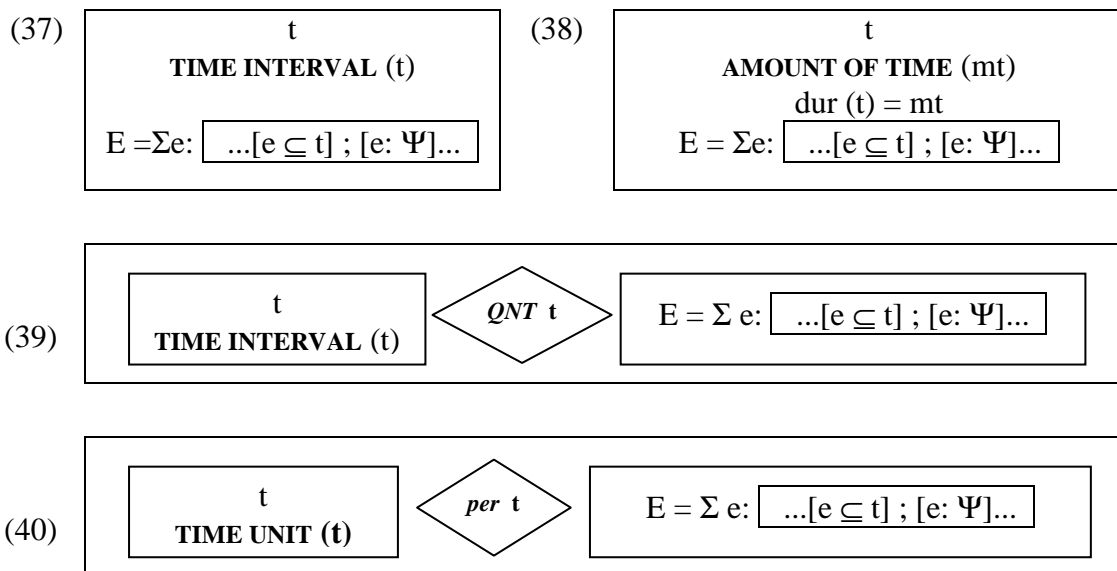
<sup>6</sup> Note that these adverbials, contrary to normal duration adverbials, readily occur in sentence initial-position.

<sup>7</sup> Cf. also the following English examples (involving different adverbials) from the British National Corpus:  
 CM0 109 It is unusual for a major organisation to change its chief executive four times in less than a decade (...). | K3K 1697 Later, experts were divided over whether two horrific attacks in just five days meant more could be expected. | B03 3011 Although the house, originally a simple hall house, has been extended and altered at least five times over nearly 600 years, it still has an overall integrity (...).  
 GW0 259 There's a man with a Doberman comes around two or three times every night. | C96 2109 The powerheads should draw the whole volume of the tank through the filter bed at least three times each hour. | AS7 1742 Assynt is a good salmon loch with upwards of sixty fish being caught most seasons.

that these structures, and in particular the temporal adverbials that occur in them, should be considered on a par, rather than scattered in independent semantic domains like location, duration, temporal quantification or frequency. Though intimately linked with those domains, these adverbials seem to share linguistic properties, which bring them together as phrases that express **temporal circumscription of quantification**.

### 3.2 Common properties of structures with different types of adverbials

First, let us start by noting that, formally, all the relevant structures might be considered to involve an abstraction over eventualities similar to the one already described in section 2. What happens is that the temporal frame involved in the abstraction may correspond to different temporal entities: (i) intervals of the time axis (in structures traditionally associated with the domain of temporal location or of temporal quantification); (ii) amounts of time (in structures traditionally associated with the domain of duration); (iii) time units (in structures traditionally associated with the domain of pure frequency). Any of these entities can be used as a temporal frame (**t**) for event-summation. Compare the schematic DRT-representations in (37)-(40).



Naturally, structures with temporally bounded quantification can be divided in different subgroups according to the type of temporal frame used. On the one hand, each subgroup may have specific properties that need to be tackled separately (this is outstandingly the case with pure frequency constructions, like *five time per month*, as we will see later on). However, on the other hand, all these constructions have linguistic properties in common – cf. schemata (37)-(40) –, which call for a parallel analysis. As for these properties, I will only underline here the similarities in distribution, leaving other possible common properties for further research.

As a matter of fact, it should be noted that phrases that identify amounts of time, like *in a week and a half*, or time units, like *per week* – just like those that identify intervals of the time

---

K9J 181 If all goes according to plan, the £60 million investment will produce around 300,000 tonnes per year of ammonia at the lowest costs in Western Europe. | HL1 499 He also received a three-year period of probation --; during which he would be required to perform 1,800 hours of community service per year --; on a more general conspiracy charge. | G19 1229 The CCLGF meets six or seven times a year and is chaired by the Secretary of State for the Environment.

axis, as *last weekend* or *since January* – may act as temporally binding expressions for indirect quantification over eventualities. They may, for instance occur, with

(i) distributive quantification over discrete objects (cf. (6) above)

(41) a. O David leu *três livros* no fim-de-semana passado.

“the David read three books in-the weekend past”

David read *three books* last weekend.

b. O David leu *três livros* numa semana e meia.

“the David read three books in-a week and half”

David read *three books* in a week and a half.

c. O David leu *três livros* por semana.

“the David read three books per week”

David read *three books* per week.

(ii) temporal measure quantification over atelic eventualities (cf. (10) above)

(42) a. O David trabalhou neste projecto *durante mais de 60 horas* a semana passada.

“the David worked on-this project for more of 60 hours the week past”

David worked on this project *for over 60 hours* last week.

b. O David trabalhou neste projecto *durante mais de 60 horas* numa semana e meia.

“the David worked on-this project for more of 60 hours in-a week and half”

David worked on this project *for over 60 hours* in a week and a half.

c. O David trabalhou neste projecto *durante mais de 60 horas* por semana.

“the David worked on-this project for more of 60 hours per week”

David worked on this project *for over 60 hours* per week.

However, structures that express pure frequency (with *por*-phrases) have a more limited distribution. In particular, they are not licensed with event quantification associated with exclusive operators or with conjunction (cf. (11) and (12) above). This correlates with the fact that (possibly) the event abstraction associated with these operators is not directly asserted (rather being implied at some level).

(43) a. O David *só* escreveu este artigo {desde Janeiro / num mês e meio}.

“the David only wrote this paper {since January / in-a month and half}”

David *only* wrote (has *only* written) this paper {since January / in a month and a half}.

b. \*O David *só* escreveu este artigo por mês.

“the David only wrote this paper per month”

\*David *only* wrote this paper per month.

(44) a. O David visitou *Londres, Paris e Berlim* {desde Janeiro / num mês e meio}.

“the David visited London, Paris and Berlin {since January / in-a month and half}”

David visited (has visited) *London, Paris and Berlin* {since January / in a month and a half}.

b. \*O David visitou *Londres, Paris e Berlim* por mês.

“the David visited London, Paris and Berlin per month”

\*David visited *London, Paris and Berlin* per month.

It can also be noted that *por*-phrases exhibit distributional restrictions comparable to those of *desde*-phrases. More precisely, since *por*-phrases are only compatible with temporally bounded quantification, requiring event-iteration, the blocking effects resulting from coercion of a single-event reading (observed in (14) and (16), in section 2, apropos *desde*-phrases) also affect them:



- (45) \*O David ofereceu este quadro a *três amigos* por semana. [group reading]  
 “the David offered this painting to three friends per week”  
 \*David offered this painting to *three friends* per week.
- (46) \*O David comprou cinco descapotáveis *ao mesmo tempo* por mês.  
 “the David bought five convertibles at-the same time per month”  
 \*David bought five convertibles *at the same time* per month.

### 3.3 *Por*-adverbials: frequency and temporal circumscription of quantification

It is implicit in what was said up to now that *por*-phrases in sequences like *cinco vezes por mês* (‘five times per month’) are being analysed autonomously, i.e. independently of the quantifying phrase (e.g. *cinco vezes*, ‘five times’) with which they combine. In fact, these phrases are taken to have a semantic role of its own, as they provide a temporal frame for quantification, along the same lines as adverbials that define time intervals or amounts of time. Given that, traditionally, sequences like *cinco vezes por mês* (‘five times per month’) are presented as an unanalysed whole – classified as an adverbial of frequency –, this ‘splitting’ analysis requires further justification. This is what I will attempt to do now.

The first thing to underline about the *por*-adverbials under consideration is that they may occur in two rather distinct types of syntactic contexts (just like, for that matter, their English counterparts with *per* or *a*).

- (47) O ministro fala/falou com o presidente *cinco vezes por mês*.  
 “the minister speaks/spoke with the president five times per month”  
 The minister speaks with the president *five times per month*.
- (48) O ministro faz/fez *cinco discursos por mês*.  
 “the minister makes/made five speeches per month”  
 The minister makes/made *five speeches per month*.

In the first sentence, the sequence *por mês* (‘per month’) is applied to the quantifier over events *cinco vezes* (‘five times’), which occurs adverbially. In the second case, the same sequence is applied to the NP *cinco discursos* (‘five speeches’), which is the direct object of the verb. In grammar books, only the first case is normally considered. There, as said, sequences like *cinco vezes por mês* (‘five times per month’) are normally considered as (unanalysed) units, and classified as adverbials of frequency (cf. e.g. Bennett & Partee 1978, Quirk *et al.* 1985, or Huddleston & Pullum 2002, for the English counterparts). No references are normally made to a possible internal analysis. Huddleston and Pullum (2002: 715), however, classify the counterparts of these *por*-phrases as “postmodifiers” (a category they oppose to “separate adjuncts”) within the overall frequency phrase: “clear postmodifiers are NPs introduced by *a* or else PPs with *per* as head”.

I will advocate here that, both in adverbial contexts like (47) and in nominal contexts like (48), the sequence [n-times/n-objects *por* unit-of-time] is a constituent of the whole sentence and that it can have a **compositional analysis**, distinguishing the sequence [*por* unit-of-time] as an expression that sets temporal boundaries for event quantification, along the lines defined in the previous sections of this paper (cf. schema (40)).

Among the syntactic properties of the Portuguese sequences [n-times/n-objects *por* unit-of-time] that justify its analysis as a syntactic constituent – expressing frequency – we might emphasize: the possibility of topicalisation, of focussing, and of anaphoric reference via a relative pronoun (like *o que*, ‘what’), as shown in the following three sentences, respectively:

- (49) a. *Cinco discursos por mês*, o ministro fez muitas vezes.  
 “five speeches per month, the minister made many times”

- b. *Cinco discursos por mês é que o ministro devia fazer!*  
 “five speeches per month [is that]<sub>FOCUS STRUCTURE</sub> the minister should make!”
- c. *Cinco discursos por mês é o que um ministro faz normalmente.*  
 “five speeches per month is [the that]<sub>=WHAT</sub> a minister makes normally”

On the other hand, the *por*-adverbial alone has considerable syntactic autonomy: it can be topicalised, and it may occur in different positions in the sentence (separate from the quantified NP *n-times / n-objects*). Witness its position in the following examples:

- (50) a. *Por mês, o ministro faz cinco discursos.*  
 b. *O ministro faz por mês cinco discursos.*  
 c. *O ministro, por mês, faz cinco discursos.*

Thus, at least in Portuguese, a compositional analysis of phrases of the type [n-times/n-objects *por* unit-of-time] seems defensible<sup>8</sup>. According to this analysis, the sequence [*por* unit-of-time] provides a temporal frame for event quantification along the lines of other temporal adverbials described in this paper. It should be noted however that, despite its relatively embedded syntactic position, this *por*-phrase often takes scope over the whole predicative content of the sentence (with some exceptions that I will not consider here<sup>9</sup>) – cf. DRS-representations of (53) and (54) below.

Furthermore, it must be underlined that, as has been often noted in the literature for the English counterparts of *por*-phrases, this subtype of structures has specific Aktionsart properties (cf. e.g. Moens 1987, or Huddleston and Pullum 2002). Sequences of the form [n-times *por* unit-of-time] combine with event descriptions to form complex expressions which behave – as a whole – as atelic expressions (activities). In Portuguese, this explains why these expressions are compatible with (i) verb tenses expressing overlapping to temporal perspective points (e.g. present or imperfective simple past) – cf. (51) –, and (ii) temporal measure phrases headed by *durante* (the counterpart of English *for*) – cf. (52):

- (51) *O ministro fala / falava com o presidente cinco vezes por mês.*  
 “the minister speaks / spoke <sub>IMPERFECTIVE SIMPLE PAST</sub> with the president five times per month”  
 The minister *speaks / used to speak* with the president five times per month.
- (52) *O ministro falou com o presidente cinco vezes por mês durante quase um ano.*  
 “the minister spoke with the president five times per month for almost a year”  
 The minister spoke with the president five times per month *for almost a year*.

The following DRS-representations illustrate the compositional analysis sketched above<sup>10</sup>:

<sup>8</sup> English *per*-phrases seem to behave similarly – cf. the following examples from the British National Corpus:

CRA 2668 Adding in refinancing of maturing debt (and allowing for individuals' national savings), that means that £1 billion of gilt-edged debt must be sold per week. | A7N 981 How much money do you spend on clothes (excluding shoes and lingerie) per month?

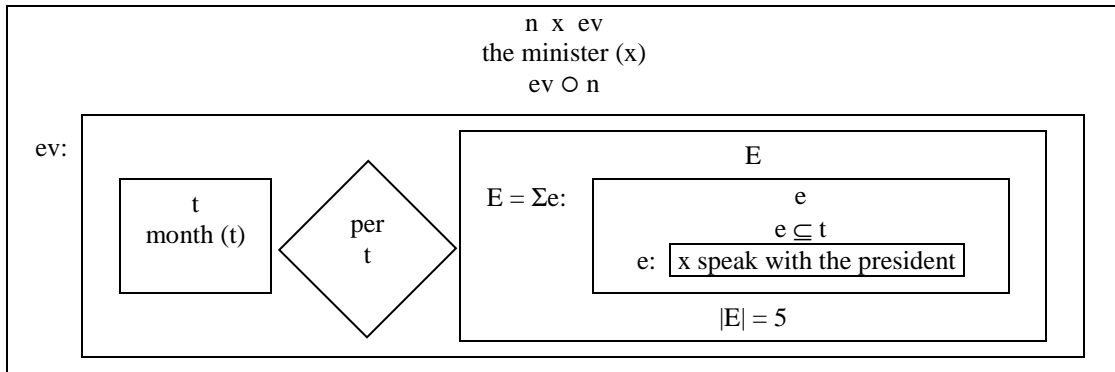
<sup>9</sup> The *por*-adverbial doesn't take scope over the predicative content of the matrix clause in some structures, e.g. when it is embedded in an NP with the counterparts of nouns like *rhythm*, *pace*, *rate*, *speed*, etc. (Note that, in these cases, it cannot be topicalised.)

(i) *O estádio estava a ser evacuado a [NP um ritmo de [duzentas pessoas por minuto]].*  
 “the stadium was to be evacuated at a pace of two-hundred persons per minute”  
 The stadium was being evacuated at [NP a pace of [two hundred people per minute]].

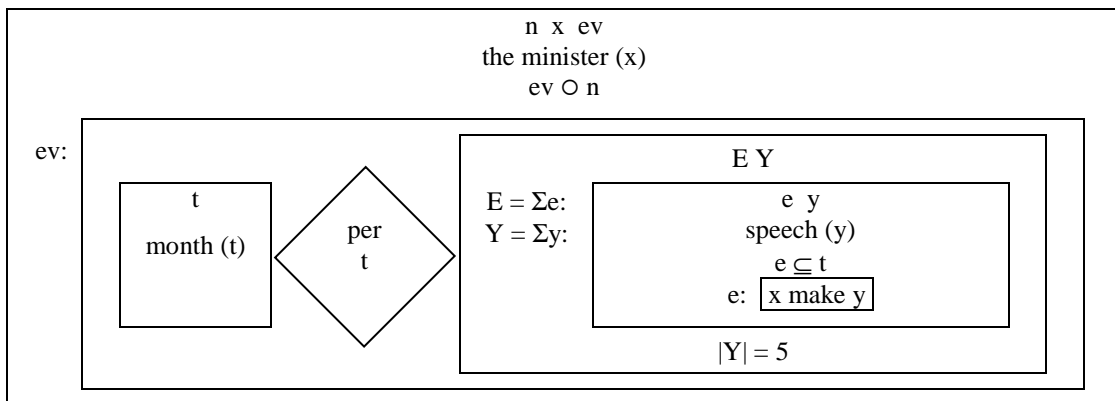
<sup>10</sup> Two notes about these representations:

(i) I will not attempt to provide here the semantics of the quantifier *por*. On the one hand, this quantifier is roughly similar to a universal quantifier. On the other hand, however, it often implies an *average value* (even when the explicit sequence *em média* (‘in average’), is absent).

- (53) O ministro fala com o presidente *cinco vezes por mês*.  
 “the minister speaks with the president five times per month”  
 The minister speaks with the president *five times a month*.



- (54) O ministro faz *cinco discursos por mês*.  
 “the minister makes five speeches per month”  
 The minister makes *five speeches a month*.



Note that the discourse referent associated with the *por*-adverbial (**t**) occurs within the sub-DRS associated with the event-abstraction (in the condition  $[e \subseteq t]$ ). Therefore, considered on its own (irrespective of the fact that it is part of a larger constituent expressing frequency), the *por*-adverbial defines a temporal frame for event quantification, and is thus comparable to the other temporal adverbials analysed in this paper (e.g. inclusive *desde*-adverbials).

#### 4 Conclusion

In this paper I attempted to identify of a set of constructions where quantification over eventualities expressed in a matrix clause directly depends on a temporal parameter expressed by a temporal adverbial. In constructions with adverbials that identify a time interval or an amount of time (e.g. *desde 1995 / since 1995, em 1995 / in 1995* or *em menos de dois meses / in less than two months*), the main role of the adverbial is, arguably, to provide a frame for event quantification, rather than to locate, or to express duration. In constructions with adverbials that identify time units (e.g. *por mês / per month*), the main role of the adverbial is to contribute to the expression of a frequency value in combination with a quantified phrase (e.g. *cinco vezes / five times* or *cinco discursos / five speeches*). However, a compositional analysis of frequency adjuncts seems defensible, according to which the isolated *per*-phrase

(ii) The fact that sequences with *por*-phrases behave as atelic predicates is symbolised in the condition  $\mathbf{ev}: \alpha$ , where  $\alpha$  is a duplex condition. The discourse referent **ev** represents the complex eventuality – an activity – of doing something with a certain frequency (for Aktionsart shift in DRT, cf. Swart 1998).

has a contribution of its own, viz. to set temporal boundaries for quantification along similar lines as the adverbials that define time intervals or amounts of time.

This paper considered mainly data from Portuguese, although the issue at stake – the evidence for a close interaction between temporal adverbials and event structure in some specific type of structures – has certainly a more general relevance.

## References

- Alves, Ana Teresa: 2003, *Sobre a Localização Temporal Adverbial Anafórica em Português*, Ph.D. thesis, Universidade dos Açores, Ponta Delgada.
- Bach, Emmon: 1986, The Algebra of Events, *Linguistics and Philosophy* **9**, 5-16.
- Eberle, Kurt: 1998, The Influence of Plural NPs on Aktionsart in DRT, in Fritz Hamm and Erhard Hinrichs (eds.), *Plurality and Quantification*, Dordrecht: Kluwer Academic Publishers, pp. 55-111.
- Huddleston, Rodney & Geoffrey Pullum: 2002, *The Cambridge Grammar of the English Language*, Cambridge: C.U.P.
- Kamp, Hans & Uwe Reyle: 1993, *From Discourse to Logic. Introduction to Modeltheoretic Semantics of Natural Language, Formal Logic and Discourse Representation Theory*, Dordrecht: Kluwer.
- Krifka, Manfred: 1990, Four Thousand Ships Passed through the Lock: Object-Induced Measure Functions on Events, *Linguistics and Philosophy* **13**, 487-520.
- Moens, Marc: 1987, *Tense, Aspect and Temporal Reference*, Ph.D. thesis, University of Edinburgh (reproduced by the Centre for Cognitive Science, University of Edinburgh).
- Mória, Telmo: 2000, *Identifying and Computing Temporal Locating Adverbials with a Particular Focus on Portuguese and English*, Ph.D. thesis, University of Lisbon. [available at <http://www.fl.ul.pt/dlgr/pessoais/tmoia/index.html>]
- Mória, Telmo: 2001, Temporal Location of Events and the Distribution of the Romance Counterparts of *Since*-Adverbials, in Joaquim Camps and Caroline Wiltshire (eds.), *Romance Syntax, Semantics and L2 Acquisition, Selected papers from the 30<sup>th</sup> Linguistic Symposium on Romance Languages, Gainesville, Florida, February 2000*, Amsterdam: John Benjamins, pp. 137-152.
- Quirk, Randolph *et al.*: 1985, *A Comprehensive Grammar of the English Language*, London: Longman.
- Rothstein, Susan: 1995, Adverbial Quantification over Events, *Natural Language Semantics* **3**, 1-31.
- Schein, Barry: 1993, *Plurals and Events*, Cambridge, Massachusetts: The MIT Press.
- Swart, Henriëtte de: 1998, Aspect Shift and Coercion, *Natural Language and Linguistic Theory* **16**, 347-385.
- Vlach, Frank: 1993, Temporal Adverbials, Tenses and the Perfect, *Linguistics and Philosophy* **16**, 231-283.

# THE PRESENT PERFECT AT THE SEMANTICS/PRAGMATICS INTERFACE: AMERICAN ENGLISH AND BRAZILIAN PORTUGUESE<sup>1</sup>

Karina Veronica Molsing,  
Pontifícia Universidade Católica, Brazil

karinaveronica21@yahoo.com

## Abstract

Modern theorists rarely agree on how to represent the categories of tense and aspect, making a consistent analysis for phenomena, such as the present perfect, more difficult to attain. It has been argued in previous analyses that the variable behavior of the present perfect between languages licenses independently motivated treatments, particularly of a morphosyntactic or semantic-syntactic nature (Giorgi & Pianesi 1997; Schmitt 2001; Ilari 2001). More specifically, the well-known readings of the American English (AE) present perfect (resultative, experiential, persistent situation, recent past (Comrie 1976)), are at odds with the readings of the corresponding structure in Brazilian Portuguese (BP), the ‘pretérito perfeito composto’ (default iterativity and occasional duration (Ilari 1999)). Despite these variations, the present work, assuming a tense-aspect framework at the semantic-pragmatic interface, will provide a unified analysis for the present perfect in AE and BP, which have traditionally been treated as semantically divergent. The present perfect meaning, in conjunction with the aspectual class of the predicate, can account for the major differences between languages, particularly regarding iterativity and the “present perfect puzzle”, regarding adverb compatibility.

## 1 Introduction

The present perfects in American English (AE) and Brazilian Portuguese (BP) are often treated as semantically divergent due to the apparent obligatory iteration of the BP variety.

- (1) a. Mary has sung “Happy Birthday”. (once)  
b. A Maria tem cantado “Parabéns”. (várias vezes)  
The Maria has sung “Congratulations” (many times)

Sentences like (1a) are most often used to express a single eventuality, although they are compatible with repetition when modified with such adverbs as 'always' or 'many times'. This is contrary to (1b), which cannot refer to a single eventuality, but must express an iteration of singing events. Obligatory iterativity is a phenomenon specific to the present perfect in BP, since the past and future perfects do not force iteration, although they are compatible with repetition as well. Some have characterized the structure's obligatory iterativity, distinguishing it from the AE present perfect, as being due to a covert habitual operator (Giorgi and Pianesi 1997) or to the selectional restrictions of the present tense morphology in BP (Schmitt 2001). The problem with these analyses is that while the present perfect is characteristically iterative, it can also express single, durative situations, as in (2) (Ilari 2001).

- (2) a. A Maria tem estado doente.  
The Mary has been sick  
b. Mary has been sick.

---

<sup>1</sup>This work was funded in part with a grant by CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior). I would like to thank the audience at *Sinn und Bedeutung 10* for their helpful comments, especially Bridget Copley, Patricia Amaral, Telmo Mória and Arnim von Stechow. All remaining errors are mine.

So, besides having the same periphrastic structure (AE, 'have' + past participle and BP, 'ter' + *particípio passado*), the two varieties also present a semantic overlap as shown in (2a) and (2b), whose meanings are equivalent. However, we still have the different readings to account for. The main readings to be considered for AE are the universal and the existential, reduced from Comrie's (1976) traditional four-way distinction, as shown in (3a) – (3d). Universal readings arise when the eventuality described holds true throughout the entire interval within which it is located. Existential readings arise when the eventuality described occurred at least once within the location interval. The existential subsumes a further distinction between resultative, recent past and experiential readings, which merely reflect contextual variants of the same eventuality. The main readings that arise in BP are that of iterativity and durativity or continuity. Iterativity is understood when the situation repeats throughout the location interval and durativity is similar to the universal reading. Below are some examples of the different readings.

- (3) AE
- |  |   |               |
|--|---|---------------|
| a. Experiential: John has visited Paris. (once/before)                       | } | (Existential) |
| b. Resultative: John has arrived. (and is here)                              |   |               |
| c. Recent past: I have just graduated from college.                          |   |               |
| d. Persistent situation: John has lived in New York for 4 years. (Universal) |   |               |

#### BP

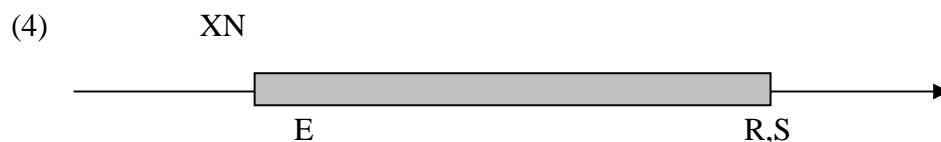
- a. Iterative: O Bruno tem ido à Disneylândia. (várias vezes)  
 The Bruno has gone to-the Disneyland  
 'Bruno has been going to Disneyland'
- b. Durative: A Maria tem sido feliz na Europa.  
 The Maria has been happy in-the Europe  
 'Mary has been happy in Europe'

In this paper, I will present a unified analysis for the present perfect structures in American English (AE) and Brazilian Portuguese (BP). In section 2, I will review the standard theories on the English present perfect and see how they might work for the BP present perfect, since the very few studies aimed at the BP present perfect have proven to be incomplete. Section 3 will test how the various readings that have been cited in the literature for the English present perfect and those available in the BP present perfect, work in a unified framework. The main property to be reconciled is that of iterativity which will then be tied into adverb restrictions in the next section. Section 4 will discuss the puzzles that arise in both languages regarding adverb compatibility. Section 5 will conclude.

## 2 Standard approaches

### 2.1 Extended Now

Standard approaches to the present perfect make use of variations of Reichenbach's (1947) three-point system of tenses: event time, speech time, and reference time. In the present perfect, the event time is located before speech time and the reference time is simultaneous with speech time. Many theorists favor the Extended Now theory (XN), in which the perfect introduces an interval whose left boundary is unspecified and whose right boundary is fixed at the reference time, in the case of the present perfect, speech time (McCoard 1978; Dowty 1979; Iatridou et al. 2003). The eventuality is located somewhere within this interval.



The immediate benefit of the XN theory is that it explains the present perfect's incompatibility with past-time adverbials, known as the “present perfect puzzle” (Klein 1992, 1994). Since the XN interval includes speech time, it is inappropriate for it to be modified by an adverb locating the eventuality in the past. This puzzle shows up in BP as well.

- (5) a. \*Lena has worked yesterday.  
b. \*A Lena tem trabalhado ontem.

Also, XN theories more aptly account for the universal readings with adverbs such as 'since' and 'for'. The different readings are derived from the semantics of the perfect meaning and the meaning of the particular adverbs. An XN analysis defends that universal readings (u-perfects) can only arise with adverbials (Iatridou et al. 2003). While adverbials play an important part in interpreting the present perfect, adverb modification is not a necessary condition for using and understanding it. A resulting drawback of defending the inseparability of u-perfects and adverbs is that one would have to then stipulate ambiguous adverbs to account for ambiguous readings of the u-perfect. Consider the following examples.

- (6) a. John has been sick for two weeks.  
b. John has been sick since 1990.

(6a) can be understood as ambiguous between the reading that John is still sick at speech time and the other reading that at some time in the past, John was sick for a period of two weeks. Likewise in (6b), not only can we understand that John's being sick is true for the entire period from 1990 up to and including speech time, it can also be true that at some point between 1990 and speech time, John fell sick and is better now. In situations where no adverb is used, XN theories often resort to covert adverbs to accommodate the notion that u-perfects can only arise with adverbs. This complicates the derivation of an existential reading, which is equally possible, given contextual information or discourse cues. See (7a).

- (7) a. John has been sick.  
b. O João tem estado doente.

Theorists consider the BP present perfect to have the particular characteristic of not requiring adverbial modification, as in (7b), setting it apart from other Romance languages (Boléo 1936; Ilari 2001). On the occasions in which the structure is used to express a continuous situation, it is only through adverbial modification that we can get an existential reading, as in (8).

- (8) O João tem estado doente muitas vezes.  
The John has been sick many times  
'John has been sick many times'

However, this varies across dialects, such that both a universal and an existential reading are possible without adverbial modification. This possibility argues against covert adverbs. Finally, XN analyses generally are not compatible with repetition, not accounting for sentences like (9a), which do not seem to be of the same type as (9b), which are treated as single eventualities of five readings, for example (Iatridou et al. 2003).

- (9) a. Bill has read “The Da Vinci Code” many times.  
b. Bill has read “The Da Vinci Code” five times.

Due to these inconsistencies, an XN analysis should be discarded because of its unconvincing cross-linguistic applicability.

## 2.2 Anteriority

Anteriority-type theories defend an interaction between the three temporal points or intervals involved in the present perfect meaning (Klein 1992, 1994). This type of theory claims that there is an interval located before speech time, within which the eventuality is located. The reference time (Klein's 'topic time') is often claimed to include or equal the speech time.

(10) tt = topic time    tsit = time of situation    tu = time of utterance



In Klein's version, however, the reference time is given a more explicit role as topic time. While the event time and speech time remain virtually the same (Klein's situation time and utterance time, respectively), the topic time refers to the time for which the claim is made. The notion of topic time can be most easily demonstrated by a question/answer scenario, in which the question sets the topic time. In (11), it is possible that the man is still lying on the ground at speech time, but the question limits the answer to the topic time set by the underlined portion.

(11) Q: What did you see when you walked in the room?

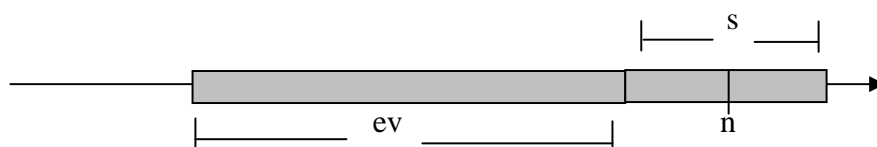
A: A man was laying on the ground.

The tense relation is given by topic time and speech time while the aspect relation is given by event time and topic time. In the present perfect, the topic time is always fixed at the present, thus including speech time. An interesting byproduct of the present perfect definition given above is that it says nothing about the distance between the eventuality and speech time, nor does it say anything about the frequency of intervals. It is Klein's topic time that distinguishes the present perfect from the simple past and the rest of the perfect system. This means that the ambiguity between the universal and existential readings is to be resolved at the level of pragmatics. However, the role of topic time in the lexical classification of verb phrases is indefeasible as Klein does not apply the traditional aspectual distinctions, making the potential for a formal implementation unclear.

## 2.3 Stativizer

Finally, there are some analyses that treat the perfect as an operator that introduces a state (Kamp and Reyle 1993; de Swart 1998; Nishiyama and Koenig 2004). There are different ways of conceptualizing how the perfect is to introduce the consequent state, but they are conceptually similar to the idea of the eventuality's interval preceding speech time, as in the anteriority theory. The relation between the prior eventuality and the ensuing state can be understood in one of three ways: as one of abutment (Kamp and Reyle 1993; de Swart 1998), causation (Moens and Steedman 1988; Smith 1997), or as introducing a permanent state (ter Meulen 1995).

(12) n = now; speech time    s = perfect state    ev = eventuality time





As Nishiyama and Koenig (from here on, NK) attest, all three of these types of stative approaches run into problems when the different types of possible inferences are taken into account. NK's examples below show how a stative approach must account for all of these possible inferences (*s* = perfect state).

- (13) Ken has broken his leg.  
 a. His leg is broken (*s*)  
 b. Ken is behind in his work (*s*)  
 c. #Susan is married (*s*)
- (14) I have seen the key in this room.  
 a. The key is in this room (*s*)
- (15) I've been in London since last week.  
 a. I am in London (*s*)

(13a) and (13b) show that we must account for two types of resultant relations: those entailed lexically and those entailed conversationally. We must also be able to exclude those states which have no causal relation, as in (13c), which would not be excluded in a stative theory with abutment. Also, we must allow for inferences which are not necessarily causal as in (14a) and (15a). NK account for these facts by including a free property variable in the semantics of the perfect meaning, whose value is to be determined at the level of pragmatics, guided primarily by Levinson's I-principle of informativeness.

In a sense, Klein's approach could be seen as a type of perfect state theory, such that the topic time serves as a "posttime" or "poststate" of the eventuality in question. This topic time takes over the role of reference time. In NK's analysis, the corresponding structure to Klein's topic time would be the perfect state. However, in NK's definition for the perfect, the original reference time remains, being that the perfect state is introduced specifically by the perfect. The perfect can take any type of eventuality and map it onto the consequent state, which overlaps speech time and thus, reference time. The category of the consequent state is determined pragmatically. This gives the prior eventuality current relevance via inference processes. How we get the relation between the prior eventuality and the consequent state is what makes the difference between NK's analysis and other treatments of the perfects as stativizers. It is not a relation of abutment, causality nor that which entails permanent consequences. It is a relation of inference that motivates the semantic-pragmatic interface. (16) through (18) are paraphrased from NK (2004: 107-8) and show that the perfect state has a semantic and a pragmatic function.

- (16) a. Semantic part: the free variable *X* is a semantic constraint imposed by the perfect form.  
 b. Pragmatic part: the value of the free variable *X* is determined by pragmatic inferences.  
 c. Constraint on *X*: it is an epistemic variable such that it is inferable from the prior eventuality.

This can be translated as (17), which means that there is some eventuality *e* and some free property variable *s* such that *e* is located before speech time and *s* overlaps with speech time.

- (17)  $\exists e \exists s [\phi(e) \wedge X(s) \wedge \tau(e) < n \wedge \tau(s) \circ n]$

How *X* is determined is guided by Levinson's I-principle of informativeness.

- (18) I-principle:  
 1. Maxim of minimization: the speaker always chooses the least informative utterance.

2. The hearer enriches the less informative utterance into the most specific interpretation, using world knowledge.

In the following proposal, I will adapt NK's analysis for BP data. To be clear, the following problems that we need to account for are: how to systematize the different readings that arise and how to understand the variable adverb compatibility in AE and BP.

### 3 Different readings in AE and BP

First, let us get a handle on what types of readings we are trying to account for. As mentioned in the previous section, many theorists defend that the universal reading can only arise in the company of adverbs. We have concluded here that both AE and BP present perfects can be used without adverbial modification. Another point to be made clear regards the fact that the BP present perfect has been cited as having only a universal, and not an existential, reading (Brugger 1978; Squartini and Bertinetto 2000). This conflicts directly with what Amaral and Howe (2005) claim about the BP present perfect, which is that the existential is a subcase of iterativity<sup>2</sup>. This is further proof of the inconsistency of the universal/existential readings in the literature. For these reasons, I propose to abandon the problematic terms 'universal' and 'existential' in favor of 'continuous' and 'noncontinuous'. Continuous readings arise when certain predicates are used to express duration or continuity throughout the interval and whose subevents repeat. Noncontinuous readings arise when certain predicates are used to express iterative situations, repeating whole events.

This way of characterizing noncontinuous readings is compatible with the notion of the presupposition of repeatability that is often associated with the present perfect (Inoue 1979; Smith 1997). That is, the AE present perfect is often used to express one-time occurring eventualities, but there is still some element of repetition that guides its felicitous use. This explains the famous examples in (19) and (20)

- (19) a. ??Einstein has visited Princeton.  
 b. Princeton has been visited by Einstein.
- (20) Have you visited the Monet exhibit?

Example (19a) is unacceptable because Einstein is dead and is therefore no longer capable of visiting Princeton again. However, (19b) is more acceptable if we are talking about Nobel Prize winners who have visited Princeton. Moreover, it is only appropriate to ask a question like (20) if: (i) the museum exhibit is still open, so that one can still possibly visit it; and (ii) the person being asked the question is physically capable of visiting the museum exhibit. Hence, the event in question must be repeatable and the referents of the noun phrase must exist at the time of utterance (Smith 1997). This condition of repeatability corroborates the idea that existential-type readings are a subtype of iterative readings. However, this does not mean that the eventuality must repeat at present or any time in the future, as shown by (21a). Even when the eventuality is understood as iterative as in the BP counterpart (21b), continuation can be canceled. So, while the eventualities need not repeat, or continue to repeat, the possibility must be there at speech time.

- (21) a. I have visited my parents, but I won't anymore.  
 b. Eu tenho visitado os meus pais, mas não vou mais.  
 I have visited the my parents, but no I-go more

How we get the readings from the present perfect meaning works like this. The eventuality described in the *ev* interval introduces a consequent state *s*, which overlaps speech time *n*, and

---

<sup>2</sup>Amaral and Howe (2005) also deal with subjunctive readings which can have existential readings. This is corroborated by historical data as well.

whose category is determined at the level of pragmatics. So, going back to example (13), an inferable consequent state to Ken's leg being broken are those listed in (13a) and (13b), but not (13c), since it is not inferable from the prior eventuality. Likewise, (14a) and (15a) are appropriate inferences for (14) and (15). Now take a stative predicate as in (22). An appropriate inference is that Bill still be in London at speech time. This means that when the prior eventuality is stative, it may introduce a consequent state of the same nature. This is how we get continuous readings. But this inference is not always necessary with stative predicates since other inferences are possible. For example,

- (22) Bill has been in London since last week.
- a. X(s): Bill is in London.
  - b. X(s): Bill is not too familiar with the tube system.
  - c. X(s): Bill got coverage of the McDonald's bombing.

The first inference is of a lexical nature and the second of a conversational nature. The third inference cancels the continuative nature of the prior eventuality. In this situation, it could be understood that Bill is a field news reporter based in New York. The bombing of a McDonald's in London occurred a week prior to the utterance and some time between the bombing and the utterance, Bill went to London to get coverage of it and has already left. (22) can be uttered felicitously by someone in London<sup>3</sup>. Turning to examples in BP, let us see how the typical readings relate to aspectual class.

Achievements and accomplishments are noncontinuous

- (23) A Lúcia tem chegado tarde ao escritório. (iterative events)

The Lucia has arrived late to-the office

'Lucia has been arriving late to the office'

- (24) O Paulo tem pintado a casa. (iterative subevents)

The Paulo has painted the house

'Paulo has been painting the house'

(24) means that the target state is not reached at speech time: the house is not completely painted yet.

Activities are noncontinuous

- (25) A Ana tem corrido muito. (iterative events or subevents)

The Ana has run a lot

'Ana has been running a lot'

(25) can be understood as repeating subevents if some accomplishment-like reference exists in the context, like if Ana is running a marathon and it is not over yet. Then it would be understood similarly to (24). Otherwise, as a true activity, it would be understood as iterative events of running. For stative predicates, Amaral and Howe (2005) distinguish stage-level and individual level predicates since they behave slightly differently with respect to iterativity and continuity.

Individual-Level Predicates (ILP) are noncontinuous

- (26) O João tem sido inteligente.

The João has been intelligent.

'João has been intelligent'

---

<sup>3</sup>To be uttered felicitously by someone not in London, the sentence would have to read 'Bill has been *to* London since last week'.

This sentence means that João has demonstrated his intelligence on various occasions<sup>4</sup>.

Stage-Level Predicates (SLP) are continuous

(27) A Maria tem estado doente.

The Mary has been sick

'Mary has been sick'

Only these last types of predicates do not force iterativity and continuity holds. An iterative reading is also possible with SLP's, but only with overt adverbial modification (Amaral and Howe 2005), as in (28).

(28) A Maria tem estado doente muitas vezes ultimamente.

The Mary has been sick many times lately

'Mary has been sick a lot lately'

#### 4 Present perfect puzzles

While the AE present perfect is compatible with single readings and iterative readings, BP forces iterative readings in most cases. In AE, we often get iterativity through adverb modification or plural NPs. Since these modifications are not necessary in BP, why is iterativity forced? This is what I will call the “frequency puzzle” and, as outlined above, it refers to the fact that the BP present perfect is incompatible with definite frequency adverbs like 'once' ('uma vez') or 'five times' ('cinco vezes'), but is compatible with indefinite frequency adverbs like 'many times' ('muitas vezes') and 'lately' ('ultimamente'). The traditional “present perfect puzzle”, the incompatibility with past time adverbials will also be dealt with, in section 4.2.

##### 4.1 The frequency puzzle

If a semantic analysis of the present perfect in BP is to stipulate that eventualities described by eventive and ILP predicates must refer to two or more occurrences (instead of 'at least one'), it must also explain why BP speakers cannot specify this number. Ultimately, what one really must explain is why frequency cannot be modified at all, regardless of whether it is one, three or fifty occurrences. It is not false to use the BP present perfect to describe an eventuality that in fact occurred only three times. However, it is infelicitous to specify the three times in the present perfect clause. This leads us to question the generally accepted idea that it is necessarily false to use the present perfect to describe an eventuality that occurs only once. Perhaps it is also just infelicitous. To even begin to answer any of these questions, we must first try to figure out the source of the iterativity.

Many theorists agree that the perfect in English outputs a state regardless of the type of eventuality described by the perfect (Dowty 1979; Kamp and Reyle 1993; Michaelis 1998; de Swart 1998). Let us assume for now that the perfect in BP outputs a state as well. Since the rest of the perfect system behaves similarly in both languages, this is not such an implausible assumption.

There are many ways languages can encode aspect and, taking a hint from Klein (1994), one can expect that some languages focus on certain parts of events while other languages focus on other parts of events. For example, in complex telic events, English tends to focus on the initial state such that the lexical properties of the final state are projected into the “posttime” (Klein 1994). In the case of the present perfect, the posttime is the perfect state. So, for a

---

<sup>4</sup>This seems to reflect some kind of coercion from an individual-level predicate to a stage-level predicate, but the output appears eventive, not stative. I am not sure what the nature of this coercion would be and so I leave it up to future research.

sentence like 'Mary has entered the room', the immediate lexical inference is that she is in the room. Now, given the fact that the BP present perfect has often been characterized as an imperfective, or a perfective with imperfective properties (Squartini and Bertinetto 2000), we can say that BP focuses on ongoing action leading to the final state. This way, the lexical properties to be projected into the “posttime”, or the perfect state, are those of continuation.

Therefore, we can maintain that both perfects output a state, but the difference is in what kind of state is introduced. In AE, the perfect most likely introduces some resulting state of the prior eventuality. In BP, the perfect most likely introduces the beginning of a state of continuation, and in the case of eventives, iterativity. More specifically, the lexical inferences that can be derived from the prior eventuality will corroborate the idea that AE outputs a resultant state and BP outputs an iterative state. While conversational inferences, discourse cues and context can give us an array of other inferences, we are concerned only with the lexical for now. Let us look at some examples. The BP examples and perfect state inferences are direct translations of the AE examples and inferences.

(29) American English

Aspectual Class	Eventuality	Lexical X(s)
Achievement	John has arrived late to work.	John is here and is late. #John arrives late
Accomplishment	John has painted his house.	The house is painted/complete. #John paints his house.
Activity	John has run.	John is disposed to run. #John runs
Individual-level	John has been smart.	??John is smart. John is not always smart.
Stage-level	John has been sick.	John is sick. John is not sick.

(30) Brazilian Portuguese

Aspectual Class	Eventuality	Lexical X(s)
Achievement	O João tem chegado tarde.	#O João está aqui e está atrasado. O João chega tarde.
Accomplishment	O João tem pintado a sua casa.	#A casa está pintada/completa. O João pinta a sua casa.
Activity	O João tem corrido.	O João está disposto a correr. O João corre.
Individual-level	O João tem sido inteligente.	??O João é inteligente. O João não é sempre inteligente.
Stage-level	O João tem estado doente.	O João está doente O João não está doente.

The right hand columns show the lexical inferences that can and cannot be derived from the prior eventuality. In achievements and accomplishments, the opposite kinds of perfect states are inferable from the prior eventuality. In AE, the perfect state inferences reflect resultant states and do not allow for a generic or repetitive reading, while BP does. In activities, one can infer in AE about the general disposition of the agent while in BP, one can infer, again a generic or repetitive reading as well as disposition. The inferences in individual-level and stage level predicates are the same. In BP, the generic or habitual inference is always cancelable with 'mas não mais' ('but not anymore'), to show that the iterative state output by the perfect does not have to be true at speech time. What must still be met, though, is the condition of repeatability as mentioned in section 3. In order to confirm that the consequent state continues or not, it must be possible for it to continue. AE and BP behave similarly with statives because the result of a state and the continuation of a state are the same.

Summing up, both AE and BP perfects are compatible with resultative and continuous inferences, but in AE the resultative property is encoded lexically while the continuous is not, and in BP, the continuous property is encoded lexically, while the resultative is not. The AE perfect introduces the end of a perfect state and the BP perfect introduces the beginning of an iterative state<sup>5</sup>.

A common test for whether an eventuality can occur in the present perfect in BP is if it is compatible with 'ultimamente' ('lately'). This ties in well with the analysis here since the iterative perfect state that yields a habitual or generic inference is located at speech time. Since the iterative state only begins after the prior eventuality, the genericity is delimited by the introduction of this state, giving us a sense of 'lately' instead of 'always'. 'Always' ('sempre') is also compatible with the BP present perfect, but must be made explicit.

If the above line of reasoning is true, then we also have an explanation for why the BP present perfect is incompatible with definite frequency adverbs, regardless of whether the frequency refers to one or more. The iterative state is compatible with those adverbs that can iterate with the eventuality and is not compatible with definite frequency adverbs which would have scope over the eventuality. So, while (31) may refer to three particular instances, it was not the speaker's intention to assert this when using the present perfect. Likewise, if the eventuality only refers to one occurrence, it would be inappropriate to use the present perfect since an iterative state is always introduced by eventive predicates in the perfect. Definite frequency adverbs are acceptable when in contexts of indefinite repetition, as in (32).

- (31) a. A Brenda tem beijado.  
 The Brenda has kissed  
 'Brenda has been kissing (lately)'
- b. \*A Brenda tem beijado três vezes.  
 The Brenda has kissed three times  
 'Brenda has kissed three times'
- (32) Eles têm nos visitado três vezes por semana.  
 They have us visited three times per week  
 'They have visited us three times a week'
- (33) a. Brenda has kissed.  
 b. Brenda has kissed three times.

---

<sup>5</sup>The notion of the BP perfect introducing the beginning of an iterative state was first suggested to me informally in a personal communication with Telmo Mória (2005).

In the AE counterparts, (33a) has an 'at least once' reading, given that the lexical property to be projected into the perfect state is that of Brenda being in the poststate of kissing. The nature of the perfect state as a resultative is what allows for modification of frequency as in (33b). Summing up, the frequency puzzle is due to the fact that the perfect in each language introduces states of different categories.

#### 4.2 The past adverb puzzle

The original "present perfect puzzle" as dubbed by Klein (1992, 1994) refers to the incompatibility of the present perfect with past time adverbs. This puzzle is shared by both AE and BP.

- (34) a. \*O Chris tem chegado ontem.  
b. \*Chris has arrived yesterday.

Positional adverbs can modify either the reference time or the event time for any kind of eventuality. This is more easily demonstrated with the past perfect.

- (35) a. Chris had left **yesterday**. (reference time)  
b. Chris wasn't in his hotel room this morning. He **had left** yesterday. (event time)

Modification of one or the other time interval depends on lexical specification and context. Many XN theories resolve this by the fact that an interval including the speech time, cannot be modified by a past-time adverb. This, however, excludes all positional adverbs (McCoard 1978, Dowty 1979, Pancheva and Stechow 2004). If the positional adverb is indefinite, it is compatible with the present perfect.

- (36) a. Chris has worked at 9 o'clock.  
b. O Chris tem trabalhado às 9 horas.  
(37) a. Chris has worked on Sundays.  
b. O Chris tem trabalhado nos domingos.

The incompatibility of the present perfect with definite positional adverbs in the past results from the reference time already being modified in terms of position, by speech time in the present tense. So, positional adverbs cannot modify both the reference time and the eventuality time simultaneously, unless there is some reason to do so. This constraint, known as the present perfect puzzle, disappears once we distinguish definite from indefinite positional adverbs.

#### 5 Concluding Remarks

The analysis outlined here, while of an informal nature, argues for a unified analysis of the present perfect in American English and Brazilian Portuguese. Adopting a perfect state framework based on Nishiyama and Koenig (2004), the present perfect meaning in both languages is semantically uniform and their differences are explained by a pragmatic divergence. The sources of both the frequency puzzle and the past adverb puzzle can be derived from the semantics and pragmatics of this present perfect meaning.

#### References

- Amaral, P. and Howe, C.: 2005, The semantics of the Portuguese present perfect and the grammaticalization of *ter/haver*, *presentation handout*, The 8<sup>th</sup> annual Ohio state university symposium on Hispanic and Luso-Brazilian Literatures, Linguistics and Cultures.

- Boléo, M. de P.: 1936, *O pretérito e o perfeito em português, em confronto com as outras línguas românicas*, Coimbra, Imprensa da Universidade.
- Brugger, G.: 1978, Eventive time properties, in A. Dimitriadis, L. Siegel, C. Sure-Clark, and A. Williams (eds), *Proceedings of the 21st Annual Penn Linguistics Colloquium*, pp. 51–63.
- Comrie, B.: 1976. *Aspect*. Cambridge: Cambridge University Press.
- Dowty, D.: 1979, *Word meaning and montague semantics: the semantics of verbs and times in generative semantics and in montague's PTQ*. Dordrecht: D. Reidel Publishing Co.
- Giorgi, A. and Pianesi, F.: 1997, *Tense and aspect: from semantics to morphosyntax*. New York: Oxford University Press.
- Iatridou, S., Anagnostopoulou, E. and Izvorski, R.: 2003, Observations about the form and meaning of the perfect. in A. Alexiadou, M. Rathert and A. von Stechow (eds), *Perfect explorations*, Berlin: Mouton de Gruyter, pp. 153–205.
- Ilari, R.: 2001, Notas para uma semântica do passado composto em português, *Revista Letras* 55, 129–152.
- Inoue, K.: 1979, An analysis of the English present perfect, *Linguistics* 17, 561–589.
- Kamp, H. and Reyle, U.: 1993, *From discourse to logic*. Dordrecht: Kluwer Academic Press.
- Klein, W.: 1992, The present perfect puzzle, *Language* 68, 525–552.
- Klein, W.: 1994, *Time in Language*. London: Routledge.
- McCoard, R.: 1978, *The English Perfect: Tense Choice and Pragmatic Inferences*. Amsterdam: North-Holland Press.
- Michaelis, L.A.: 1998, *Aspectual grammar and past-time reference*. Routledge: London.
- Moens, M. and Steedman, M.: 1998, Temporal ontology and temporal reference, *Computational Linguistics* 14, 15–29.
- Nishiyama, A. and Koenig, J.P.: 2004, What is a perfect state?, in B. Schmeiser, V. Chand, A. Kelleher and A. Rodriguez (eds), *WCCFL 23 Proceedings*, pp. 101–113, MA: Cascadilla Press.
- Pancheva, R. and von Stechow, A.: 2004, On the Present Perfect Puzzle, in K. Moulton and M. Wolf (eds) *Proceedings of NELS 34*.
- Reichenbach, H.: 1947, *Elements of Symbolic Logic*, New York: The Free Press.
- Schmitt, C.: 2001, Cross-linguistic Variation and the Present Perfect: The Case of Portuguese, *Natural Language and Linguistic Theory* 9, 403–453.
- Smith, C.: 1997, *The parameter of aspect (second edition)*. Dordrecht: Kluwer Academic Press.
- Squartini, M. and Bertinetto, P.M.: 2000, The simple and compound past in romance languages, in Dahl, Ö., *Tense and aspect in the languages of Europe*. Berlin; New York: Mouton de Gruyter.
- de Swart, H.: 1998, Aspect shift and coercion, *Natural Language and Linguistic Theory* 16, 347–385.
- ter Meulen, A.: 1995, *Representing time in natural language: the dynamic interpretation of tense and aspect*. Cambridge: The MIT Press.



# MULTIPLE MODALS CONSTRUCTION

Fabrice Nauze,  
ILLC, University of Amsterdam

F.D.Nauze@uva.nl

## Abstract

Modal items of different semantic types can only be combined in a specific order. Epistemic items, for instance, cannot be embedded under deontic ones. I'll argue that this fact cannot be explained by the current semantic theories of modality. A solution to this problem will be developed in an update semantics framework. On the semantic side, a distinction will be drawn between circumstantial information about the world and information about duties, whereas I'll use Nuyts' notion of m-performativity to account for certain use of the modal items.

## 1 Introduction

The aim of this paper is to get a better grip on certain properties of modal items. The problem I will focus on concerns the modal combination of different semantic types.

Even though there is no general agreement on a precise definition and categorization of modality, a certain number of types have been identified and emerged as typical instances, like epistemic and deontic modality. I will concentrate on those two types and try to extend the analysis to a simple instance of evidentiality.

Both epistemic and deontic modality have generally been studied in isolation. Modal items (figure 1) have been categorized as belonging to one or more types, as epistemic or deontic, with a certain force, on a scale from mere possible to necessary. However not much work has been devoted to the study of combinations of modal items. This contribution will try to highlight some problems inherent to these cases.

	possibility	necessity	evidential
modal verbs	may, might	must, have to	
adverbs	maybe	certainly, obligatorily	reportedly
adjectival phrases	it is possible that	it is necessary that	
verbs	to be allowed to	to be required to	
PP			according to John

Figure 1: Some modal items of English

### 1.1 Some data

To see what is special about these combinations, we can look at the following examples:

- (1) a. Adverbs & modal verbs:  $[[epistemic]] > [[deontic]]$   
Maybe John must go to Berlin.
- b.  $2 \times$  adverbs:  $[[evidential]] > [[deontic]]$   
Reportedly, this rule doesn't obligatorily apply to students.
- c.  $2 \times$  modal verbs:  $[[epistemic]] > [[deontic]]$   
John may have to go to Berlin.

- d. Modal verbs & verbs:  $[[epistemic]] > [[deontic]]$   
 John might be obliged to quit the country.
- e. Adjectival phrase & verb:  $[[epistemic]] > [[deontic]]$   
 It is possible that John is allowed to leave.
- f. PP & modal verb:  $[[evidential]] > [[epistemic]]$   
 According to John, the company might fire 1.000 employees.

The inequalities indicate the relative (semantic) scope of the modal items. In (1-a) for instance,  $[[epistemic]] > [[deontic]]$  means that the epistemic item is interpreted as having scope over the deontic item. Abstracting from the particular examples it seems that the following hypothesis can be formed:

**Hypothesis 1** *If two modal items of different types are present in a grammatical sentence, they will be interpreted as having the following scope*

$$[[evidential]] > [[epistemic]] > [[deontic]]$$

We can try to test this hypothesis by trying to produce a counterexample:

- (2) a. #John must possibly go to Berlin.<sup>1</sup>  
 b. #John is allowed to certainly go to Berlin.  
 c. #The company might reportedly fire 1.000 employees.<sup>2</sup>

Those examples seem to confirm the hypothesis. However, more than a correct description of the phenomenon (given the 9 sentences...), we would like to have an explanation. The obvious and traditional way to go is to check whether it is a syntactic, semantic or pragmatic problem.

The paper will be organized as follows. In section 2, I will argue that it cannot be a purely syntactic problem; in section 3, I will review the traditional semantic analysis of modality and argue that it cannot explain adequately this phenomenon either. I will then introduce Nuyts' analysis in section 4 and show how it can be used to sketch a framework where the problems at stake are made more explicit (section 5). I will finally conclude on a cross-linguistic note.

## 2 Not a syntactic problem

The order of interpretation proposed in hypothesis 1 will probably look familiar to the reader. Namely, it looks like a highly simplified version of Cinque's hierarchy of adverbs and functional heads in Cinque (1999):

$$\dots > \text{ModP}_{\text{evidential}} > \text{ModP}_{\text{epistemic}} > \dots > \text{ModP}_{\text{alethic}} > \dots > \text{ModP}_{\text{volition}} > \dots > \\ \text{ModP}_{\text{obligation}} > \text{ModP}_{\text{ability}} > \dots > \text{ModP}_{\text{permission}} > \dots > V$$

One could maybe argue that the semantic ordering is derivative of this universal syntactic hierarchy. However I don't think any argument for an explanation along this line, that the hard-wiring in the syntax implies the semantic scope restrictions, sounds convincing. To understand why, here is a quote from Cinque:<sup>3</sup>

<sup>1</sup>I just claim here that the reading where *possibly* is interpreted under deontic *must* is not grammatical. The sentence seems correct with this surface syntactic structure if the epistemic adverb is "semantically moved" to have scope over the deontic modal.

<sup>2</sup>The reading with the evidential having scope over the epistemic modal is available and grammatical.

<sup>3</sup>This is however quite a selective cut of the original text! The first dots actually corresponding to "Although"...

“...many (perhaps most) of the relative orders among functional elements may ultimately reduce to scope relations among what we can take to be different semantic operators...” Cinque (1999, p.134-135)

Although Cinque ultimately considers his hierarchy to be hard-wired in the syntax, he concedes that a great part of the explanation for the hierarchy lies in the nature of the “semantic operators” and their relative scope. Hence the hierarchy still needs to be explained in non-syntactic terms. Moreover, syntacticians with concurrent theories about the syntax of modal items, like Cormack and Smith (2002), still agree on this point as well.

It has to be stressed however that the syntactic properties of particular modal items usually do influence their combinatorial properties with other modal elements. The point I want to make here however is that the fact that epistemic modals are “never” interpreted under deontic ones cannot be explained by syntactic considerations alone. As there seems to be an agreement among syntacticians on the fact that hypothesis 1 is not a strictly syntactic phenomenon, I will gladly take over this conclusion and continue the investigation by looking at the semantics of modal expressions.

### 3 Truth-conditional semantics

#### 3.1 Kratzer’s possible worlds semantics

(Kratzer 1981, Kratzer 1991) offers a unified analysis of natural language modality within the framework of possible worlds semantics. The main tenet of her analysis is that modal items are not polysemous but context-sensitive. To be more precise, the modal items (like modal auxiliaries) that can be interpreted in different ways (deontically and epistemically, for instance) are context-sensitive.

Modality is a semantic domain that has to do with possibility and necessity. The quantificational force of a modal is therefore not context-sensitive, for instance *must* has universal force (necessity) whereas *may* has existential force (possibility).<sup>4</sup>

The context then fixes the interpretation to be given to a modal element through conversational backgrounds (the “In view of...” part of examples in (3)). Obviously (3-a) is interpreted epistemically and (3-b) deontically.

- (3) a. (In view of what is known) John may go to his office.  
b. (In view of what the law provides) John may go to his office.

In order to avoid some problems of simple modal logic, modals are made doubly context-dependent. They depend on two different conversational backgrounds (functions from worlds to sets of propositions): one determining the accessible worlds from the world of evaluation (modal base), the other ordering those accessible worlds (ordering source). For instance, epistemic modals depend on an epistemic modal base and a stereotypical ordering source (characterizing a ‘normal’ course of events) and deontic modals depend on a circumstantial modal base (characterizing the relevant facts) and a deontic ordering source.

<sup>4</sup>It has recently been argued in Matthewson, Rullmann and Davis (2005) that this is actually not a cross-linguistically valid generalization. Lillooet’s modal enclitics would seem to have a context-dependent quantificational force.

### 3.2 Formalization

I will first introduce von Fintel and Iatridou's version of Kratzer's system (as formulated in von Fintel and Iatridou (2004)).

**Definition 2** *Let  $W$  be a set of possible worlds.*

- i) A **proposition**  $p$  is a set of worlds,  $p \in \mathfrak{P}(W)$ .
- ii) A **conversational background** is a function from worlds to sets of propositions,  $f : W \rightarrow \mathfrak{P}(\mathfrak{P}(W))$ .
- iii) If a conversational background  $f$  is a **modal base**, it determines a set of accessible worlds from  $w$  by  $\cap f(w)$ .
- iv) A set of propositions  $P$  determines a **strict partial order**  $<_P$  as follows:

$$\forall w', w'' : (w' <_P w'' \text{ iff } \forall p \in P (w'' \in p \rightarrow w' \in p) \text{ and } \exists p \in P (w' \in p \wedge w'' \notin p))$$

- v) A strict partial order  $<_P$  determines a **selection function**  $max_P$  from set of worlds as follows:<sup>5</sup>

$$\forall V \subseteq W : max_P(V) = \{w \in V : \neg \exists w' \in V : w' <_P w\}$$

Intuitively, the ordering source will be used to order the worlds and the selection function will select the 'best' worlds according to it. We are now ready to give the definition of a possibility and a necessity modal:

**Definition 3 (Necessity and possibility modal)** *In a world  $w$ , a proposition  $p$  is a **necessity** (respectively **possibility**) with respect to a modal base  $f$  and an ordering source  $g$ , i.e.  $\llbracket must\ p \rrbracket^{w,f,g} = 1$  ( $\llbracket may\ p \rrbracket^{w,f,g} = 1$ ) iff*

$$\begin{aligned} & \forall w' \in max_{g(w)}(\cap f(w)) : w' \in p \\ & (\exists w' \in max_{g(w)}(\cap f(w)) : w' \in p) \end{aligned}$$

To summarize, all modal items are analyzed as quantifiers over possible worlds. Which worlds are to be quantified over is contextually determined: only the closest accessible worlds according to an 'ideal' are considered.

### 3.3 Examples

- (4) (In view of what his boss ordered him) John must go to Berlin.

$$\begin{aligned} & \llbracket must\ (\text{John goes to Berlin}) \rrbracket^{w,f,g} = 1 \quad \text{iff} \\ & \forall w' \in max_{g(w)}(\cap f(w)) : w' \in (\text{John goes to Berlin}) \end{aligned}$$

Sentence (4) is interpreted deontically. In the present framework, that means that the context provides a circumstantial modal base  $f$  and a deontic ordering source  $g$ . The sentence is true if and only if in all the worlds that share the same circumstances as the base world  $w$  and where most of his duties are fulfilled, John goes to Berlin. We can now turn to an example of combination of modals.

<sup>5</sup>This selection function determines the closest worlds according to the 'ideal'  $P$ . As usual, this move is only harmless as long as we assume the Limit Assumption of Lewis (1973, p.19).

(5) Pedro may have to leave the country.

$$\begin{aligned} & \llbracket \text{may must (Pedro leaves the country)} \rrbracket^{w, f_1, g_1, f_2, g_2} = 1 \text{ iff} \\ & \exists w' \in \max_{g_1(w)}(\cap f_1(w)) : \forall w'' \in \max_{g_2(w')}(\cap f_2(w')) : \\ & w'' \in (\text{Pedro leaves the country}) \end{aligned}$$

- a. (In view of what is known) It is possible that (in view of what the law provides) it is necessary that Pedro leaves the country.
- b. #(In view of what the law provides) It is possible that (in view of what is known) it is necessary that Pedro leaves the country.

The problem is to determine which conversational background is attributed to which modal. The standard reading is the one where *may* is epistemic and *have to* deontic, paraphrased as (5-a). But the framework doesn't prohibit reading (5-b).<sup>6</sup> There is no reason why we could not combine the conversational backgrounds in this way. The only straightforward solution is to stipulate that deontic modals scope under epistemic ones. This problem will, I think, be cropping up for any "modal" theory of deontic modality that treats deontic modality on a par with epistemic modality, i.e. as an accessibility relation on worlds.

### 3.4 Brennan's version: Back to the 70's

Another solution to the problem would be to differentiate between epistemic and deontic modals at the semantic level. This path has been explored in Brennan (1993).<sup>7</sup> She developed a revision of Kratzer's framework where deontic modals have their own special modal base. The starting point for this move can be found in the following quote from Kratzer (1991, p.650):

"... the distinction between modals with circumstantial and modals with epistemic modal bases which is at the heart of our proposal may correlate with a difference in argument structure."<sup>8</sup>

Remember that circumstantial modal bases are "used" with deontic modals. Hence, if modal bases for deontic and epistemic modals also differ structurally, maybe we will be able to explain their combinatorial properties by this fact. The difference in argument structure referred to by Kratzer (1991) corresponds very roughly to the difference between raising and control verbs. Jackendoff (1972), for instance, develops an analysis of modal auxiliaries where epistemic and deontic modals correspond to raising verbs (or speaker-oriented adverbs) and control verbs (subject-oriented adverbs) respectively. However both types of modals are considered to

<sup>6</sup>It is interesting to remember that such an example was originally used in Kratzer (1978, p.144-147) to argue for an attributive conversational background (against a referential one). But notice however that making (5-b)'s deontic conversational background explicit in (5) doesn't even force a *deontic > epistemic* reading. The *epistemic > deontic* reading is still the only natural reading and the deontic ordering source is interpreted as  $g_2$  (not  $g_1$ ):

- (i) In view of what the law provides, Pedro may have to leave the country.

Furthermore this explicit deontic conversational background outside of the epistemic scope seems to force a referential reading of the ordering source, i.e.  $g_2(w') = g_2(w)$  (though not of its circumstantial modal base). On the contrary, the typical reading of (5) seems to involve a referential reading of the modal base, i.e.  $f_2(w') = f_2(w) \approx f_1(w)$ . This must certainly be studied in more detail. In particular this could undermine the stance of definition 3, leaving an anaphoric view à la Frank (1997) as only possibility.

<sup>7</sup>Brennan (1993) actually concentrates on the analysis of root modals (deontic, ability...), and is not meant to solve the problems caused by modal combinations.

<sup>8</sup>See Brennan (1993, p.5): "...she [Kratzer] leaves open the possibility that there are also structural differences (in argument structure, for example) between them."

belong to the same syntactic class of (modal) auxiliaries, the difference being in their respective interpretation rules.

Brennan implements this analysis within Kratzer's framework which has the consequence of changing the notion of modal base for some deontic modals, namely for those that function as control verbs. Epistemic modals and all the ordering sources remain the same and the new modal bases for deontic modals are functions of an individual and a world and yield a set of properties.<sup>9</sup> My interest lies not so much in the precise formalization than in the fact that an essential distinction is made between epistemic and deontic modals, therefore I will simply sketch a consequence of this framework with an example of combination of modals.

The proposed interpretation of example (6) is blocked because the sentence is semantically not well-formed. This is due to the fact that the deontic modal takes as argument the (denotation of the) intransitive verb phrase under it; however this IV is constituted of an epistemic modal and a verb phrase but, as epistemic modals are propositional operators, the sentence is uninterpretable.

- (6) # Pedro may have to leave the country. (deontic > epistemic)  
 $\llbracket may_d('must_{ep} \lambda x. \lceil x \text{ leaves the country} \rceil')(Pedro) \rrbracket^{w,f,x,g} = \#$

This failure of interpretation can thus be attributed to the epistemic modal: because some of its basic properties would not be respected, epistemic modals cannot be embedded under deontic ones. The main problem with Brennan's analysis is that it only partially solves the problem of combinations of modals, i.e. only in those cases where the deontic modal is a "VP-modal" as in example (7-a). The other deontic modals, as example (7-b), are still analyzed as propositional operators along the same lines as epistemic modals. Hence, Brennan's analysis could solve the problem if sentence (7-b) could embed an epistemic modal. However, sentence (8) does sound ungrammatical and the problem doesn't seem to disappear for those deontic modals.

- (7) a. Pedro must leave.  
 $(must_d^1[\lceil \lambda x. x \text{ leaves} \rceil])(Pedro)$   
 b. Tax forms have to be filled out in ink.  
 $must_d^2[\lceil \text{Tax forms are filled out in ink} \rceil]$

- (8) # Tax forms have to maybe be filled out in ink. (deontic > epistemic)

The second problem with Brennan (1993) comes to light in example (7), namely, she has to abandon the aim of a fully unified theory of modality. Even though the general idea of context-dependence is kept, Brennan has to introduce different interpretive rules for the non context-dependent parts of deontic and epistemic modals (the  $must_d^1$  and  $must_d^2 = must_{epistemic}$  of example (7)). This goes obviously against one of the starting points and main motivation of the original framework (see Kratzer (1978, p.103)). However this distinction between deontic and epistemic modals seems to be descriptively more adequate: the two systems don't appear to be on a par. I can have uncertainties about whether someone has some obligations but I don't really know what it would amount to to have epistemic obligations. Hence I will follow Brennan in making a distinction between epistemic and deontic but I will try to give an analysis general enough to encompass the two types of deontic modals as example (8) makes it clear that those deontic forms have the same distributional properties.

<sup>9</sup>See Brennan (1993, p.65-68).

#### 4 Linguistic interlude

Before turning to the formal analysis, I will briefly expose some views held by Palmer (2001) and Nuyts (2004) concerning modality. First, epistemic modality is about knowledge: but not anybody's knowledge. As Palmer (2001) puts it "...with epistemic modality speakers express their judgments about the factual status of the proposition". Therefore questions of truth could be a step too far and we should maybe opt instead for a framework that takes as a central issue the information exchange between a speaker and a hearer.

Simplifying somehow, we could say that within the standard account an epistemic possibility sentence is true if, given a set of propositions representing what is known, the sentence is compatible with this information. It can well be in some cases that the set of propositions represents the speaker's knowledge, but it would seem to be more general than Palmer's view. Nevertheless as soon as we take into account some pragmatic considerations it becomes obvious that under reasonable assumptions the two positions amount to the same. In particular, if we assume that the speaker knows the meaning of *might* and asserts truthfully "John might be home," the relevant set of propositions must be a part of the speaker's knowledge.<sup>10</sup> Palmer only states that "speakers express their judgments" whereas the truth-conditional account tells us under which conditions the sentence is true. However one can understand the meaning of an epistemic sentence without knowing which *f* and *g* of definition 3 are the relevant ones, i.e. without knowing its truth value. To capture this core meaning of "expressing the speaker's judgment" it seems that we should better use a framework that is able to represent the information exchange and not only the truth conditions.

To formalize the idea that the speaker expresses in an assertion his judgment about the status the embedded proposition, I will use Nuyts notion of m-performative<sup>11</sup> and descriptive use of modals from (Nuyts 2001, Nuyts 2004). A modal is used m-performatively if it expresses the current commitment (i.e. at utterance time) of the speaker towards the proposition expressed, and it is used descriptively if no such commitment is made (at utterance time) by the speaker about the evaluation of the embedded proposition.

- (9)
- a. It's possible that it was raining that night.
  - b. It was possible that it was raining that night.
  - c. According to John, it's possible that it was raining that night.

In example (9-a), the speaker evaluates as possible a certain past raining-event and commits himself to this evaluation. It would be pragmatically odd for the speaker to continue by saying "but it wasn't." Sentence (9-b) doesn't involve the same commitment on the part of the speaker, that is, he doesn't have to believe at the moment of utterance that it is possible that it was raining in order to utter (9-b) truthfully (he could even know that it wasn't raining). Finally, in example (9-c) the speaker reports John's opinion and obviously doesn't have to commit himself to it.

In simple declarative clauses, modal items are usually used m-performatively, i.e. they standardly convey a commitment of the speaker. However, in a past tense declarative as (9-b) this commitment is not conveyed; this is the case too in knowledge "reports" as (9-c) but also in the antecedent of conditionals or under attitude verbs. The main point is then that some modal items can be used m-performatively and descriptively, as *possible* in (9), but that some other modal items can almost exclusively be used m-performatively.<sup>12</sup> Furthermore m-performative items

<sup>10</sup>Notice that the knowledge of the hearer cannot be taken as already containing this information, otherwise any *might*-sentence would be automatically true and as such pragmatically odd.

<sup>11</sup>It is actually called performative by Nuyts but was so renamed by Faller (2002) in order to avoid confusion with the speech-act notion of performativity.

<sup>12</sup>Epistemic modal adverbs, like *maybe*, are usually m-performative. This could well be a consequence of their

can only be used in illocutionary force bearing environments (Faller 2002, p.213). They cannot occur under negation, in the antecedent of a conditional or, for instance, under a m-performative modal item. This means that, in a sentence combining two modal items with scope  $m_1 > m_2$ ,  $m_1$  would be m-performative and  $m_2$  would be descriptive.

#### 4.1 Proposal

I want to make use of some of those ingredients in order to account for the combinational properties of modal items. The basic intuition is that it makes sense to be uncertain about some obligations whereas to have possibilities as obligations seems odd.

I will follow Brennan in making a distinction between epistemic and deontic items in the semantics (although S and VP deontic modals will be treated uniformly). This simply means that I will not treat factual information about the world and deontic information at the same level. Epistemic items will be formalized as tests on an agent's information state and deontic ones as update of the agent's to-do-list. I will then formalize Nuyts' notion of m-performativity indirectly. M-performativity will be the default interpretation of the 'highest' modal in an assertion. Hence modal items that are inherently m-performative will be anchored to the speech event and represent the speaker's commitment.

M-performative epistemic modals as *maybe* will thus have to be interpreted on a whole information state, but as deontic operators force further interpretation on the deontic domain, the combination m-performative epistemic under deontic item will result in the failure of interpretation.

### 5 Formal framework

I will first introduce the standard setup of update semantics (US from now on) and from that construct in a stepwise way an US system with obligations. I will finally try to render Nuyts' ideas within this framework and use it on examples of combinations of modal items.

#### 5.1 Update semantics

**Definition 4** *An US system is made of three components: a language, a set of information states, a set of update operations.*

1. The **basic language**  $\mathcal{L}_0$  is constructed as usual from a set of atomic sentences  $\mathcal{P}$  and combination thereof with the connectives  $\neg$  and  $\wedge$ , i.e.  $\mathcal{P} \subseteq \mathcal{L}_0$ , if  $\varphi \in \mathcal{L}_0$  then  $\neg\varphi \in \mathcal{L}_0$  and if  $\varphi$  and  $\psi \in \mathcal{L}_0$  then  $\varphi \wedge \psi \in \mathcal{L}_0$ .

The **possibility language**  $\mathcal{L}_1$  is defined as follows,  $\mathcal{L}_0 \subseteq \mathcal{L}_1$  and if  $\varphi \in \mathcal{L}_0$  then  $\text{poss}(\varphi) \in \mathcal{L}_1$ .

2. A world/possible world/possibility is a function with domain  $\mathcal{P}$  and range  $\{0, 1\}$ , and  $W$  is the set of possible worlds. An **information state**  $\sigma$  is a subset of  $W$ , and let  $\Sigma$  be the set of information states.

3. The update operations are then defined as follows,



$$\begin{aligned}
\sigma[p] &= \{w \in \sigma \mid w(p) = 1\}, \\
\sigma[\neg\phi] &= \sigma - \sigma[\phi], \\
\sigma[\phi \wedge \psi] &= \sigma[\phi] \cap \sigma[\psi], \\
\sigma[\text{poss}(\phi)] &= \sigma, \text{ if } \sigma[\phi] \neq \emptyset \text{ (}\emptyset \text{ otherwise)}.
\end{aligned}$$

Obviously this very simple system is not conceived to talk about obligations but about knowledge. Learning that  $\phi$  is the case consists in updating your information state with  $\phi$ . Learning that  $\neg\phi$  is the case means removing those possibilities (i.e. possible worlds) where  $\phi$  is the case from your information state. Learning that  $\phi \wedge \psi$  is learning that  $\phi$  and that  $\psi$ , and finally  $\phi$  is possible,  $\text{poss}(\phi)$ , if learning that  $\phi$  doesn't leave you with no information, i.e. some world in your information state is a  $\phi$ -world.

In order to account for obligations I will adopt a method introduced by Portner (2003) and used for imperatives by Mastop (2005) in a US-framework. The main idea is to use a to-do-list to represent obligations. What is a to-do-list? It is not much than what it says, a list of sentences that we take to stand for **obligations**, the main point being that this list is a separate entity from the circumstantial information about the world. I will not deal with permissions but argue that it doesn't affect the problem at stake.

### Definition 5 (Worlds and obligations)

1. A to-do-list is a set  $\pi = \{(p, DO), (q, DO), \dots\}$  with  $p, q$  atomic sentences, i.e. a subset of the product  $\mathcal{P} \times \{DO\}$ .
2. A possibility is a pair of a world and a to-do-list, i.e.  $(w, \pi)$ . A possibility is thus characterized by what is the case and what are the duties in it.

Obviously this is a very crude characterization of obligations. Moreover some choices have to be explained about the formalization and the notation. Just as possibilities are functions from atomic sentences to truth values, to-do-lists could be seen as partial functions from atomic sentences to  $\{DO, DON'T\}$ ,<sup>13</sup> i.e. duties and prohibitions.

- (10)    a. #It is allowed that you *maybe* go.  
           b. You must not come to my talk.  
           c. #You must not *maybe* come to my talk.

Example (10-a) shows that permission sentences cannot embed epistemic items either. Example (10-b) which exemplifies a prohibition behaves in the same way as an obligation when it combines with an epistemic item, see (10-c). Therefore I'll concentrate on obligations and simplify the framework correspondingly, keeping the  $(p, DO)$  notation as a reminder of this more complex structure and leaving permission aside.

- (11)    a. Thesis paper must be acid-free.  
           b. #Thesis paper must *maybe* be acid-free.  
           c. Junior must go to bed at 8.00.  
           d. #Junior must *maybe* go to bed at 8.00.

There are some other features of deontic constructions that don't seem to change the embedding properties. First, most frameworks link to-do-lists to individuals, this means the to-do-list has to be a list of atomic imperatives, as Mastop (2005), or properties, as Portner (2003). In the

<sup>13</sup>Mastop (2005) defines its to-do-lists using atomic imperatives, not atomic sentences.

same way as Brennan (1993), it would solve the problem for example (10-b) with an analysis of epistemic items as propositional operators. However this doesn't work for example (11-a) (and its ungrammatical version (11-b)). There, the obligation is not restricted to a particular individual (neither syntactically or semantically) and the deontic seems to scope over the whole sentence in an ought-to-be reading.<sup>14</sup> The combination in (11-b) is still odd, precisely because the concept of epistemic obligation is odd, whether it is linked to a particular individual or not. Finally the question of the addressee (or the source/authority) of the obligation need not be a worry. Sentence (11-c) can be, depending on the context, used to convey that Junior<sub>1</sub> (age 9) has been ordered by his mother to go to bed at 8.00 or that the babysitter has been requested to see to it that Junior<sub>2</sub> (age 1:6) will be in bed at 8.00. Whatever interpretation is salient, its maybe-version (11-d) is still ungrammatical. Therefore I will only model obligations in the simplest way possible, abstracting away from who's the carrier of the obligation and who issued it.

We now have to extend our system to be able to talk about obligations. I will first extend the notion of information states, then add a new operator to the language and define its update operation.

### Definition 6 (US with to-do-lists)

1. An **information state**  $\sigma$  is a set of possibilities, i.e. a subset of  $W \times \mathfrak{P}(\mathcal{P} \times \{DO\})$ . The absurd state is the empty set  $\emptyset$  and the initial state is the set of all possibilities consisting of a world and a to-do-list,  $\mathbf{0} = W \times \mathfrak{P}(\mathcal{P} \times \{DO\})$
2. The **simple deontic language**  $\mathcal{L}_2$  is defined as follows,  $\mathcal{L}_1 \subseteq \mathcal{L}_2$ , if  $p \in \mathcal{P}$  then  $!p$ ,  $poss(!p)$  and  $!poss(p) \in \mathcal{L}_2$ .
3. The update operations are defined in the obvious way for the already given operators.

$$\begin{aligned}\sigma[!\varphi] &= \{i \in \sigma \mid i = (w, \pi) \text{ and } \pi[\varphi] = \pi\}, \\ \pi[\varphi] &= \pi \cup \{(\varphi, DO)\}\end{aligned}$$

The update operation for  $!p$  could be simplified to the equivalent  $\sigma[!p] = \{i \in \sigma \mid i = (w, \pi) \text{ and } (p, DO) \in \pi\}$ , but what I want to illustrate here is that  $!$  triggers an operation on to-do-lists. To learn that  $p$  is an obligation is to add  $p$  to your information state's to-do-list.<sup>15</sup> Consider a sentence of the form  $poss(!p)$ , that could be used to model the logical form of sentence (12):

(12) John might have to give a talk.

$!p$  is possible in state  $\sigma$ ,  $\sigma[poss(!p)] = \sigma$ , if and only if learning that  $p$  is an obligation doesn't leave you with no information, i.e.  $\sigma[!p] \neq \emptyset$  which means  $p$  belongs to a possibility's to-do-list in  $\sigma$ . Now consider a sentence of the form  $!poss(p)$ :

$$\begin{aligned}\sigma[!poss(p)] &= \{i \in \sigma \mid i = (w, \pi) \text{ and } \pi[poss(p)] = \pi\} \\ &= \{i \in \sigma \mid i = (w, \pi) \text{ and } \pi \cup \{(poss(p), DO)\} = \pi\} = \emptyset\end{aligned}$$

The interpretation of this sentence results in the absurd state as there is no such thing in the to-do-lists as the obligation of a possibility.

It is time to add the last change on the information state. So far an information state is a set of possibilities consisting of a world and a to-do-list. It characterizes the information an agent

<sup>14</sup>Feldman (1986).

<sup>15</sup>However it is an eliminative system, hence the equivalence with the simpler definition.

may have. We will add information about what other agents know. To do that we need a set of agents  $\mathcal{A}$ , and a particular agent  $a \in \mathcal{A}$ ;  $a$ 's information about the other agents is of the form  $A_a = \{\sigma_b \mid b \in \mathcal{A} - \{a\}\}$  with  $\sigma_b \subseteq W \times \mathfrak{P}(\mathcal{P} \times \{DO\})$ , that is, an information state according to definition 6.<sup>16</sup>

**Definition 7 (Information state of some agent a)**

1. A possibility is a tuple of the form  $i = (w, \pi, A_a)$ . An information state is a set of possibilities.
2. The new language is defined as follows,  $\mathcal{L}_2 \subseteq \mathcal{L}_3$  and if  $\varphi \in \mathcal{L}_2$  then  $\Box_b \varphi \in \mathcal{L}_3$  for  $b \in \mathcal{A}$ .
3. The update operation for  $\Box_b$ ,  $b \in \mathcal{A}$  is:

$$\sigma_a[\Box_b \varphi] = \{i \in \sigma_a \mid i = (w, \pi, A_a) \text{ with } \sigma_b \in A_a \text{ and } \sigma_b[\varphi] = \sigma_b\}$$

The goal of such an information state is simply to represent different kinds of information by different entities. This is however not enough to solve the ordering problem. As was already noticed, at this point the system is only able to represent the harmless combinations of epistemic over deontic modals.

## 5.2 Assertions and m-performativity

As already mentioned, m-performativity will be modeled as a default interpretation of assertions. The standard interpretation of a declarative sentence conveys that its content represents the speaker's belief or commitment.

**Definition 8 (Assertion)** *The update due to agent a's assertion of  $\varphi$  to agent b is modeled as follows,*

$$\sigma_b(\varphi)_a = \sigma_b[\varphi] \cap \sigma_b[\Box_a \varphi]$$

In this view, accepting  $a$ 's assertion consists in accepting the content of the utterance and learning that it is also part of  $a$ 's knowledge. The top level operator of a sentence  $\varphi = Op[\psi]$  will thus also be bound to the speaker's information state through  $\Box_a$ , i.e. making the utterance m-performative.

Finally, we need to account for inherently m-performative modal items. Those items are only interpretable in illocutionary force bearing environments as assertions. A m-performative epistemic possibility modal is an operator, say *Poss*, similar to *poss* but restricted to assertions, i.e.,<sup>17</sup>

$$\sigma_b(Poss \varphi)_a = \sigma_b[\Box_a poss \varphi] \text{ if } \sigma_b[\varphi] \neq \emptyset, (\emptyset \text{ otherwise})^{18}$$

We can also define the m-performative deontic operator, say  $!_m$ , as the operator  $!$  but restricted to assertions.

<sup>16</sup>A better, though more involved, way to represent this would be to allow the information state of the agent to contain other information states of the same kind. This leads to circularity but can be formalized in the framework of non-wellfounded sets.

<sup>17</sup>It is still unclear how to formalize this correctly, but I would prefer not to add this operator to the syntax of the language.

<sup>18</sup> $\sigma_b(Poss \varphi)_a = \sigma_b[poss \varphi] \cap \sigma_b[\Box_a poss \varphi]$  and  $\sigma_b[poss \varphi] = \sigma_b$  if  $\sigma[\varphi] \neq \emptyset$  ( $\emptyset$  otherwise).

### 5.3 Examples

Now the system is in place, we can use it on the examples and see how the hearer interprets sentence (13)?

(13) S: “Maybe John must go to Berlin.”

Intuitively this sentence means that some state of affairs is an epistemic possibility, namely that John has the obligation to go to Berlin. Formally it will have the following logical form:  $Poss !p$  with the relevant interpretation of  $p$ .

$$\sigma_H(Poss(!p))_S = \sigma_H[\Box_S poss(!p)] \text{ if } \sigma[!p] \neq \emptyset$$

Hence, if the information state of the hearer contains a possibility where John has such an obligation ( $\sigma[!p] \neq \emptyset$ ), we obtain that the hearer updates his information state with the fact that the speaker is committed to  $poss(!p)$ .

$$\begin{aligned} \sigma_H(Poss(!p))_S &= \{i \in \sigma_H \mid i = (w, \pi, A_H) \text{ with } \sigma_S \in A_H \text{ and } \sigma_S[poss(!p)] = \sigma_S\} \\ &= \{i \in \sigma_H \mid i = (w, \pi, A_H) \text{ with } \sigma_S \in A_H \text{ and } \sigma_S[!p] \neq \emptyset\} \end{aligned}$$

Hence the combination m-performative epistemic over descriptive deontic works fine. We can now turn to the infelicitous combinations, deontic  $>$  (m-performative) epistemic, of the form  $!_m Poss(p)$ .

(14) S: #“John must *possibly* go to Berlin.” (example (2-a))

$$\begin{aligned} \sigma_H(!_m Poss(p))_S &= \sigma_H[!Poss(p)] \cap \sigma_H[\Box_S !Poss(p)], \\ \text{however, } \sigma_H(!_m Poss(p)) &= \{i \in \sigma_H \mid i = (w, \pi, A_H) \text{ and } \pi[!Poss(p)] = \pi\} = \emptyset \end{aligned}$$

The failure of interpretation is now caused by the fact that  $Poss$  cannot be interpreted outside an illocutionary force bearing environment. This must be contrasted with the explanation of the infelicity of example (12). Failure is there due to the structure obligation (to-do-lists) whereas it is now due to the m-performativity. It would seem that, if this result is not only caused by the epistemic nature of the element, we should obtain a similar result by trying to embed a m-performative deontic item, and indeed examples in (15) involving a m-performative deontic are infelicitous.

(15) a. #Maybe, you must go now!  
b. #Maybe, go now!

(16) According to John, Pete might have to go to Berlin.

Lastly, I would like to suggest that sentences containing an evidential-like element as *according to John*<sup>19</sup> can be integrated within this framework quite easily (using the  $\Box$  operator). A sentence like (16) will just have the following logical form,  $\Box_J poss(!p)$ . However it would require for instance the extension of this framework by using non-wellfounded sets.

<sup>19</sup>Whether “according to John” should be considered a real evidential (quotative or hearsay type) is problematic. If we do so, sentence (i-a) would suggest that hypothesis 1 should probably be revised too.

(i) a. It might be so that, according to John it was scheduled at 18.00 but that, according to Pete it was scheduled at 19.00.  
b.  $[[evidential]] \geq [[epistemic]] > [[deontic]]$

## 6 Conclusion

In this paper, I argued that the existence of certain scope properties of modal categories should be accounted for within a semantic framework. I therefore introduced an update semantics system in which the ordering  $[[epistemic]] > [[deontic]]$  follows from the semantics and pragmatics of the modal items. Two central points of this system allow it to account for the scope order.

First Brennan's distinction between deontic and epistemic items has been sharpened, following Portner (2003) and Mastop (2005), allowing us to differentiate between deontic and epistemic operators. The former operate on to-do-lists while the latter operate on circumstantial information. Second, I used Nuyts' notion of m-performativity to model Palmer's conception that with modality "...speakers express their judgments..." Some modal items can typically only be used m-performatively, that is, anchored to the speaker at the speech event, which explains why they cannot embed. These two factors were used to account for the possible and impossible combinations of deontic and epistemic items, used descriptively and m-performatively.

Of course, this framework is still quite crude and can be improved in several directions. It would seem natural, for instance, to have a more involved account of the deontic realm. The to-do-lists can only handle obligations but it should be extendable to a full (constructive) system with permission in the manner of Mastop (2005). The analysis of the relative scopes should be extended to other modalities, in particular to more typical instances of evidentiality than the one used in this paper. Finally, hypothesis 1 on the relative order of modalities must definitely be tested cross-linguistically: it would be surprising if it turned out to be a feature unique to the English language.

## References

- Brennan, V.: 1993, *Root and Epistemic Modal Auxiliary Verbs*, PhD thesis, University of Massachusetts, Amherst.
- Cinque, G.: 1999, *Adverbs and Functional Heads: a Cross-linguistic Perspective*, Oxford studies in comparative syntax, Oxford University Press, New York.
- Cormack, A. and Smith, N.: 2002, Modals and negation in English, in S. Barbiers, F. Beukema and W. van der Wurff (eds), *Modality and its Interaction with the Verbal System*, Vol. 47 of *Linguistics Today*, John Benjamins.
- Faller, M.: 2002, *Semantics and Pragmatics of Evidentials in Cuzco Quechua*, PhD thesis, Stanford University.
- Feldman, F.: 1986, *Doing the Best We Can: An Essay in Informal Deontic Logic*, Reidel.
- von Fintel, K. and Iatridou, S.: 2004, What to do if you want to go to Harlem: Notes on anankastic conditionals and related matters. ms.
- Frank, A.: 1997, *Context Dependence in Modal Constructions*, PhD thesis, University of Stuttgart.
- Jackendoff, R.: 1972, *Semantic interpretation in generative grammar*, MIT Press, Cambridge.
- Kratzer, A.: 1978, *Semantik der Rede: Kontexttheorie, Modalwörter, Konditionalsätze*, Scriptor, Königstein.

- Kratzer, A.: 1981, The notional category of modality, in H. J. Eikmeyer and H. Rieser (eds), *Words, Worlds and Contexts. New Approaches in Word Semantics*, Walter de Gruyter, Berlin, pp. 38–74.
- Kratzer, A.: 1991, Modality/Conditionals, in A. von Stechow and D. Wunderlich (eds), *Semantik: ein internationales Handbuch der zeitgenössischen Forschung*, Vol. 6 of *Handbücher zur Sprach- und Kommunikationswissenschaft*, Walter de Gruyter, Berlin, pp. 639–656.
- Lewis, D. K.: 1973, *Counterfactuals*, Basil Blackwell, Oxford.
- Mastop, R.: 2005, *What Can You Do? Imperative Mood in Semantic Theory*, PhD thesis, ILLC Dissertation Series.
- Matthewson, L., Rullmann, H. and Davis, H.: 2005, Modality in St’át’imcets, *Papers for the 40<sup>th</sup> International Conference on Salish and Neighbouring Languages*. Also to appear in: MIT Working Papers on Endangered and Less Familiar Languages (Volume on Salish).
- Nuyts, J.: 2001, *Epistemic Modality, Language, and Conceptualization: A Cognitive-Pragmatic Perspective*, Vol. 5 of *Human Cognitive Processing*, Benjamins, Amsterdam.
- Nuyts, J.: 2004, *Over de (beperkte) combineerbaarheid van deontische, epistemische en evidentiele uitdrukkingen in het Nederlands*, number 108 in *Antwerp Papers in Linguistics*, Department of Linguistics of the University of Antwerp.
- Palmer, F. R.: 2001, *Mood and Modality*, Cambridge Textbooks in Linguistics, second edn, Cambridge University Press.
- Portner, P.: 2003, The meaning and force of imperatives, Paper presented at the workshop “Conditional and Unconditional Modality” (ESSLI 2003, Vienna).

# FORKING PATHS AND POLARITY ITEMS LICENSING\*

Francesca Panzeri  
Università degli Studi di Milano-Bicocca

francesca.panzeri@unimib.it

## Abstract

There is an elegant account, proposed by Beaver and Condoravdi (2003), that assumes that the temporal connectives *before* and *after* are converses (i.e., they are analyzed by means of a unified lexical schema), and that explains away their different logical and veridical behavior appealing to other factors. There is an elegant explanation that connects the licensing of Polarity Items to informational strengthening requirements: Polarity Items are viewed as existentials that lead to a widening of the domain of quantification, and they are predicted to be legitimate only when this widening leads to a stronger statement (roughly, in downward monotone contexts). My plan is to connect these two approaches – by proposing an amendment in the definition Beaver and Condoravdi presented for *before* and *after* that is meant to account also for their Polarity Items licensing behavior.

## 1 The data

It is a well-known fact that the two temporal connectives *after* and *before* appear to be converses (i.e., if (1) is true, then also (2) is true):

- (1) Fred came home after Wilma left.
- (2) Wilma left before Fred came home.

but, on the other hand, display different properties. In particular, they exhibit different *logical properties*: *after* expresses a relation which is neither transitive nor asymmetrical; *before* expresses a relation which is transitive and asymmetrical.<sup>1</sup> And they have diverging *veridical properties*: *after* constitutes a veridical operator, that is, from the truth of *A after B*, *B* may be inferred:

- |                                      |           |
|--------------------------------------|-----------|
| (3) Fred came home after Wilma left. | VERIDICAL |
| (4) Wilma left.                      |           |

Whereas *before* may be read veridically (as in (5), where the temporal clause is implied to be true); or it may receive a non-committal interpretation (as in (6), where the subordinated clause is implied to have been likely when the main clause took place); or it may assume a counterfactual reading (as in (7), where the *before*-clause is implied to be false):

- |   |                |
|---|----------------|
| (5) Fred bought a Toyota before the price went up.  | VERIDICAL      |
| (6) Fred left the country before anything happened. | NON-COMMITTAL  |
| (7) Fred died before he saw his grandchildren.      | COUNTERFACTUAL |

---

\* I would like to thank Gennaro Chierchia, Carlo Cecchetto, Ivano Caponigro, Carlo Geraci and the audience at Sinn und Bedeutung X for insightful comments. A shorter version of this paper was published in the Proceedings of the Fifteenth Amsterdam Colloquium.

<sup>1</sup> In this paper, I will not analyze *after* and *before* logical patterns.

And, finally, *after* and *before* differ also in their licensing properties. The temporal connective *after* does not (normally) license Polarity Items,<sup>2</sup> and it requires indicative mood (cf. (8) and the Italian (9) for explicit mood marking), whereas *before* does license Polarity Items, and it requires subjunctive mood (cf. (10)-(11)):

- (8) \* Fred left the party after *anyone* else did.  
 (9) Gianni fuggì dopo che Mario aveva rivelato (qualche / \**alcun*) segreto.  
 Gianni left after that Mario had<sub>IND</sub> revealed (some / any) secret.  
 (10) Fred left the party before *anyone* else did.  
 (11) Gianni fuggì prima che Mario rivelasse *alcun* segreto.  
 Gianni left before that Mario revealed<sub>SUBJ</sub> any secret.

## 2 Standard account

The traditional account may be traced back to some remarks put forth in Anscombe (1964), and it is defended, amongst others, in Landman (1991) and Ogihara (1995). Its main feature is to posit two distinct lexical entries for the temporal connectives: in both cases, the sentences *A after/before B* are regarded as true when there is a time *t* verifying the main clause *A* that follows/precedes the subordinated clause *B* – but in the case of *after* the *A*-time *t* must follow *some B*-time *t'* (i.e., *after* involves existential quantification over times verifying the temporal clause); in the case of *before*, the *A*-time *t* must precede *all B*-times *t'* (i.e., *before* requires universal quantification over times verifying the temporal clause):

### Landman (1991)

$[[A \text{ after } B]] = 1$  iff  $\exists t [t \in A \ \& \ \exists t' < t [t' \in B]]$

*A after B* is true iff there is a time *t* verifying *A* and there is a time *t'* verifying *B*, and *t* follows *t'*. I.e., iff there is an *A*-time *t* that follows a *B*-time *t'*.

$[[A \text{ before } B]] = 1$  iff  $\exists t [t \in A \ \& \ \forall t' [(t' \in B) \rightarrow t < t']]$

*A before B* is true iff there is a time *t* verifying *A* and for all times *t'*, if *t'* verifies *B*, then *t* precedes *t'*. I.e., iff there is an *A*-time *t* that precedes all *B*-times *t'*.

Within this perspective, *after* and *before*'s different licensing properties immediately follow: *before*-clauses involve universal quantification – and thus they constitute downward entailing environments, that are known to be Polarity Items licensors; *after*-clauses, on the other hand, call for existential quantification over times, and thus they do not allow strengthening inferences. As for their veridicality problems, *after* turns out to be a veridical operator (since the instantiation of *B* is a necessary condition for the truth of *A after B*); whereas *before* is non-veridical (since for *A before B* to be true, *B* needs not be realized).<sup>3</sup> But the standard account has also some shortcomings: in particular, the apparent converseness between *before* and *after* is lost, and it is not clear how to present a compositional account of their meanings.

## 3 Beaver and Condoravdi (2003)

In a recent paper,<sup>4</sup> Beaver and Condoravdi defended a *uniform* account for the analysis of the two temporal connectives. The first step consists in the introduction of a coercion operator *earliest* – that applies to a set of times verifying a clause *C*, and that selects its left boundary (i.e., the earliest amongst all the *C*-times). Sentences of the form *A after (/ before) B* are

<sup>2</sup> Linebarger presented some counterexamples to this generalization. They are discussed in the Appendix.

<sup>3</sup> Some adjustments are needed, because otherwise any sentence with an unrealized *before*-clause is predicted to be true – independently of its likelihood. See Ogihara (1995).

<sup>4</sup> Beaver D. & Condoravdi C. (2003). A Uniform Analysis of *Before* and *After*.



viewed as true relatively to a time  $t_0$  just in case there is a time  $t$  that verifies the main clause  $A$  and that follows ( $/$  precedes) the *earliest* time  $t'$  that verifies the temporal clause  $B$ .

As it stands, the definition cannot explain *after* and *before* diverging veridical properties – since for the truth of  $A$  *before*  $B$  there must be a (earliest) time verifying  $B$  (that is, *before* turns out to be a veridical operator). Beaver and Condoravdi's solution is to exploit the definedness requirement associated with the coercion operator *earliest*: *earliest* must pick up the earliest amongst all the times verifying the  $B$ -clause. If there are no  $B$ -times in the evaluation world, alternative worlds are to be taken into consideration. These alternative worlds are the *historical alternatives* to an evaluation world  $w$  at a time  $t$  –  $alt(w,t)$  – those worlds that coincide with  $w$  up to  $t$ , and from that moment may diverge only in reasonable ways, i.e., the normal future continuations of  $w$  after  $t$ . The operator *earliest* is then defined relatively to this expanded domain of worlds.

### Beaver and Condoravdi (2003)

$alt(w,t) = \lambda w'$ .  $w'$  is indistinguishable from  $w$  for all times  $t' < t$ ;  
and  $w'$  is a normal continuation of  $w$  after  $t$ .

$[[A \text{ after } (/before) B]]^w = 1$  iff  $(\exists t: \langle w,t \rangle \in A) t > (</> \text{earliest. } \lambda t'. (\exists w' \in alt(w,t)) \langle w',t' \rangle \in B$

$A$  *after* (*before*)  $B$  is true in  $w$  iff there is an  $A$ -time  $t$  that follows ( $/$  precedes) the earliest amongst the times  $t'$  for which there is an historical alternative  $w'$  to  $(w,t)$  such that  $\langle w',t' \rangle$  verify  $B$ ; i.e. iff there is an  $A$ -time  $t$  that follows ( $/$  precedes) the earliest  $B$ -time – not necessarily in the evaluation world  $w$ , but possibly in one of its historical alternative  $w'$ .

The difference between *before* and *after*'s veridical properties is couched on the asymmetry of time branching: roughly, once a time  $t$  is located (i.e., the time in which the main clause  $A$  holds), what is past with respect to  $t$  is fixed – and thus the set of historical alternatives to  $w$  at  $t$  is in fact reduced to the evaluation world  $w$  itself, whereas what is future with respect to  $t$  may involve different future branches, i.e., it calls for a set of historical alternative worlds.

Somehow more formally, in the evaluation of a sentence of the form  $A$  *after*  $B$ , since the historical alternatives coincide with  $w$  for all  $t' < t$  (all times  $t'$  that precede  $t$ ), and since the earliest  $B$ -time is located before the  $A$ -time  $t$ , the set  $alt(w,t)$  is reduced to the singleton  $\{w\}$ , and the definition can be simplified to:

$[[A \text{ after } B]]^w = 1$  iff  $(\exists t: \langle w,t \rangle \in A) t > \text{earliest. } \lambda t'. \langle w,t' \rangle \in B$

For the sentence to be true, there must be an  $A$ -time  $t$  that follows the earliest amongst the times  $t'$  that verify  $B$  in the evaluation world  $w$ . Thus, for the sentence to be true, the subordinated clause  $B$  has to be instantiated in the evaluation world – that is, *after* is predicted to be veridical.

When we turn to *before*-sentences, the situation is different. Since the event in the  $B$ -clause is future with respect to the  $A$ -time  $t$ , historical alternatives (i.e., future branches) of  $w$  after  $t$  are activated:  $B$  is to be instantiated in at least one of these branches – not necessarily in the evaluation world.

$[[A \text{ before } B]]^w = 1$  iff  $(\exists t: \langle w,t \rangle \in A) t < \text{earliest. } \lambda t'. (\exists w' \in alt(w,t)) \langle w',t' \rangle \in B$

$A$  *before*  $B$  is true in a world  $w$  if and only if there is a time  $t$  such that the pair  $\langle w,t \rangle$  verifies  $A$ , and that time  $t$  precedes the earliest amongst the times  $t'$  for which there is a historical alternative  $w'$  to  $w$  at  $t$  such that  $\langle w',t' \rangle$  verifies  $B$ .

Thus, for instance, coming back to the counterfactual reading of *before*, the sentence in (7) is predicted to be true just in case there is a past time  $t$  in which Fred dies, and in at least one

future alternative to *w* at *t* Fred sees his grandchildren,<sup>5</sup> and that time *t* precedes the earliest amongst all the times in which he sees his grandchildren.

I think that Beaver and Condoravdi's proposal is extremely convincing, since it can explain the apparently diverging properties *after* and *before* display by means of a single lexical schema. The problem is that, in their (2003) SALT paper, *after* and *before*'s different licensing behaviour remains unaccounted for.<sup>6</sup>

#### 4 The proposal

The evaluation of a *before*-clause may require considering alternative worlds; an *after*-clause is assessed with respect to the evaluation world. I propose to connect the licensing of Polarity Items precisely to this difference.

This is formally obtained by introducing an amendment to Beaver and Condoravdi's uniform definition for *after* and *before*: roughly, the time *t* that verifies the main clause *A* is to be ordered (as temporally following or preceding) *all the earliest B-times* (i.e., all the times *t'* that constitute the earliest times verifying the *B*-clause relatively to the historical continuations of  $\langle w, t \rangle$ ). In other words, the new "basic" definition for the temporal connectives *after* and *before* renders both subordinated clauses downward entailing contexts (because of the universal quantification over (earliest-)times), that is, Polarity Item licensing environments. In order to account for their *diverging* licensing properties, the plot is then to exploit once more the asymmetry of time branching: in the evaluation of an *A after B* sentence, since what is past with respect to a given time is fixed, the universal quantification over earliest *B*-times is in fact reduced to an ordinary existential quantification – and thus the ungrammaticality of Polarity Items in *after*-clauses is derived.

Before entering into the details and into the formal definitions, let me first sketch the idea behind the connection between the asymmetry of time branching and the licensing of Polarity Items. One of the most influential approach to the problem of PIs licensing<sup>7</sup> treats expressions like *any* as existential quantifiers that lead to a widening of the domain of quantification. In normal, positive contexts, such a widening would cause a loss of information.<sup>8</sup> In other contexts enlarging the domain brings about a strengthening of the statement made. These kinds of environments share a semantic property – Downward Entailingness – that is, they are characterized by the fact that they enable inferences from set to subsets. The idea is that Polarity Items are legitimate only when they appear in contexts in which the widening of the domain of quantification leads to a strengthening of the claim, i.e., only in downward entailing contexts. Examples of these environments are: negation, antecedents of conditionals, and *restrictors of universal quantifiers*.

What is then the connection between Polarity Item licensing (i.e., the semantic property of downward entailingness) and the asymmetry of time branching? In the derivation of the necessarily factual interpretation of *after*-sentences versus the possibly non-veridical instances of *before*-clauses, we have seen how once we locate a time *t* (verifying the main

<sup>5</sup> That is, for the sentence to be true, at the time in which Fred died it had to be possible that he had a chance to see his grandchildren. The requirement that there is at least one (possible – not necessarily real) future continuation of  $\langle w, t \rangle$  in which the temporal clause gets realized (that is, the requirement on the definedness of the operator *earliest*) is meant to rule out anomalous sentences like:

(i) The 7 years-old girl died before she saw her grandchildren.

<sup>6</sup> In a (2004) "aggregate hand-out", Beaver and Condoravdi did present a solution for PI licensing. I analyze their proposal in the Appendix.

<sup>7</sup> See Kadmon and Landman (1993), Krifka (1995), Lahiri (1998) and references therein.

<sup>8</sup> The claim that *some/any student came* is informationally stronger if the existential quantifier ranges over a "normal" – contextually determined – domain, and it is informationally weaker if the existential quantifier ranges over an enlarged domain of individuals

clause *A*), what is past with respect to that *t* is instantiated in a single world-history (i.e., only the evaluation world *w* is taken into consideration), whereas what is future with respect to *t* may be realized in different, alternative branches (i.e., a set of historical alternatives is activated). Focussing now on the subordinated clause *B*, it is now straightforward to see that if *B* is to be located in the past of the *A*-time *t* (as in the evaluation of *A after B*), a single interval of times *t'* verifying *B* in *w* is to be considered. If on the other hand the clause *B* is to be (possibly) realized in the future of the *A*-time *t* (as in the assessment of *A before B*), there might be different branches in which *B* gets instantiated, that is, there might be different intervals of times *t'* in which *B* is true. And, in this latter case, there will be many left-boundaries of these *B*-intervals, that is, there will be many earliest times *t'* that verify *B*. This means that the evaluation of the subordinated clause *B* requires the assessment of the different forking paths that depart after the *A*-time *t*. And this is tantamount to saying that it involves an expansion of the domain of possible worlds against which *B* is evaluated. My claim is that Polarity Items are legitimate in *before*-clauses precisely because of this enlarging of alternatives. More formally, simply because the *B*-clause now constitutes a downward entailing environments.

Let me now present the formal definition for the uniform analysis of *after* and *before*, and then derive the ungrammaticality of Polarity Items in *after*-clause. With a rough simplification, *A before/after B* is true iff there is an *A*-time *t* that precedes/follows all the earliest *B*-times *t'*. The asymmetric nature of time-branching ensures that in the case of an *after*-sentence, there is an unique (earliest *B*-time) *t'*; whereas in the case of a *before*-clause, there might be different (earliest *B*-time) *t'* – and for *A before B* to be true, the *A*-time *t* must precede *all* times *t'*.

More precisely, when *A before B* is assessed, the event in the *B*-clause follows the event in the *A*-clause, and this amounts to saying that there might be many branches in which *B* is instantiated (thus, many earliest *B*-times). In order to evaluate *A before B*, we first take into consideration all the time-world pairs  $\langle w', t' \rangle$  that verify *B*, for any world *w'* that belongs to the set of historical alternatives to *w* at *t*; and then we collect all the times *t'* that are the earliest amongst them. The sentence *A before B* is true in *w* iff there is an *A*-time *t* that precedes all the earliest times *t'*. In this reformulation of the definition, the temporal clause *B* constitutes a downward entailing context:

***A before B***

$$[[A \text{ before } B]]^w = 1 \text{ iff } \exists t [\langle w, t \rangle \in A \ \& \ \forall t' [(t' = \text{earliest.} \lambda t''. (\exists w' \in \text{alt}(w, t)) \langle w', t'' \rangle \in B) \rightarrow t < t']]$$

(12) We left before *anyone* came.

$$[[\text{We left before anyone came}]]^w = 1 \text{ iff } \exists t [\langle w, t \rangle \in [[\text{we leave}]] \ \& \ \forall t' [(t' = \text{earliest.} \lambda t''. (\exists w' \in \text{alt}(w, t)) \langle w', t'' \rangle \in [[\text{someone come}]]] \rightarrow t < t']]$$

= there is a time *t* such that we leave in *w* at *t*, and for all times *t'* and for all historical alternatives  $\text{alt}(w, t)$  *w'* s.t. *t'* is the earliest time in which someone come in *w'*, *t* precedes *t'*.

The initial definition for *after*-sentences mirrors the one for *before*, with only the direction of temporal ordering reversed.

***A after B - def. 1:***

$$[[A \text{ after } B]]^w = 1 \text{ iff } \exists t [\langle w, t \rangle \in A \ \& \ \forall t' [(t' = \text{earliest.} \lambda t''. (\exists w' \in \text{alt}(w, t)) \langle w', t'' \rangle \in B) \rightarrow t > t']]$$

But, as Beaver and Condoravdi argued, since the *B*-times *t'* precede the *A*-time *t*, the set of historical alternatives is reduced to the evaluation world, thus the definition can be simplified:

**A after B - def. 2:**

$$[[A \text{ after } B]]^w = 1 \text{ iff } \exists t [\langle w, t \rangle \in A \ \& \ \forall t' [(t' = \text{earliest. } \lambda t'. \langle w, t' \rangle \in B) \rightarrow t > t']]$$

Taking into consideration only a single world, if the *after*-clause is in fact instantiated in the evaluation world, there is a unique earliest time  $t'$ . Thus, there is no need to universally quantify over all the earliest  $B$ -times, and thus the definition can be further simplified to:

**A after B - def. 3:**

$$[[A \text{ after } B]]^w = 1 \text{ iff } \exists t [\langle w, t \rangle \in A \ \& \ t > \text{earliest. } \lambda t'. \langle w, t' \rangle \in B]$$

In this last simplified definition, the *after*-clause does not constitute anymore a downward entailing context (since the initial universal quantification over earliest  $B$ -times is reduced to a statement about the unique earliest  $B$ -time, because of the reduction of  $\text{alt}(w, t)$  to  $\{w\}$  itself). Thus, Polarity Items are predicted to be ungrammatical in *after*-clauses.

## 5 Conclusion

With a small amendment to Beaver and Condoravdi's definition for *before* and *after* sentences, it is possible to account for the phenomenon of Polarity Items licensing by means of a single lexical schema (i.e., without having to posit two different lexical entries) – that renders only *before*-clauses a context that licenses strengthening inferences, whereas *after*-clauses are predicted to create environments in which these inferences do not go through. The difference between *before* and *after* is due to the asymmetric nature of time branching – an assumption made by Beaver and Condoravdi to account for their differences in the veridical properties.

## 6 Appendix

### 6.1 Linebarger's counterexamples

Linebarger (1987) noticed how not all instances of Polarity Items in *after*-clauses lead to ungrammaticality, as witnessed by (13):

(13) He kept writing novels long after he had *any* reason to believe they would sell.

And the fact that also some *after*-clauses license Polarity Items constitutes a counterexample to my claim that (after the suitable revisions of the definition) *after*-clauses are not downward entailing contexts. But before trying to offer a solution, let me cast doubt on the existence of a clearly identifiable class of counterexamples. That is, my question becomes: is there any clear criterion to identify a class of *after*-clauses that license Polarity Items?

Linebarger herself suggested that these counterexamples had in common the occurrence of an appropriate measure phrase (such as *long*). But a closer scrutiny demonstrates that the presence of a measure phrase does not constitute neither a necessary (cf. (14)) nor a sufficient condition (cf. (15)) for the licensing of Polarity Items:

(14) Some say the cuts were made after there was any real use for them.

(15) \* He kept writing novels long after he retired to *any* Caribbean island.

Let me moreover notice how the more natural Italian translation of (13) would mark the subordinated clause with subjunctive mood – even if in normal *after* clauses the indicative is the only viable option:

(16) Ha continuato a scrivere racconti molto dopo che ci fosse alcuna speranza.  
(He) has continued to write novels long after that cl. was<sub>SUBJ</sub> any hope.

And subjunctive mood marking is related to the activation of alternative worlds. Thus, my answer is that, even if I do not have (yet) a clear explanation of the facts, it seems to me that these kinds of sentences require the consideration of alternative branches in which the subordinated clause gets realized – even if the subordinated clause is to be placed in the past of the main clause event.

## 6.2 Beaver & Condoravdi (2004)

In a (2004) “aggregate” hand out from a series of talks, Beaver and Condoravdi sketch a proposal to explain *before* and *after* diverging properties for what concerns Polarity Items licensing. I will first outline Beaver and Condoravdi’s argument,<sup>9</sup> and then I will raise some objections.

Beaver and Condoravdi adopt Kai von Stechow (1999) suggestion, according to which Polarity Items are licensed if strengthening inferences are valid in contexts where all the presuppositions are satisfied. And, since the evaluation of a *before*-sentence (and an *after*-sentence) is defined only if the domain of the coercion operator *earliest* is not empty, we have to check whether strengthening inferences go through in contexts when this presupposition is met, that is, when there is at least a time verifying the subordinated temporal clause.

That is, in order to check whether (18) entails (19), and whether (20) entails (21) – i.e. to check whether *before* and *after* create a context in which strengthening inferences are valid – we have to consider a context in which (17) is taken for granted (since, if (17) is not assumed, the sentences in (19) and in (21) would turn out as undefined):

- (17) At some time, Fred sang loudly.
- (18) Everybody left before (=earlier than the first time) Fred sang.
- (19) So, everybody left before Fred sang loudly.
- (20) Everybody left after (=later than the first time) Fred sang.
- (21)  $\nRightarrow$  Everybody left after Fred sang loudly.

Beaver and Condoravdi notice how the inferences are secured in the case of a *before*-sentence, but not when *after* is involved. This is the case because in the evaluation of *A before B*, the *A*-time *t* is ordered with respect to the whole event represented by the subordinated clause *B*. And when an event is temporally ordered with respect to a *complete interval*, then it is temporally ordered with respect to any subpart of it (and this warrants strengthening inferences). On the other hand, *after*-clauses are not normally ordered with respect to complete intervals (i.e., an *A*-time may follow the beginning of the *B*-event, without following the whole *B*-event), and this amounts to saying that in that case strengthening inferences are not secured.

Quite interestingly, there are some cases in which the *A*-event is in fact placed after (not just the beginning, but) the whole *B*-event. In those cases, according to Beaver and Condoravdi the coercion operator would pick up the *right* (and not the left) boundary of the interval corresponding to the *B*-clause (i.e., it would be a *latest* operator, and not an *earliest* operator). In these situations, strengthening inferences are indeed valid, and thus Polarity Items are predicted to be grammatical. And these cases would be exemplified by Linebarger’s sentences:

- (22) He kept writing novels long after he had any reason to believe they would sell.

---

<sup>9</sup> A cautionary remark: I am presenting what I understood of Beaver and Condoravdi’s argument – but since my observations are based only on the cited hand out, I might have misunderstood what they meant.

The *A*-event (“he keeps writing novels”) is to be placed not simply after the beginning of the *B*-clause, but also after its completion. This licenses strengthening inferences, thus it licenses the occurrence of *any*.

Summing up, Beaver and Condoravdi propose to connect Polarity Item licensing to contexts that warrants Strawson-like entailments (i.e., strengthening inferences, provided presuppositions are satisfied). And, in normal cases, only *before* creates such a context, whereas *after* does not. But there exist also cases in which instead of an *earliest* operator, a *latest* operator is at stake: in those cases also *after*-clauses constitute environments that license strengthening inferences, and thus Polarity Items are predicted to be grammatical, as illustrated by Linebarger’s sentences.

I think that Beaver and Condoravdi’s analysis is open to some objections. The first one questions their claim that the fact that a time *t* is temporally ordered with respect to a complete event is a sufficient condition to warrant Strawson-like entailments, and thus to license Polarity Items. Consider for instance an achievement predicate in the *B*-clause:

(23) \* He kept writing novels (long) after he retired to *any* Caribbean island.

An achievement predicate describes a punctual event. In other words, we can say that the earliest time in which “he retired to *X*” coincide with the whole event of retiring to *X*. Thus, if the time *t* in which he keeps writing novels (i.e., in which the main clause is true) follows the earliest time in which he retired to *X* (i.e., in which the subordinated clause is true), then *t* will surely follow the whole event of his retiring to *X*. That is, if there is an achievement predicate in the *after*-clause, then strengthening inferences ought to go through, and Polarity Items ought to be licensed. But this is not the case, as demonstrated by the ungrammaticality of (23).

Beaver and Condoravdi must have considered such an objection, because in their hand out they take into account (23), and they highlight that: “The act of retirement is punctual. We do not get subset inferences because we are dealing with a singleton set, so the NPI in unlicensed.”

But when achievement predicates appear in *before*-clauses, *any* is indeed grammatical (that is, NPI *are* licensed). So, either strengthening inferences ought to go true even if the event denoted by the predicate is punctual, or Polarity Items are not licensed in contexts when subset inferences go through:

(24) Phillip Hazell joined the fray at this time but it took him several seconds before he spotted any German aircraft

<http://reality.sgiweb.org/suchyta/redbaron/2000/20000211.html>

(25) Mr. Brown died, however, before he realized any of his anticipations

<http://www.rootsweb.com/~nyhchs/townhistories/wilmurt.html>

Moreover, there seems to be evidence that the Italian counterpart of *after* (*dopo che*) always orders the main clause event with respect to the whole, completed, *B*-event. Thus, for instance, the only reading the Italian (26) receives is that Sandro’s arrival in the States follows Gennaro’s departure – that is, there cannot be overlapping between the two events:

(26) Sandro è stato in America dopo che Gennaro è stato in America.  
Sandro was in America after that Gennaro was in America.

Nevertheless, as witnessed by the example in (9), *after*-clauses do not license Polarity Items in Italian.

There is another problem connected to Beaver and Condoravdi’s explanation for the licensing of Polarity Items in *after*-clauses. They claim that “in some cases” the coercion operator has to pick up the right boundary (i.e., the latest time) instead of the left boundary (i.e., the earliest time) of an interval of times verifying the subordinated clause. But how are we

supposed to tell when this is the case? That is, more generally, what are the criteria to set apart cases in which *after* orders the *A*-event with respect to the *earliest B*-time or with respect to the *latest B*-time?<sup>10</sup>

I have already argued that there are no independent criteria to identify the class of cases in which Polarity Items are legitimate in *after*-clauses (since the presence of an appropriate measure phrase modifying *after* (such as *long*) does not represent neither a necessary nor a sufficient condition – cf. the examples in (14)-(15)). Thus, Beaver and Condoravdi's account turns out to be circular: Polarity Items are licensed in some *after*-clauses because the *A*-time *t* is ordered with respect to the *latest B*-time *t'*; but the only reason I could guess for *why* the *A*-time *t* has to be ordered with respect to the *latest B*-time *t'* is simply "because a Polarity Item is grammatical".

More generally, I object to the line of explanation put forth by Beaver and Condoravdi in order to justify *before* and *after* diverging licensing properties because I think that it is a more efficient and natural move to resort to the same kind of explanation (i.e., the asymmetric nature of time branching) to account for both veridical and licensing properties. In other words, I hope to have shown that appealing to the same factor (i.e., the asymmetry of time branching) that is held responsible for *after*'s necessarily veridical reading and for *before*'s possibly non-veridical interpretation, it is straightforward to derive as well the licensing of Polarity Items only in *before*-clauses.

## References

- Anscombe, G.E.M.: 1964, Before and after, *The Philosophical Review* **73**, 3-24.
- Beaver, D. and Condoravdi, C.: 2003, A Uniform Analysis of *Before* and *After*, in R. Young and Y. Zhou (eds.), *Proceedings of SALT XIII*, CLC Publications, Cornell.
- Beaver, D. and Condoravdi, C.: 2004, *Before* and *After* in a Nutshell. Aggregate handout from talks presented at Cornell, NYU, MIT and UCSC. <http://www.stanford.edu/~dib/>
- von Stechow, P.: 1999: NPI Licensing, Strawson Entailment, and Context Dependency, *Journal of Semantics* **16**, 97–148.
- Heinämaa, O.: 1974, *Semantics of English Temporal Connectives*, Ph.D. thesis, University of Indiana at Bloomington.
- Kadmon, N. and Landman, F.: 1993, Any, *Linguistics and Philosophy* **15**, 353–422.
- Krifka, M.: 1995, The Semantics and Pragmatics of Polarity Items, *Linguistic Analysis* **25**, 209–257.
- Lahiri, U.: 1998, Focus and Negative Polarity in Hindi, *Natural Language Semantics* **6**, 57–125.
- Landman, F.: 1991, *Structures for semantics*, Kluwer, Dordrecht.
- Linebarger, M.: 1987, Negative Polarity and Grammatical Representation, *Linguistics and Philosophy* **10**, 325–387.
- Ogihara, T.: 1995, Non-factual *Before* and Adverbs of Quantification, in M. Simon and T. Galloway (eds.), *Proceedings of SALT V*, CLC Publications, Cornell.

<sup>10</sup> And why this option is not available in the case of *before*?





# ALMOST THERE: THE MEANING OF *almost*

Doris Penka,  
Universität Tübingen

d.penka@uni-tuebingen.de

## Abstract

Modifiability by *almost* has been used as a test for the quantificational force of a DP without stating the meaning of *almost* explicitly. The aim of this paper is to give a semantics for *almost* applying across categories and to evaluate the validity of the *almost* test as a diagnosis for universal quantifiers. It is argued that *almost* is similar to other cross-categorical modifiers such as *at least* or *exactly* in referring to alternatives ordered on a scale. I propose that *almost* evaluates alternatives in which the modified expression is replaced by a value close by on the corresponding Horn scale. It is shown that a semantics for *almost* that refers to scalar alternatives derives the correct truth conditions for *almost* and explains selectional restrictions. At the same time, taking the semantics of *almost* seriously invalidates the *almost* test as a simple diagnosis for the nature of quantifiers.

## 1 Background: The *almost* test

Modifiability by *almost* has been used in the literature as a test for the quantificational force of a DP. At the heart of this test lies the observation that universal quantifiers can be modified by *almost*, whereas existentials cannot:

- (1) a. Almost every student passed the exam.  
b. \*Almost a / some student passed the exam.

Consequently, so the argument goes, if some DP whose quantificational status is unclear can be modified by *almost*, it must have universal force. So (un)modifiability by *almost* has been used as an argument in the discussion of elements for which it is notoriously unclear whether they should be analysed as universals or existentials. Carlson (1981) was the first to use the *almost* test, applying it to distinguish between NPI *any* and Free Choice *any*. He argued that, since Free Choice *any*, but not NPI *any* can be modified by *almost*, the former is a universal quantifier, whereas the latter is an existential.

- (2) a. Almost any student can solve this problem set. Free Choice  
b. \*I didn't see almost any student. NPI

Subsequently, the *almost* test has also been used to help decide the nature of so called n-words in Negative Concord languages. Zanuttini (1991) used the fact that n-words can be modified by *almost*, as illustrated in (3), to argue that n-words are universal quantifiers interpreted with wide scope over negation, rather than existentials in the scope of negation.

- (3) Non ha detto quasi niente / \*alcunché. (Italian, from Zanuttini, 1991)  
not has said almost nothing / anything  
'He said almost nothing.'

The validity of the *almost* test as a diagnosis for universal quantifiers has been questioned on empirical grounds (Partee 1986, Błaszczak 2001, Horn 2005). However, as long as the meaning

of *almost* is not explicitly stated and selectional restrictions derived from it, it remains unclear what *almost* is really sensitive to and whether the arguments based on modifiability by *almost* are valid.

The aim of this paper is to state a precise and general semantics for *almost* and evaluate the validity of *almost* as a diagnosis for universal quantifiers under this semantics. I will first critically review existing accounts of the semantics of *almost* by Sadock (1981) and Morzycki (2001), showing that neither is adequate because they do not account for the contribution the modified constituent makes to the semantic. I then go on to propose that this problem can be overcome if it is acknowledged that the semantics of *almost* is akin to that of focus-sensitive operators like *only*. A semantics for *almost* along these lines is spelled out in section 3 where I argue that *almost* refers to alternatives on a Horn scale and signifies that some alternative close by on the corresponding scale is true. Section 4 investigates the consequences of the proposed analysis of *almost* for the DP domain with particular focus on the elements to which the *almost* test has been applied, namely n-words in Negative Concord languages and NPI *any*. I conclude that (un)modifiability by *almost* does not constitute a valid test for the quantificational force of a quantifier.

## 2 Previous analyses of *almost*

### 2.1 Sadock (1981)

The first analysis of the semantics of *almost* is due to Sadock (1981). He defines *almost* as an intensional operator:

$$(4) \quad \llbracket \mathbf{almost} \rrbracket = \lambda w. \lambda p_{\langle st \rangle}. \exists w' [w' \text{ is not very different from } w \ \& \ p(w')]$$

Sadock further argues that an assertion of the form *almost* p is associated with the conversational implicature that p be false in the actual world. He derives this implicature via Grice's Maxim of quantity: since uttering *almost* p makes a weaker statement than uttering p (p being true in the actual world entails that there is a possible world in which p is true, but not vice versa), the hearer infers that the speaker does not believe p and thus assumes that p is false.

$$(5) \quad \text{Bill almost swam the English Channel.}$$

So for example, the sentence in (5) asserts that there is a world not very different from the actual world in which Bill swam the English Channel, i.e. that if the actual world would be minimally different, Bill would indeed have swum the English Channel. At the same time, the use of *almost* leads to the implicature that Bill did not swim the English Channel.

However, the implicature that the proposition *almost* operates on is false is very hard to cancel (6a) and contrasts thus with other scalar implicatures, such as the inference from the use of *some* to *not all* in (6b):

- (6) a. ?Not only did Bill almost swim the English Channel, he did swim it.  
 b. Not only did Bill eat some of the cake, he ate all of it.

Since cancelability is a central property of implicatures, this indicates that the requirement that the proposition *almost* operates on be false, is part of the truth conditions rather than an implicature (see Hitzeman (1992) and Rapp and von Stechow (1999) for more arguments against the implicature approach).

There is another problem with the truth conditions Sadock (1981) assumes: As Morzycki (2001) points out, Sadock’s meaning rule in (4) might do for VP-modifying *almost*, but cannot directly be extended to DP-modifying *almost*. The problem is that it does not specify in which respect the world  $w'$ , in which the proposition  $p$  holds, is allowed to vary from the actual world. For example, whereas in the correct interpretation of (7a) the  $p$ -world varies with respect to the number of non-dry plants from the actual world, according to (4) it could also vary with respect to the degree of dryness, so that (7a) is wrongly predicted to be true if every plant is minimally moist. So according to (4), (7a) could be true in the same circumstances as (7b).

- (7) a. Almost every plant is dry.
- b. Every plant is almost dry.

## 2.2 Morzycki (2001)

Morzycki (2001) tries to remedy this problem by imposing a special requirement on DP-modifying *almost* that the worlds not vary with respect to the extension of the VP.

$$(8) \quad \llbracket \mathbf{almost}_{DP} \rrbracket = \lambda Q_{\langle \langle e, st \rangle, st \rangle} . \lambda P_{\langle e, st \rangle} . \lambda w . \neg Q(P)(w) \ \& \ \exists w' [ Q(P)(w') \ \& \ \text{CLOSE}(w)(w') ] \\ \ \& \ \lambda X . [ P(X)(w) ] = \lambda X . [ P(X)(w') ]$$

To illustrate how this addition makes sure that the  $p$ -world varies in the relevant respect and thus leads to the correct truth conditions for (7a), let us consider a toy model consisting of the two worlds  $w$  and  $w'$  and four individuals  $a, b, c, d$ . Let us assume that  $w'$  counts as close to the actual world  $w$ . Assume further that there are three plants in the actual world,  $a, b$  and  $c$ , and that  $c$  is the only plant that is not dry, thus preventing the proposition “that every plant is dry” from being true in  $w$ . Now, according to (8), the dry things in  $w'$  are the same as the dry things in  $w$ . Then the only way for  $w'$  to make “that every plant is dry” true is to assume that the “offending” plant  $c$  is not there in  $w'$ , such that there are only two plants in  $w'$ ,  $a$  and  $b$ , and both of them are dry. This state of affairs is shown in (9).

(9)		plants	dry	individuals
	$w$	$a \ b \ c$	$a \ b \ d$	$a \ b \ c \ d$
	$w'$	$a \ b -$	$a \ b \ d$	$a \ b - d$

While Morzycki’s amendment to the meaning of *almost* modifying DP indeed ensures that the  $p$ -world varies in the relevant respect, it is itself problematic. First, the additional requirement he assumes for DP-modifying *almost* is nothing other than putting the desired result into the semantics by brute force. This also has the result that he has to assume a separate lexical entry for DP-modifying *almost*, and this runs counter to his claim of giving a unified cross-categorical semantics for *almost*. Further, the stipulation he makes derives wrong selectional restrictions. Morzycki derives the fact that existentials cannot be modified by *almost* from the requirement for DP-modifying *almost* that the worlds not vary with respect to the extension of the VP. He argues that existentials modified by *almost* are pragmatically odd, because they would require that something that is not in the NP-extension in the actual world be in the NP-extension in the  $p$ -world. For example, in the case of (10) something that is not a plant but dry in the actual world would have to be a plant in the world  $w'$  that makes “that some plant is dry” true. Such a state of affairs is again illustrated for our model in (11).

- (10) #Almost some plant is dry.

(11)		plants	dry	individuals
	w	a b	c d	a b c d
	w'	a b c	c d	a b c d

Since requiring that an individual changes an essential properties like being a plant across worlds is a very strange requirement, (11) is ruled out pragmatically. But according to this reasoning, negative quantifiers should also not be modifiable by *almost*, since they would require that something that is in the NP-extension in the actual world not be in the NP-extension in the p-world. To see this consider (12) and the state of affairs shown in (13).

(12) Almost no plant is dry.

(13)		plants	dry	individuals
	w	a b c	c d	a b c d
	w'	a b –	c d	a b c d

In (13), c is the “offending” plant, being dry and thus preventing “that no plant is dry” from being true in w. So c cannot be a plant in a world w' that makes this proposition true. But because of the requirement that the VP-extension not vary across worlds, c will be a dry thing in w' and therefore has to be part of w'. So c has to change from a plant in w to something that is not a plant in w'. In contrast to cases where *almost* modifies a universal quantifier we cannot simply assume that the “offending” individual does not exist in w' because it has to be in the VP extension in w'.

The discussion in this section shows that accounts by Sadock (1981) and Morzycki (2001) based on intensional similarity cannot do the job. The fundamental problem they face is that they do not account for the role the modified constituent plays in the semantics of *almost*.

### 3 The meaning of *almost*

So how can the contribution of the modified constituent be formalised while at the same time treating *almost* as a cross-categorial modifier? Although due to the focus of this paper, I concentrate on *almost* modifying DPs, it is important to keep in mind that *almost* can modify elements of various syntactic categories:

(14)	a.	John almost fell asleep during the talk.	VP
	b.	The victim was almost dead when the police found him.	AP
	c.	Almost every linguist has read ‘Syntactic Structures’.	DP
	d.	Bob almost never drinks alcohol.	AdvP

I think we the answer can be found if one considers work on other expressions that show a similar behaviour, namely focus sensitive operators like *only* and *even*. Rooth (1985) gives a cross-categorial semantics for these expressions that accounts for the semantic contribution of the focused constituent. He proposes that these operators take an additional argument besides the proposition they operate on. The second argument is a (contextually determined) alternative set C consisting of propositions in which the focused constituent is replaced by entities of the same semantic type.

But the semantics of *almost* has a further ingredient. As has been observed by Hitzeman (1992), *almost* operates on a scale. A sentence in which *almost* modifies an expression P entails the truth of a corresponding sentence without *almost* in which P is replaced by a value close by, but lower on the scale associated with P. For example, the sentence (15) entails that n people died of the

disease, with  $n$  being close to, but smaller than 100.

- (15) Almost 100 people died of the disease.

This means that the semantics of *almost* involves a special type of alternatives, namely alternatives that are ordered on a scale. There are other expressions whose semantics has been argued to involve scalar alternatives, namely expressions such as *at least*, *at most* or *more than*. McNally (1998) and Krifka (1999) define a semantics for these expressions that is both cross-categorical following Rooth's (1985) semantics of *only* and involves alternatives ranked on a scale.

Krifka assumes that scalar alternatives can be introduced in two ways. First, scalar alternatives can be introduced in the same way as usual focus alternatives, i.e. by an intonationally marked focus. But intonational prominence is not necessary for the introduction of scalar alternatives, because certain expressions are automatically associated with alternatives ordered on a scale (see also Chierchia (2005)). These are expressions that are part of a so called Horn scale, i.e. a scale ordered by the entailment relation such that an element of the scale entails all the elements ranked lower (Horn 1972).

To ensure that the relevant alternatives are available at the level where they are evaluated, Krifka further assumes that the scalar ordering is projected along with the focus alternatives, so that the ranking of the alternatives having the type of the focus value carries over to the alternatives at the propositional level.

For the implementation of scalar alternatives, I follow Schwarz (2005) who assumes that operators evaluating scalar alternatives have a restrictor variable ranging over scales of propositions. In the case of *almost*, the relevant alternatives are the ones which are close by on the ordered scale. I will use  $\approx$  to signify the 'close by'-relation and as the corresponding restrictor variable. This leads to the following semantics for *almost*:<sup>1</sup>

- (16)  $[[\mathbf{almost}_{\approx}]] = \lambda w. \lambda p_{\langle s, t \rangle}. \neg p(w) \ \& \ \exists q [ q \approx p \ \& \ q(w) ]$

Note that it is only required that the alternatives under consideration be close to  $p$ , but not that they are ranked lower than  $p$ . That only alternatives ranked lower can be true is ensured by the first conjunct in (16), which requires that  $p$  be false. Since  $p$  is logically entailed by alternatives ranked higher on a Horn scale, only alternatives ranked lower can be true.

To see how this semantics works, consider the sentence in (17a), in which the scale is given by the sequence of natural numbers. Let us assume for the sake of simplicity that the values that count as 'close by' are the ones within a deviation of 10% of the original value, i.e. the numbers between 90 and 110 in this case. The restrictor variable  $\approx$  then denotes the set of propositions in (17b). Applying the meaning of *almost* stated in (16) derives the truth conditions (17c), which in effect say that the number of people who died of the disease is somewhere between 90 and 99. This corresponds to the meaning the sentence (17a) intuitively has.

- (17) a. Almost 100 people died of the disease.  
 b.  $\{p \mid p = \text{that } n \text{ people died of the disease, } 90 \leq n \leq 110\}$   
 c.  $\neg(\text{100 people died of the disease}) \ \& \ n \text{ people died of the disease, } 90 \leq n \leq 110$

The occurrence of *almost* in a statement has a further consequence that becomes obvious when comparing the acceptability of (17a) to that of (18).

<sup>1</sup>I do not want to commit myself regarding the status of the two conjuncts as presupposition, implicature or part of the truth conditions.

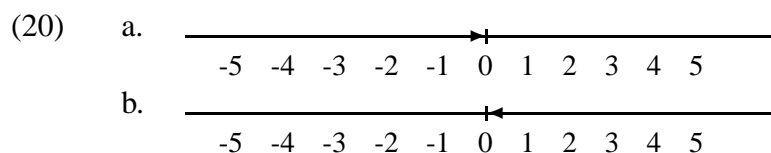
(18) #Almost 102 people died of the disease.

The combination of *almost* with round number words is fine, whereas *almost* combined with non-round number words sounds strange. This follows if we assume that *almost* also indicates that a more coarse-grained scale is used, similarly to the effect *approximately* has. Since the values on more coarse-grained scales correspond to round number words (Krifka t.a.), expressions that indicate a coarser granularity level show a strong preference for round number words.<sup>2</sup>

It is a general property of Horn scales that their direction is influenced by the utterance context (see Horn, 1972). We find this also with scales associated with *almost*, as the following example from Sadock (1981) illustrates:

(19) It's almost 0° Celsius.

The sentence in (19) can mean two things, depending of the situation in which it is uttered. In a situation in which it is already cold, it can mean that it is getting warmer and the temperature is approaching 0° Celsius from below. In this case, the direction of the temperature scale is the usual from bottom to top as shown in (20a). On the other hand, if (19) is uttered in a situation in which it is getting colder, it means that the temperature is actually still above 0° Celsius. In this case, the direction of the scale is reversed (20b).

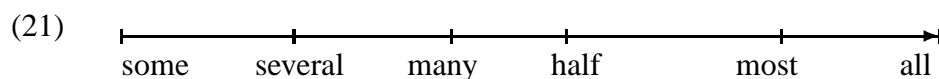


#### 4 Implications for *almost* as a test

With the semantics of *almost* introduced in the last section at hand let us now see what we can say about the selectional restrictions *almost* exhibits in the DP domain.

##### 4.1 *almost* and quantifiers

As argued for by Horn (1972), quantifiers form a scale ordered by entailment:



Considering this quantifier scale we can explain why certain quantifiers cannot be modified by *almost*. We observe that vague quantifiers such as *several*, *many* and *most* are incompatible with *almost*, while *half* and *all* are fine:

- (22) a. \*Almost several / many / most students passed the exam.  
       b. Almost half / all of the students passed the exam.

<sup>2</sup>This preference for round number words holds at least in the numerical domain, where the values on more coarse-grained scales correspond to multiples of the powers of ten. Things are different in the temporal domain, where the values on the minute scale for instance correspond to multiples of 15. This is reflected in the fact that *almost* is fine with these values on a minute scale:

- (i) I had to wait almost 45 minutes.

As argued by Hitzeman (1992), vague quantifiers do not correspond to precise values on the scale. Consequently it is not clear what part of the scale counts as ‘close by’, and so the semantics of *almost* is not compatible with vague quantifiers. In contrast, *half* and *all* have a precise location on the scale and are therefore fine with *almost*.

Furthermore, recall that existentials cannot be modified by *almost*:

(23) \*Almost a / some student passed the exam.

This can be attributed to the fact that existentials form the bottom of the quantifier scale. There is thus no lower value which can be part of a proposition which is both a scalar alternative and true as required by the semantics of *almost*.

There are however cases in which *almost* is fine with existentials, such as the examples in (24):

- (24) a. It took me almost an hour to get here.  
 b. King Penguins are almost a meter high.  
 c. With this diet you can lose almost a pound of body fat per day.

In these cases, we are dealing with measure phrases that are associated with a dense scale. Because of the density of the scale, we can always find a value that makes a suitable scalar alternative for *almost*. In (24a) for example, there are values lower than one hour on the time scale, namely the fractions of one hour. Thus incompatibility of *almost* and existentials only holds in case of a discrete scale, where fractions of a unit are not possible.

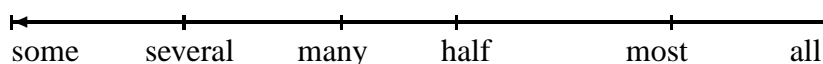
#### 4.2 n-words modified by *almost*

But does the fact that existentials (at least if associated with a discrete scale) cannot be combined with *almost* allow conclusions on the nature of n-words in Negative Concord languages? This is presupposed by Zanuttini (1991) who used the fact that n-words can be modified by *almost*, as illustrated in (25), as a crucial argument against the assumption that n-words are existential quantifiers that occur in the scope of negation (as argued for by Laka (1990) and Ladusaw (1992), a.o.).

(25) Non ha telefonato quasi nessuno. (Italian)  
 not has called almost n-person  
 ‘Almost nobody called.’

It is well known that the entailment relations are reversed under negation, leading to reversal of the direction of the corresponding Horn scale. Thus the quantifier scale in negative contexts looks like (26):

(26) Quantifier scale in negative contexts:



Under negation, existentials are at the top of the scale rather than at the bottom. This means that in negative contexts there are values lower on the scale than existentials which can be part of an alternative proposition that is true. Thus *almost* is not prevented from modifying existentials as long as they are in the scope of negation and *almost* operates on the negated proposition.

I will now show that the proposed semantics of *almost* in combination with the assumption that *nessuno* is an existential quantifier also derives the correct truth conditions by illustrating this

for the Italian sentence (25). The alternative values on the quantifier scale that count as ‘close by’ to the existential are quantifiers like *a few*, *a couple* and *several*. Assuming that *almost* is interpreted with wide scope over negation, the restrictor variable  $\approx$  denotes the following set of propositions:

- (27) {that it is not the case that a few people called,  
that it is not the case that a couple of people called,  
that it is not the case that several people called}
- (28)  $\neg(\text{that it is not the case that somebody called}) \ \& \ \exists p [ p \in \approx \ \& \ p ]$

For (25) the proposed meaning of *almost* results in the truth conditions given in (28). In combination with the denotation of the alternative set  $\approx$  in (27), the truth conditions in effect say that somebody called, but it is not the case that more than a small number of people called. Again, this corresponds to the meaning (25) intuitively has.

Thus modifiability by *almost* does not help to decide the nature of n-words. As far as compatibility with *almost* is concerned, there is no difference between universal quantifiers interpreted with wide scope over negation and existential quantifiers interpreted in the scope of negation.

It is interesting to note that there is a parallel between existentials and possibility modals. While adjectives expressing modal possibility, corresponding to existential quantification over possible worlds, normally cannot be modified by *almost*, the negated forms of the adverbs are fine with *almost*:

- (29) a. \*It is almost possible to get an appointment with the dean.  
b. It is almost impossible to get an appointment with the dean.

In German, the positive form of the possibility adverb (*möglich*) can also be modified by *almost* if it is in the scope of the negative marker *nicht*:

- (30) a. \*Es ist fast möglich einen Termin beim Dekan zu bekommen.  
it is almost possible a appointment with.the dean to get  
b. Es ist fast unmöglich einen Termin beim Dekan zu bekommen.  
it is almost impossible a appointment with.the dean to get  
c. Es ist fast nicht möglich einen Termin beim Dekan zu bekommen.  
it is almost not possible a appointment with.the dean to get

So the facts concerning the compatibility of *almost* with adverbs of modal possibility confirm that existential quantifiers can be modified by *almost* as long as they are in the scope of negation.

### 4.3 Incompatibility of *almost* and NPIs

This leaves the question why *almost* cannot modify NPI *any*. Since NPI *any* in English is the incarnation of the existential determiner in negative contexts and as I have just argued, existentials in negative contexts are in principle compatible with *almost*, we would expect *any* to be fine with *almost*, contrary to what we find:

- (31) \*I didn't see almost any student.

I believe that the incompatibility of *almost* and NPIs should be reduced to an intervention effect, which are known since Linebarger (1980) to arise in the licensing of NPIs.



In a recent paper, Beck (t.a.) gives a semantic analysis of intervention effects occurring in wh-questions that also extends to the question at hand. Beck argues that intervention effects are due to focus interpretation, or more generally the evaluation of alternative sets. An intervention effect occurs whenever an alternative evaluating operator interferes in the evaluation of another operator involving alternatives. She states this as the General Minimality Effect, which claims that for the evaluation of alternatives introduced by an XP another operator evaluating focus alternatives cannot be skipped. This excludes constellations of the form in (32), where the  $\sim$  operator (i.e. the operator evaluating focus alternatives defined by Rooth (1992)) intervenes in the evaluation of the alternatives introduced by  $XP_1$ , because it prevents the alternatives introduced by  $XP_1$  from being passed up to the position where they could be evaluated by  $Op_1$ .

(32)  $*[Op_1 \dots [\sim C [\dots XP_1 \dots ]]]$

Beck (t.a.) proposes that intervention effects arising in the licensing of NPIs are also a form of the General Minimality Effect. Linebarger (1980) observed that (33a) does not have the reading (33b) where the universal quantifier takes scope in between the negation and the NPI:

- (33) a. I didn't always buy anything.  
 b. #It is not the case that I always bought a thing.

Beck's account of NPI intervention effects builds on the analyses by Krifka (1995) and Lahiri (1998) who argue that the licensing of NPIs involves the evaluation of focus alternatives. Adopting an analysis in the style of Lahiri (1998), according to which the focus alternatives introduced by an NPI are evaluated by an operator *even* taking wide scope with respect to negation, results in a LF-representation like (34) for the unavailable reading (33b) of (33a):

(34)  $[even_D [\sim D [not [always [I bought [a thing]_F ]]]]]$

Beck argues that quantificational elements are also associated with alternatives and thus intervene in focus evaluation. Thus (34) is an instance of (32) because the intervening quantifier *always* prevents the focus alternatives introduced by the NPI from being passed up to the position where they could be evaluated by *even*. Because *even* has no alternatives to operate on the representation (34) is ruled out.

Under this analysis of intervention effects in NPI licensing, *almost* is predicted to be an intervener. The semantics of *almost* I propose crucially involves the evaluation of alternatives. The combination of *almost* and NPIs thus leads to a constellation as (32), which is excluded by the General Minimality Effect. More precisely, *almost* and the implicit *even* associated with NPIs both operate on the same set of alternatives. I illustrate this for the sentence (35) that has two possible LF-representations, depending on the scopal ordering of *almost* and negation.

- (35) \*I didn't see almost any student.

If *almost* is interpreted within the scope of negation we get the representation (36), where *almost* evaluates the alternatives introduced by the NPI *any student* and there are thus no alternatives left for *even*.

(36)  $[even_D [\sim D [not [almost_C [\sim C [I saw [a student]_F ]]]]]$

If we assume that *almost* takes wide scope with respect to negation (as we did in the case of n-words modified by *almost*) there are no alternatives for *almost* to evaluate, because the alternatives are already 'eaten up' by *even*:



tificational nature of the DP. In particular, taking the semantics of *almost* seriously invalidates the *almost* test as a diagnosis for universal quantifiers. There is more involved than just the quantificational force of the modified DP.

## References

- Beck, S.: t.a., Intervention effects follow from focus interpretation, to appear in *Natural Language Semantics*.
- Błaszczak, J.: 2001, *Investigation into the Interaction between the Indefinites and Negation*, PhD thesis, Humboldt-Universität Berlin.
- Carlson, G.: 1981, Distribution of free-choice ‘any’, *Chicago Linguistics Society* 17, pp. 8–23.
- Chierchia, G.: 2005, Broaden your views. implicatures of domain widening and the ‘logicality’ of language. Ms, University of Milan.
- Hitzeman, J.: 1992, The selectional properties and entailments of ‘almost’, *Chicago Linguistics Society* 28, pp. 225–238.
- Horn, L. R.: 1972, *On the Semantic Properties of Logical Operators in English*, PhD thesis, UCLA.
- Horn, L. R.: 2005, Airport’86 revisited: Toward a unified indefinite ‘any’, in G. Carlson and F. J. Pelletier (eds), *The Partee Effect*, Stanford, CSLI.
- Krifka, M.: 1995, The semantics and pragmatics of polarity items, *Linguistic Analysis* 25, 209–258.
- Krifka, M.: 1999, At least some determiners aren’t determiners, in K. Turner (ed.), *The Semantics/Pragmatics Interface from different points of view*, Elsevier Science, Oxford, pp. 257–291.
- Krifka, M.: t.a., Approximate interpretation of number words: A case for strategic communication, in I. Vogel and J. Zwarts (eds), *Cognitive foundations of communication*, Koninklijke Nederlandse Akademie van Wetenschappen, Amsterdam.
- Ladusaw, W. A.: 1992, Expressing Negation, in C. Barker and D. Dowty (eds), *Proceedings of SALT II*, Ohio State Working Papers in Linguistics 40, Ohio State University, pp. 237–259.
- Lahiri, U.: 1998, Focus and negative polarity in Hindi, *Natural Language Semantics* 6, 57–123.
- Laka, I.: 1990, *Negation in Syntax: On the Nature of Functional Categories and Projections*, PhD thesis, MIT.
- Linebarger, M. C.: 1980, *The Grammar of Negative Polarity*, PhD thesis, MIT.
- McNally, L.: 1998, Existential Sentences without Existential Quantification, *Linguistics and Philosophy* 21, 353–392.
- Morzycki, M.: 2001, ‘Almost and its kin, across categories, in R. Hastings, B. Jackson and Z. Zvolensky (eds), *Proceedings of SALT XI*, CLC Publications, pp. 225–238.

- Partee, B.: 1986, 'Any', 'almost' and superlatives (The Airport Squib). unpublished paper. Rereprinted in: *Compositionality in formal semantics: selected papers by Barbara H. Partee*, Blackwell, 2004, 31–40.
- Rapp, I. and von Stechow, A.: 1999, Fast 'almost' and the visibility parameter for functional adverbs, *Journal of Semantics* **16**, 149–204.
- Rooth, M.: 1985, *Association with Focus*, PhD thesis, University of Massachusetts at Amherst.
- Rooth, M.: 1992, A theory of focus interpretation, *Natural Language Semantics* **1**, 75–116.
- Sadock, J.: 1981, Almost, in P. Cole (ed.), *Radical Pragmatics*, Academic Press, NY, pp. 257 – 271.
- Schwarz, B.: 2005, Scalar additive particles in negative contexts, *Natural Language Semantics* **13**, 125–168.
- Zanuttini, R.: 1991, *Syntactic Properties of Sentential Negation: A Comparative Study of Romance Languages*, PhD thesis, University of Pennsylvania.

# THE PRESIDENT AND THE MAN ON THE STREET: DEFINITE DESCRIPTIONS AND PROPER NAMES ACROSS POSSIBLE SITUATIONS\*

Daniel Rothschild,  
Princeton University

drothsch@princeton.edu

## Abstract

Kripke's "modal argument" uses consideration about scope within modal contexts to show that proper names and definite descriptions must be of two different semantic types. I reexamine the data that is used to motivate Kripke's argument, and suggest that it, in fact, indicates that proper names behave exactly like a certain type of definite description, which I call "particularized" descriptions.

Many people draw a sharp contrast between the way speakers use names to talk about individuals and the way they use definite descriptions to do so. A proper name is used to pick out one specific individual. A definite description, on the other hand, provides a general formula for picking out distinct individuals in different situations. Metaphorically, a name is a tag attached to an individual, whereas a definite description is a set of instructions for finding an individual that satisfies some criterion.

This difference between names and descriptions is said to account for a well-known fact: descriptions exhibit narrow-scope readings with respect to modal operators while names do not. Here is an example in which a definite description has what is normally considered a scope ambiguity with a modal operator.

(1) Mary-Sue could have been married to the president.

Imagine (1) being uttered in a situation in which Grover Cleveland is the president. On one reading, (1) could be made true by a possible situation in which a) Grover Cleveland is married to Mary-Sue and b) Grover Cleveland is not president. This is the *wide-scope* reading of "the president" since it picks out the individual satisfying the role in the actual world, regardless of whether he satisfies it in the possibilities considered. On another reading, (1) could be true because of a possible situation in which Mary-Sue is married to someone else, say Jake, who is president in that possible situation. This is the *narrow-scope* reading of "the president" since the description picks up its referent within the possible situation considered.

Consider, by contrast, what happens if we replace the description in (1) with a proper name:

(2) Mary-Sue could have been married to Grover Cleveland.

There is no way of understanding (2) as having two different readings analogous to those of (1). Even if, as a matter of their syntax, proper names can have different scope with respect to modal

---

\*I am indebted to Jessica Boyd, Sam Cumming, Delia Graff, Gilbert Harman, Irene Heim, Nathan Klinedinst, Margaret Miller, Jim Pryor, Philippe Schlenker, Brett Sherman, and Edwin Williams for helpful comments on earlier drafts and/or discussion of these topics. I am also grateful to the audience at *Sinn und Bedeutung* for many interesting comments and questions, not all of which are addressed here.

operators, there are no different truth-conditional readings corresponding to the different scopes the name can take.

The standard picture of names and descriptions explains this difference between them. Modal operators are generally taken to quantify over different possible situations. Since names are tags linked to individuals while descriptions are instructions for finding an individual in a given situation, only the latter can pick out different individuals across different possible situations. This line of reasoning forms the basis of Kripke's famous modal argument for the claim that names cannot be semantically equivalent to descriptions (Kripke 1972).<sup>1</sup>

This paper centers on a simple observation: scope ambiguities between definite descriptions and modal operators are only sometimes available (or, at least, are only sometimes apparent). It turns out that the narrow-scope readings of definite descriptions within modal operators are only available when the common ground—the mutual beliefs of the conversational participants—includes the proposition that across a wide range of possible situations the descriptive content has a unique satisfier.

The behavior of definite descriptions under modals is the contemporary debate about the semantics of proper names. I argue that the modal argument against descriptivist theories of names loses its force once we take into consideration the fact that many definite descriptions systematically fail to show narrow-scope readings. To make this point, I consider a treatment of proper names which construes them as linguistic devices akin to definite descriptions. According to this picture, both types of expressions are used to pick out individuals that satisfy some descriptive content. I show that this account accurately predicts the behavior of names with respect to modal operators.

## 1 Descriptions Under Modal Operators

First, we need to look at the details of the interaction of definite descriptions with modal operators. The key observation here is that definite descriptions have distinct wide- and narrow-scope readings with respect to modal operators. Although this observation plays a central role in much of the philosophical discussion of names and descriptions, there is little in the way of detailed study of the phenomenon.<sup>2</sup>

It will be useful to think of modal operators—like “must” and “might”—as quantifiers over possible worlds (or situations). To say that something *must* happen is to say that in all possible worlds it does happen. To say that something *can* happen is to say that there is a possible world (or situation) in which it does happen. Of course, modality comes in different flavors: modal operators may be read metaphysically, epistemically, or deontically. In this paper, I will concentrate on metaphysical modals—in keeping with much of the philosophical literature on names, descriptions, and modals.

Let's consider an example in order to get a grip on the narrow-scope readings of definite descriptions with respect to modal operators:

---

<sup>1</sup>The modal argument is widely discussed in the philosophy of language (Linsky 1983, Soames 2002, Stanley 1997).

<sup>2</sup>Within the semantics literature most discussion of the interaction of descriptions and modals centers around the phenomenon of modal subordination. Here is an example of modal subordination:

A bear might come in to the cabin. The bear would eat you.

The modal in the second sentence, although universal in force, is only interpreted relative to the worlds involving the possibility mentioned in the first sentence (Roberts 1989). In this paper, I will not discuss either this phenomenon or anaphoric uses of definite descriptions like the use of “the bear” in the second sentence, which refers back to the indefinite “a bear” in the first sentence.

(3) Aristotle might not have been the teacher of Alexander.

If we read the modal as having a metaphysical force, it is natural to think that (3) is true. But since Aristotle *was* the teacher of Alexander, the sentence can only be true if the description “the teacher of Alexander” picks up its reference *under* the modal operator. In other words, “the teacher of Alexander” must pick out different individuals in the different worlds over which the modal operator quantifies. The truth of (3) is then established by the existence of a possible world in which the description “the teacher of Alexander” picks out someone besides Aristotle. In that possible world, Aristotle is not the teacher of Alexander. By contrast, the wide-scope reading of the description could not possibly be true. This is because, on the wide-scope reading, “the teacher of Alexander” picks out its referent in the actual world. But, in this case, it picks out Aristotle and the sentence would then assert that in some possible world Aristotle is not Aristotle, which is false.

Before moving on let me make a cautionary note. Sometimes the narrow-scope reading of a sentence containing a description and a modal may not be distinguishable from the wide-scope reading. If the sentence only quantifies over possible worlds across which one and the same person satisfies the description, it will be impossible to tell from the truth-conditions of the sentence whether the description within it takes narrow or wide scope. For this reason, all of my claims about when we can or cannot get a narrow-scope reading of a sentence apply only to contexts in which the different scopes have an effect on the truth-conditions of the sentence.

### 1.1 Role-type vs. Particularized Descriptions

Example (3) in the previous section demonstrates that some definite descriptions have narrow-scope readings under modal operators. But the modal argument, as we shall see, relies on the claim that this is *generally* true of definite descriptions and this is the claim I wish to dispute. In order to do so, I need to make a distinction between two kinds of definite descriptions, which I call *role-type* and *particularized* descriptions.

A description is a *role-type description* if it is part of the common ground that there is exactly one person (or one salient person) satisfying the descriptive content across a range of relevant metaphysically possible situations and that the satisfier sometimes varies from situation to situation.<sup>3</sup> Some examples of role-type descriptions are “the family lawyer,” “the mayor,” “the president,” “the tallest pilot,” and “the director.” With role-type descriptions, we usually know independently of the specific conversational situation that the descriptive content is satisfied uniquely across other possible situations: It is part of general knowledge that cities generally have one mayor, countries one president, and so on. Of course, many role-type descriptions are incomplete in the sense that they need to be augmented by an implicit specification of the particular role in question—so, for instance, “the president” might be used to mean “the president of the US” or the “the president of the board of trustees.” Likewise superlative descriptions, such as “the tallest man,” require some domain within which they operate: “the tallest man” might mean “the tallest man in the room,” or “the tallest man in the galaxy.” But the basic criterion stands: a role-type description is a description for which it is part of the common ground both that the content of the (completed) description is uniquely satisfied across a wide range of possible situations and that the satisfier varies amongst these situations.

*Particularized descriptions* are simply those descriptions that are not role-type descriptions. The mark of a particularized description, then, is that it is *not* part of the common ground that the descriptive content has a unique but varying satisfier across a whole range of relevant meta-

<sup>3</sup>Note that while the number of metaphysically possible situations may be great, only certain situations are relevant when we use modals in normal speech with their metaphysical force.

physically possible situations. Descriptions whose only content consists in general properties shared by many different individuals tend to be particularized descriptions, such as, “the tall boy,” “the dog,” and “the loose-fitting cap.” Descriptions that refer to people by their physical location or what they did at some point are also usually particularized, such as, “the man I met yesterday,” “the person over there,” and “the cat in the basement.” The reason these descriptions count as particularized—in ordinary contexts—is that we can only know that there is a single most salient individual satisfying the descriptive content (and thus the description picks some individual out) by having some sort of knowledge particular to the narrow conversational context (e.g. for “the tall boy” we must know that there happens to be exactly one tall boy around). I might further note that particularized descriptions may also be “incomplete” in the sense that one might naturally fill out descriptions like “the tall man” with extra information such as “in this room.”<sup>4</sup>

Whether a description counts as particularized or role-type depends upon what the common ground is. This means that corresponding to almost any particularized description there is some conceivable conversational context in which that description would count as a role-type description, and vice versa. So the distinction is not one between different types of linguistic expressions, but between different types of expression/context pairs. However, certain descriptions cast themselves more naturally as one sort or the other. When I give an example it will be clear if I mean it to be particularized or not.

It is worth noting that the role-type/particularized distinction is not the famous distinction between referential and attributive uses of descriptions introduced by Donnellan (1966). On Donnellan’s scheme, roughly speaking, attributive descriptions are used to speak of whoever satisfies the predicative content of a description, whereas referential descriptions are used to refer to known individuals. Whether a definite description falls on one side or the other of Donnellan’s distinction depends on how it is *used*; how it is classified according to my distinction depends, instead, upon the relationship between the common ground and the predicative content of a description. Classification according to my distinction is independent of how a description is used, and, so, is independent of how it sits with regard to Donnellan’s distinction. (But there may be points of contact. For instance, when a description is used attributively the conversational participants typically assume, or pretend to, that across different epistemically or different metaphysically possible situations different individuals would satisfy the descriptive content.<sup>5</sup> Thus it may be that attributive uses are only possible with role-type descriptions.)

## 1.2 Role-type and Particularized Descriptions with Modals

Now, as we have seen, role-type descriptions allow narrow-scope readings with respect to modal operators, as in (3), repeated here:

- (4) Aristotle might not have been the teacher of Alexander.

The description from (4), “the teacher of Alexander” can easily be a role-type description since it can be part of the common ground that across a wide range of possible worlds Alexander would have had a teacher, but not necessarily the same teacher (for example, a different student of Plato might have been chosen instead to be Alexander’s teacher). The question I turn to now is whether particularized descriptions exhibit the same sort of behavior with regard to modal

<sup>4</sup>How incomplete descriptions are dealt with is a matter of much controversy within formal semantics and philosophy of language (Soames 1986).

<sup>5</sup>I think one can generalize the notion of role-type and particularized descriptions to epistemically possible situations in addition to metaphysically possible ones, though I do not explore that here.



operators as role-type descriptions do.

Let's look at an example. Suppose that I went to a reception at the Met last night. At the reception, we can suppose, I talked to many different people for brief periods of time. Now, suppose that I learn that my old friend Hans was due to come to the reception but that he didn't make it because his plane was delayed. Let us suppose that for this reason it is a relevant *possibility* that Hans could have made it to the reception, and that, if this were the case, I would have talked to him all night at the reception. This possible situation, if it were actual, is one which I could aptly describe with this sentence:

(5) Hans is the person I talked to the whole time.

Now suppose that I want to express to someone at the party that I consider (5) to be a possibility. One might think that I could do this by uttering a version of (5) with a possibility modal:

(6) Hans might have been the person I talked to the whole time.

There is, however, something very odd about using (6) to express the possibility of a situation in which (5) is true (assuming there is actually no one who I talked to the whole time). Indeed, if I utter (6) at the party, I will probably confuse my audience. (I will discuss a bit later how one might try to make sense of such utterances.) This oddness is quite surprising, however. If the definite description "the person I talked to the whole time" can have scope within the modal operator, then we would expect that (6) would express the possibility of a situation within which (5) is true. Since such a situation *is* possible we would expect the utterance to be not only felicitous but also true. However, for some reason this narrow-scope reading of the description "the person I talked to the whole time" is not actually available.<sup>6</sup> (The wide-scope reading of the description is quite hard to get as well since there is no person in the actual situation the description could refer to.)

Let's consider another example. Suppose that throughout an entire dinner party Siegfried does not eat anything, and is unique in this regard. Suppose that I have another friend, say Siegmund, who also would not have eaten anything if he had been at the dinner. Now, suppose I say something like this:

(7) I might have enjoyed talking to the person fasting through the dinner.

It does not seem like I could mean anything but that I might have enjoyed talking to Siegfried by an utterance of (7). This is true even if it is possible that Siegmund could have come and Siegfried not come. In this possible situation, of course, Siegmund would have been the only person fasting. Nonetheless, it does not seem like (7) can easily express the proposition that there is a possible situation in which I would have enjoyed talking to *whoever* was unique in fasting at the dinner, Siegmund, Siegfried or someone else entirely. In this respect we cannot easily get the narrow-scope of the description "the person fasting through the dinner."

We can, however, create conversational backgrounds within which "the person I talked to the whole time" has a narrow-scope reading in (6) and "the person fasting through the dinner" has a narrow-scope reading in (7). First take (6) again:

(8) Hans might have been the person I talked to the whole time.

---

<sup>6</sup>Those familiar with presuppositions may not be surprised by this, since this is, roughly speaking, *predicted* by the presuppositional theory of descriptions.

Suppose that it is part of the common ground that I generally talk to one person throughout an entire evening (because, for instance, I always start an argument with someone about politics which lasts the whole evening). In this case, I could utter (8) in order to express the proposition that if Hans had come he would have filled the role of being the person I talked to all night. However, this is a case in which “the person I talked to the whole time,” which would usually be a particularized description, acts as a role-type description since it indicates a role which is uniquely filled across many relevant counterfactual situations.<sup>7</sup>

The situation is similar for (7). If we can take it for granted that there is usually exactly one person fasting at such dinners, or that the organizers had intended to invite exactly one person who wouldn't eat, though not any specific person, then the narrow-scope reading of (7) is available. However, without such an assumption the reading is very hard to get.

We have seen, then, that in order to get a narrow-scope reading of a definite description we need to treat it as a role-type one. Sometimes in response to an utterance the audience changes their assumptions, and, hence the common ground through the process of *accommodation* (Lewis 1983, Stalnaker 2002). This process of accommodation can lead the audience to treat a description as a role-type one even if prior to the utterance it is not part of the common ground that the description designates a role. Here is an example in which such accommodation might occur. Suppose I utter (9) when discussing a party I have just been to:

(9) If I had gotten there earlier I might have been the person in charge of hats.

My audience would not take me just to be asserting that if I had gotten to the party earlier I would, by myself, have taken charge of the hats. Rather, they must *also* assume that across a whole range of different possible ways in which the party could have transpired there would have been one person who saw to the hats. Making this assumption, through accommodation, the audience can then understand my assertion in (9) to be the assertion that if I had gotten to the party earlier I would have played the role of dealing with the hats.

To understand better the behavior of descriptions within modal operators it is worth comparing sentences with particularized descriptions with sentences containing a typical role-type description. Here is one:

(10) Adlai Stevenson could have been the president.

There is a natural reading of (10) on which the role-type description “the president” has narrow scope. It is true, for instance, if there are relevant possible worlds where Stevenson beats Eisenhower. These are worlds in which Stevenson is “the president.” But that sort of reading, i.e. the narrow-scope one, is exactly the reading we do not find for (6), (7), or (9) without choosing backgrounds in which the descriptions act as role-type ones.

These observations about the scope of particularized and role-type descriptions beg for any explanation. Unfortunately I think the details of such an explanation will take us too far afield

---

<sup>7</sup>I can only think of one other circumstance in which the description “the man I talked to the whole time” could have a non-rigid, narrow scope in an utterance of (8). This other case is the one in which the description “the person I talked to the whole time” has already been introduced in either its definite or indefinite form in the conversation. For instance, instead of just saying (8) I might have said (i):

(i) I could have talked to a person the whole time. Hans might have been the person I talked to the whole time.

If I utter (i) it seems that the description in the second sentence can have a narrow-scope reading, and thus the utterance might express something true. However, in this case, the definite description is anaphorically linked to the indefinite description that precedes it. I want to put aside these anaphoric uses of descriptions as they involve the description inheriting properties from the original use.

and are not pertinent in reassessing the modal argument. Unsurprisingly, I think facts like these need to be explained in terms of the theory of presuppositions. The Russellian account of definite descriptions, as far as I can tell, can give us no leverage on the different availability of the narrow- and wide-scope reading of definite descriptions within modal operators. Indeed, whether we should describe the difference in terms of scope rather than in terms of a world-variable in the description itself seems to me an open question.<sup>8</sup>

## 2 Proper Names and the Modal Argument

An extremely influential argument in the philosophy of language, Kripke's modal argument, purports to show that proper names are not semantically equivalent to definite descriptions.<sup>9</sup> Here is one version of the argument:

1. Definite descriptions exhibit narrow-scope readings with respect to modal operators.
2. Proper names do not exhibit narrow-scope readings with respect to modal operators.
3. The meaning of a proper name cannot be the same as that of a definite description.

The argument depends upon the sort of observations I made in the introduction to this paper. Consider, for instance, (2), repeated here:

(11) Mary-Sue could have been married to Grover Cleveland.

The modal argument begins by suggesting that on the hypothesis that "Grover Cleveland" is really semantically equivalent to some description, "the F," one should expect to find two possible readings of (11), corresponding to whether the description, "the F," gets its scope under the modal (finding the satisfier of the description within each possible situation) or outside the modal (picking out its actual satisfier, i.e. Grover Cleveland). However (11) does not seem to exhibit different readings of this sort. So, the argument concludes, "Grover Cleveland" cannot be equivalent to "the F."

Many have noted that the argument only shows that proper names are not semantically equivalent to those descriptions whose descriptive content allows them to pick out different objects in different possible situations. In other words, the argument shows that proper names are not equivalent to those descriptions whose descriptive content is actually capable of being satisfied by different individuals in different situations. Some descriptions do not have this property. These include descriptions whose descriptive content contains some indexical reference to the actual world. No matter what their scope is, such descriptions always pick out the same individual (they are so-called *rigidified descriptions*). In light of this qualification, we can view the modal argument as purporting to establish that, if proper names are semantically equivalent to any definite descriptions, they are semantically equivalent to rigidified descriptions like "the actual mayor."<sup>10</sup>

The first premise in my presentation of the modal argument above states that definite descriptions exhibit narrow-scope readings with respect to modal operators. In this paper, however, I have presented and explained a significant qualification to this claim. I have shown that only

<sup>8</sup>An excellent discussion of the issues involved here and the problems for the Russellian rather than presuppositional view is to be found in chapter 3 of Elbourne (2005) (in particular, pages 109-112).

<sup>9</sup>Three pieces that seem to understand the argument this way are Linsky (1983, ch. 7), Stanley (1997), and Soames (2002, ch. 2).

<sup>10</sup>Discussion of rigidified descriptions include Nelson (2002), Stanley (1997), and Soames (2002).

*role-type* descriptions can have narrow scope with respect to a modal operator. Thus, we need to revise our assessment of the modal argument in light of this qualification.<sup>11</sup>

In fact, once we recognize that definite descriptions do not *always* exhibit scope ambiguities with respect to modal operators, the modal argument loses much of its force against descriptivist accounts of names. If one assumes that descriptions always exhibit scope ambiguities, then *one* instance of a sentence containing a proper name and a modal operator that does not show a scope ambiguity will serve to demonstrate that names cannot be descriptions (except perhaps rigidified descriptions). But, once we have recognized that descriptions do not generally show scope ambiguities, we can no longer reason in this way. Many definite descriptions, such as “the man in the corner” and “the person I saw yesterday,” have restrictions on what scope they can get with respect to modal operators. These descriptions belong to the large class of descriptions that are particularized in most contexts and, thus, do not exhibit narrow-scope readings in these contexts. The modal argument fails to show that proper names are not equivalent to *these* sorts of descriptions.

It’s worth noting that this is a significantly larger qualification than the one in the previous section about rigidified descriptions. Descriptions like “the man in the corner” are not rigidified descriptions since they have a predicative content which different individuals can satisfy in different situations. So, the class of definite descriptions that are generally particularized includes descriptions which are not rigidified. In addition, while it’s extremely hard to find real English expressions that act as rigidified descriptions (“the actual mayor” certainly doesn’t), it’s extremely easy to find English expressions that are usually particularized descriptions.

Another way of putting my basic point is to say that the modal argument still leaves open the possibility that names are particularized descriptions. Of course, whether a description is particularized or *role-type* depends upon the relationship between the common ground and the predicative content of the description. So, a name is unlikely *always* to be a particularized description, but a name might be equivalent to a definite description that has a descriptive content which makes it particularized in most contexts. This hypothesis would explain the resistance names show to taking narrow scope in most instances.

In the remainder of the paper I examine one particular descriptivist conception of names to see whether, according to this conception, names can be construed as particularized descriptions. I will also look at contexts in which, according to this descriptivist proposal, names do *not* act as particularized descriptions. By looking at these contexts we can assess whether, as the descriptivist should predict, names can sometimes get narrow scope with respect to modal operators. I will argue that—contrary to the philosophical orthodoxy—the descriptivist view does extremely well at predicting the potential scope of proper names with respect to modal operators.

### 3 Names as Metalinguistic Descriptions

The view that names are semantically equivalent to definite descriptions is often described as the view that names are *disguised* descriptions, since unlike real definite descriptions names do not openly show their descriptive content. This leads to the question of what the descriptive

---

<sup>11</sup>Kripke explicitly acknowledges the degree to which his argument depends on descriptions acting Russellian, and hence being able to get narrow scope (Kripke 1972). Geurts (1997) also picks up on this issue, arguing that names are like certain descriptions which always take wide scope (though he does not offer an account of *why* these descriptions take wide scope):

The presuppositions triggered by names seem to have a decidedly stronger tendency to ‘take wide scope’ than some others. In this respect, too, they are on a par with other descriptively attenuate ‘incomplete’, definites like ‘the door’ or anaphoric pronouns like ‘it’. (p. 18)

content of a name is. Here I will sketch one answer to this question, but I will not systematically consider alternatives.

One of the most plausible instantiations of the view that names are descriptions treats names as “metalinguistic” descriptions.<sup>12</sup> On this account, the meaning of a name *N* is roughly captured by the description “the bearer of *N*.” We must distinguish this account of the semantics of proper names from the truism that a name *N* refers to whoever is referred to by *N*. The view that names are metalinguistic descriptions, unlike this truism, is neither trivial nor circular. We have a social practice of naming, under which one cannot bear a name just in virtue of some person using it to refer to you. So the facts about name-bearing are not mere trivial metalinguistic ones, like the fact that “jump” means jump. In fact, the metalinguistic view of names makes a very strong claim: that each proper name has the same meaning as some particular definite description.

Definite descriptions trigger presuppositions; so, if proper names are equivalent to certain definite descriptions they will also trigger presuppositions. Earlier, I suggested that definite descriptions trigger the presupposition that there is a uniquely salient individual satisfying the descriptive content. So, if a name *N* were equivalent to the description “the bearer of *N*,” then a use of *N* would trigger the presupposition that there is a uniquely salient person bearing *N*. It seems plausible that names carry this presupposition. For when we use a proper name usually we presuppose that there is a most salient person bearing the name. Without this presupposition we could not expect our audience to understand to whom we meant to refer.

Kripke (1972) makes other powerful arguments, besides the modal argument, against the view that names are disguised descriptions. His strongest argument, to my mind, is one about speaker knowledge. Here is a version of this argument: If the name “Plato” were synonymous with the description “the author of *The Republic*” then one would think that competent users of the name would have to know—at least implicitly—that Plato is the author of *The Republic*. However, it is absurd to suppose that it is a condition on semantic competence with the term “Plato” that one know that “Plato” wrote *The Republic*.

I do not think the metalinguistic view succumbs to this argument about speaker knowledge. The knowledge that a person referred to by a name bears that name may well be part of every competent speaker’s grasp of the meaning of the name. The only objection to this that I can see is the claim that children are able to use proper names without having sufficient conceptual resources to grasp descriptions like “the bearer of *N*.” There are a few things to be said about this. First, the conceptual capacities of very young children may be extremely sophisticated, so that the empirical claim may simply be false: children might, from their first uses of proper names, be in a position to grasp (in some sense) the descriptions associated with names.<sup>13</sup> Second, even if children can use proper names without grasping the descriptions associated with them, this does not mean that the adult use of proper names is not descriptive in the way I have suggested.<sup>14</sup> Third, it may be that children’s use of proper names is in some way *parasitic* on adult usage or *deferential* to it, so that if adults did not use names as metalinguistic descriptions children would not be able to use them to refer people at all. These considerations show that the knowledge argument may not be successful against the metalinguistic view.<sup>15</sup>

<sup>12</sup>Such views have a long tradition. Kneale (1962) explicitly advocates a metalinguistic view and Burge (1973) comes close to this view, though he treats names as predicates. More recently, Geurts (1997), Katz (2001) and Bach (2002) have endorsed versions of the view that names are metalinguistic descriptions.

<sup>13</sup>Bloom (2001) discusses what conceptual capacities children might need to learn the meaning of names and other words.

<sup>14</sup>Of course many who hold a descriptive account of names will not be happy with this response because they do not think that it is possible for there to be referring devices without descriptive content. They may, however, think that children associate *different* descriptions with names from those which adult users associate with them.

<sup>15</sup>See the literature cited in footnote 12 for discussion of how the metalinguistic view of names might avoid other challenges from Kripke and elsewhere.

#### 4 Names as Descriptions under Modals

Now that we have a reasonable account of the descriptive content of proper names in hand we can see whether it predicts that names are usually particularized descriptions. Recall that particularized descriptions are ones whose descriptive content is *not* commonly known to be uniquely satisfied by different individuals across a range of relevant possible circumstances. It seems to me that in most contexts metalinguistic descriptions must be particularized. For instance, it would require a very odd context to make it plausible that over an entire range of different possibilities there would always be a uniquely salient “Samuel” available, but without this being the same person in each situation. In many possible situations there is at least one person called “Samuel”, but it is hard to see why there would always be one most salient such person.

In other words, metalinguistic descriptions *are* particularized definite descriptions in most contexts, since for most relevant classes of possible situations one cannot suppose there will be a different uniquely salient person satisfying the descriptive content in each situation. Supporting this view is the fact that it is quite hard to get descriptions of the form “the man bearing the name *N*” to have narrow scope under metaphysical modals. Consider this sentence:

(12) The president might not have been the man called “Havelock.”

It is very hard to read “the president” in (12) as a wide-scope description while reading “the man called ‘Havelock’” as a narrow-scope description—in other words it is hard to read the sentence as saying that the actual man who is now the current president might have had a different name. So, as we should expect given the conclusions I have reached, metalinguistic descriptions are extremely resistant to getting narrow scope.

Of course, in some contexts even metalinguistic descriptions will count as role-type descriptions. And in such cases, metalinguistic descriptions will be able to receive narrow-scope interpretations. Let us imagine a situation in which it is part of the common ground that there is always one, but not always the same, person bearing a particular name across different situations. Consider the name “M”—the name of the head of the British secret service in *James Bond*. “M” looks like a proper name, but if it is a proper name it is one which *can* get narrow scope with respect to modal operators:

(13) John might have become M.

The names of superheros also exhibit this behavior. Consider Batman and Superman. In different circumstances different individuals may bear the superhero-title.<sup>16</sup> Given this fact, it would be appropriate to talk about who *might* have been Superman or Batman. If proper names were just tags attached to particular individuals this behavior would be unexpected: We would not expect that the mere presentation of various relevant counterfactual situations across which different individuals lay claim to the same name would allow names to have narrow scope under modal operators. So names such as “M” and “Superman”, unless they are somehow special, or differ in their semantic status from other proper names, provide support for the idea that names are semantically equivalent to definite descriptions, and, thus, in appropriate circumstances, can act as role-type descriptions.<sup>17</sup>

The metalinguistic view has many further consequences, however, and we need to see whether they are also supported by our linguistic intuitions about how proper names work. For instance,

<sup>16</sup>Apparently there is a series of comic books set in the future in which different individuals are Batman, Superman, etc.

<sup>17</sup>Some, such as Soames (2002), argue that names like these are semantically distinct from other proper names.

the view entails that names should *always* show the same potential scope as the definite descriptions that paraphrase them. Many have contested this point. The following examples, discussed in Abbott (2001), are supposed to show that names cannot be synonymous with metalinguistic descriptions:

- (14) Aristotle might not have been Aristotle.  
 (15) Aristotle might not have been the man named "Aristotle."

The usual claim is that (14) has no true reading whereas (15) has a true reading.

It is worth pointing out, first of all, that neither sentence *easily* gets a sensible reading as a metaphysical modal assertion. This is evident from the fact that neither (14) nor (15) express the same thing as (16) nor is as obviously true:

- (16) Aristotle might not have been named "Aristotle."

This fact, of course, just follows from the earlier observation that particularized descriptions like "the man named Aristotle" in (15) do not have narrow-scope readings under metaphysical modals. A sentence like (15) is not assertible just by virtue of there being a metaphysically possible world where Aristotle is not named "Aristotle." Rather getting the narrow-scope reading of the description in (15) requires the common ground to include an entire range of relevant possible situations in which the descriptive content is satisfied by different individuals.

In certain contexts, a description such as "the man named 'Aristotle'" will be a role-type one. For instance, imagine it is commonly known that Greek law ensures that one and only one person is called "Aristotle" at a single moment of time. In this case there may be different relevant possible situations in which different people are uniquely called "Aristotle" and so the description "the man named 'Aristotle'" acts as a role-type one. Then, we might have an interest in who would have been called "Aristotle" if the actual person called "Aristotle" had not been born. Consider this sentence:

- (17) The person bearing the name "Aristotle" could have been a sailor. In these circumstances, it seems like it is quite easy to give the description a narrow-scope interpretation.

The crucial test for the metalinguistic descriptivist view is whether proper names also allow narrow scope in such circumstances. It is unclear what one should say about the sentence containing two proper names, (14), repeated below, when uttered in a context in which a Greek law of this sort is commonly known to be in effect. I think it is perhaps less good than the sentence yielded by replacing the proper names with two definite descriptions:

- (18) The man called "Aristotle" might not have been the man called "Aristotle."

But the difference between the felicity of these two sentences is *very* subtle, and both of these sentences are rather unnatural. A better example of a potential narrow-scope use of a proper name is a variation on (17):

- (19) Aristotle could have been a sailor.

If there is a Greek law stipulating that there is always one and only one Aristotle at any given time, then (19) seems like it has a reading on which the name gets narrow scope. I am not sure whether, with the narrow-scope reading, (19) is less natural than (17) or not. In general, I am not

sure where the weight of intuitions lies in these cases.<sup>18</sup> However, I do not think the intuitions are weighty enough to form the basis of a serious argument against the view that names are semantically equivalent to metalinguistic definite descriptions.

We should not despair over the semantics of proper names just because our judgments of critical cases are hazy. The messiness of the data is not an obstacle to understanding proper names; it is just another piece of data in its own right. The question of whether proper names are particularized descriptions might not have a determinate answer. The right hypothesis may be that names are very similar to metalinguistic descriptions, but not *exactly* the same. That is, we may have a conventionally encoded *bias* towards particularized readings of the descriptive content that names bring with them.

What is important to see is that once we restrict our attention to the relevant situations—the cases where names should, on the descriptivist view, get narrow scope—the difference between names and descriptions becomes extremely subtle. Altogether the metalinguistic view of proper names does well at predicting what scope proper names will get under modal operators. If anything, it does better than standard non-descriptivist views which do not have many resources for explaining the fact that names sometimes *do* exhibit narrow scope under modal operators.

I certainly do not intend this as a serious defense of the metalinguistic view of proper names. While the view has its attractions, I am not inclined to think it is correct—if only for the reason that it is hard to explain why, out of the whole space of possible descriptive contents that names might have, names happen to have the metalinguistic content.<sup>19</sup> My main point here is just that considerations of scope do not force us to treat proper names as being semantically distinct from definite descriptions.

## References

- Abbott, B.: 2001, Definiteness and proper names: Some bad news for the description theory, *Journal of Semantics* **19**, 191–201.
- Bach, K.: 2002, Giorgione was so-called because of his name, *Philosophical Perspectives* **16**, 73–103.
- Bloom, P.: 2001, *How Children Learn the Meaning of Words*, MIT.
- Burge, T.: 1973, Reference and proper names, *Journal of Philosophy* **70**, 425–439.
- Donnellan, K.: 1966, Reference and definite descriptions, *Philosophical Review* **75**, 281–304.
- Elbourne, P.: 2005, *Situations and Individuals*, MIT Press.
- Geurts, B.: 1997, Good news about the description theory of names, *Journal of Semantics* **14**, 319–348.
- Katz, J.: 2001, The end of millianism, *Journal of Philosophy* **98**, 137–166.
- Kneale, W.: 1962, Modality de dicto and de re, in E. Nagel, P. Suppes and A. Tarski (eds), *Logic, Methodology and Philosophy of Science. Proceedings of the 1960 International Congress.*, Stanford University Press.

<sup>18</sup>One has to put aside the question-begging temptation—common in discussions of the modal argument—to label any narrow-scope use of a proper name as somehow special and, hence, irrelevant. The important thing to note in this context is that the narrow-scope uses of some definite descriptions, the ones which are usually particularized such as that in (17), *also* sound slightly odd.

<sup>19</sup>I am inclined to think linguistic usage (in speech or in the head) does not determinately fix the descriptive content of names. Thus, there is no fact of the matter about what the descriptive content of names is.



- Kripke, S.: 1972, Naming and necessity, in G. Harman and D. Davidson (eds), *Semantics of Natural Language*, D. Reidel Publishing Co., Dordrecht, pp. 253–355.
- Lewis, D.: 1983, Scorekeeping in a language game, *Philosophical Papers, Vol.I*, Oxford University Press.
- Linsky, L.: 1983, *Oblique Contexts*, University of Chicago Press.
- Nelson, M.: 2002, Descriptivism defended, *Nous* **36**, 408–435.
- Roberts, C.: 1989, Modal subordination and pronomial anaphora in discourse, *Linguistics and Philosophy* **12**, 685–721.
- Soames, S.: 1986, Incomplete definite descriptions, *Notre Dame Journal of Formal Logic* **27**, 349–375.
- Soames, S.: 2002, *Rigid Designation*, Oxford.
- Stalnaker, R.: 2002, Common ground, *Linguistics and Philosophy* **25**, 701–721.
- Stanley, J.: 1997, Names and rigid designation, in B. Hale and C. Wright (eds), *A Companion to the Philosophy of Language*, Blackwell, pp. 555–585.



# PRESUPPOSITIONS IN PROCESSING: A CASE STUDY OF GERMAN *auch* \*

Florian Schwarz,  
University of Massachusetts at Amherst

florian@linguist.umass.edu

## Abstract

This paper presents two experimental studies investigating the processing of presupposed content. Both studies employ the German additive particle *auch* (*too*). In the first study, participants were given a questionnaire containing bi-clausal, ambiguous sentences with 'auch' in the second clause. The presupposition introduced by *auch* was only satisfied on one of the two readings of the sentence, and this reading corresponded to a syntactically dispreferred parse of the sentence. The prospect of having the *auch*-presupposition satisfied made participants choose this syntactically dispreferred reading more frequently than in a control condition. The second study used the self-paced-reading paradigm and compared the reading times on clauses containing *auch*, which differed in whether the presupposition of *auch* was satisfied or not. Participants read the clause more slowly when the presupposition was not satisfied. It is argued that the two studies show that presuppositions play an important role in online sentence comprehension and affect the choice of syntactic analysis. Some theoretical implications of these findings for semantic theory and dynamic accounts of presuppositions as well as for theories of semantic processing are discussed.

## 1 Introduction

The study of presuppositions has been an important topic in both the philosophy of language and in linguistic semantics and pragmatics, but only more recently has it become a topic investigated with psycholinguistic methods. However, a lot can be gained from such investigations, both with respect to theoretical issues in presupposition theory as well as with respect to our understanding of semantic processing. In the following, I present two experimental studies focusing on the German additive particle *auch* (*too*). I argue that the results from these studies indicate that presuppositions play an important role early on in sentence comprehension processes. This, together with seeing other relevant studies in the processing literature from the viewpoint of semantic theory, opens up the possibility of testing theoretical claims with psycholinguistic methods. One conclusion suggested by the results presented here is that something like contextual updates (in the sense of update semantics) are carried out below the sentence level in actual processing, namely at the level of DPs. In addition to these theoretical conclusions, some implications for a theory of semantic processing are also discussed.

The paper is organized as follows. In the following section, I provide some background on the issues relevant to the experiments, including my theoretical assumptions about presuppositions and a few remarks about existing work on semantic processing. Section 3 presents the two experimental studies that were carried out. Section 4 discusses implications of the experimental

---

\*Thanks for comments and discussion are due to: Lyn Frazier, Angelika Kratzer, Chuck Clifton, John Kingston, Chris Potts, Florian Jäger, Kai von Stechow, Kristen Syrett, Greg Carlson, Barbara Partee, Paula Menendez-Benito, Jan Anderssen, the participants of 2nd Year Seminar and Semantics Reading Group, and the audience at Sinn and Bedeutung 10. Part of this work was supported by NIH Grant HD-18708 to the University of Massachusetts.

results for presupposition theory and theories of semantic processing. Section 5 provides a brief summary and a conclusion.

## 2 Background

One might start out the enterprise of investigating presuppositions in processing by wondering whether they matter at all in online sentence comprehension. After all, they are most commonly thought of as crucially relating to the context, and at least in the experimental settings typically used in psycholinguistic work, there is no realistic context. So it is at least possible that participants in experiments more or less ignore such context related information, especially if considerations relating to presuppositions are part of very late pragmatic processes in sentence comprehension that are more like conscious reasoning. If, on the other hand, the processor automatically made use of presupposed content, we would expect that participants would not be able to ignore it. In this case, the question becomes in what ways presuppositions can affect the parsing of incoming strings of linguistic expressions, and how quickly is their content accessible to the parser. Furthermore, we would want to know whether presuppositions interact with other factors known to be relevant in parsing, and if so in what ways. In order to address these issues in more detail, I will outline my theoretical assumptions and some of the previous findings on pragmatic processing.

From a theoretical viewpoint, we are, of course, especially interested in what implications experimental results might have for semantic and pragmatic theory. In connection with this it is interesting to note that most of the theoretical frameworks for the analysis of presuppositions share a procedural view of some sort which determines how presupposed content is integrated with the contextual information (although they don't make any explicit claims about actual processing). For concreteness, I will frame the discussion in this paper in terms of Heimian update semantics (Heim 1982, Heim 1983a, Heim 1983b). This is not to say that the results presented here could not be framed in other presupposition theories. In particular, they might just as well be viewed in terms of Discourse Representation Theory (Kamp 1981), which shares most of the features relevant for our purposes with update semantics.

Presuppositions have two crucial properties: first, they are something that is taken for granted by the discourse participants. Secondly, presupposed content behaves differently from asserted content in most embedded contexts. This is at the heart of what is usually referred to as the *projection problem* (for an overview, see von Stechow 2004, Beaver 1997). In update semantics, which can be viewed as a formal implementation of the accounts for presuppositional phenomena by Stalnaker and Karttunen (Stalnaker 1973, Stalnaker 1974, Karttunen 1973, Karttunen 1974), the aspect of being taken for granted is modeled by the common ground, which is the set of worlds in which all of the beliefs that the discourse participants knowingly share are true. A sentence can only be felicitously uttered when the presuppositions that come with uttering the sentence are entailed by the common ground. The behavior of presuppositions in embedded contexts is accounted for by the way that the common ground is updated when a new utterance is made in the discourse. Under certain circumstances, presupposition failure can be remedied by a process of accommodation (Lewis 1979), in which the common ground is adjusted in such a way that it does entail the presupposition at issue.

Update semantics represents the meanings of sentences as context change potentials. More concretely, sentence meanings are understood as functions from contexts to contexts (where contexts are modeled either as sets of worlds or sets of pairs of worlds and assignment functions). One of the crucial issues in this type of theory is where or when context updates take place. Quite frequently the discussion in the literature focuses on the sentence or clause level, which seems intuitively plausible. However, in the full version of Heim's system, which in-

cludes assignment functions, updates also take place at the level of noun phrases (which are viewed as denoting atomic propositions). Furthermore, in order to account for certain facts concerning the behavior of presuppositions in embedded contexts, Heim (1983a) introduces the notions of local and global accommodation. As I will discuss in some more detail below, the issue of where updates take place is crucial for semantic processing viewed from the perspective of update semantics: if the processor is to make use of compositional semantic information, the way in which it can be used crucially depends on the point at which it has access to it.

Before turning to the discussion of the experiments, let me briefly review some existing work on presuppositions in processing. Most related work focuses on the presupposition of the definite article and follows the basic approach taken in the seminal study of Crain and Steedman (1985).<sup>1</sup> Looking at locally ambiguous sentences like the one in (1), they show that varying the discourse context (as in (2)) affects the way that the sentence is parsed.

- (1) The psychologist told the wife that he was having trouble with. . .
- a. . . her husband.
  - b. . . to leave her husband.
- (2)
- a. *Complement Inducing Context*  
A psychologist was counseling a married couple. One member of the pair was fighting with him but the other one was nice to him.
  - b. *Relative Inducing Context*  
A psychologist was counseling two married couples. One of the couples was fighting with him but the other one was nice to him.

In (1-a) the *that*-clause is interpreted as the complement of 'told', while in (1-b), it is a relative clause modifying *wife*. The latter reading is much harder to see due to a typical garden-path effect. The preceding contexts were varied in introducing either one or two couples, the idea being that if two couples are introduced, the definite description consisting of the noun only (*the wife*) cannot refer successfully, while the complex description consisting of the noun and the following *that*-clause analyzed as a relative clause does have a unique referent. The sentences were judged to be ungrammatical about 50 per cent of the time in a grammaticality judgment task when the context and the sentence did not match, but they were judged to be grammatical around 75 to 90 per cent of the time when the context matched. Crucially, even the garden-path in (1-b) was ameliorated by putting it in a matching context. This finding motivated Crain and Steedman to propose a principle of parsimony, which guides the selection between different syntactic parses in their parallel parsing architecture, so that the reading carrying the fewest unsatisfied presuppositions will be the preferred one. Similar techniques are used in more recent work (van Berkum, Brown and Hagoort 1999, van Berkum, Brown, Hagoort and Zwitserlood 2003). These studies all focus on definite descriptions and show effects of presuppositions indirectly in connection with structural parsing issues in particular parsing architectures. The studies presented here aim to broaden the range of triggers being studied and to look at effects of presuppositions in a more direct way. The experimental techniques used here contribute a new type of evidence for presupposition theory, where many hotly debated issues involve subtle intuitions. Furthermore, an attempt is made to integrate the experimental results into the theoretical discussion, in order to contribute to a theory of semantic processing informed by linguistic semantics.

<sup>1</sup>But recent work is becoming more diverse in terms of the presupposition triggers covered. See, for example, Chambers and Juan (2005) on *again* and for new work on pragmatic processing more generally (Noveck and Sperber 2004).

### 3 Two Experimental Studies on *auch*

How should we go about testing the potential effects of presuppositions in sentence processing? One of the standard techniques in psycholinguistics is to compare a normal or unproblematic form to a somehow deviant (or temporarily deviant seeming) form. This basic idea is applied to presuppositions in the two studies below in two ways: first, participants were shown ambiguous sentences containing *auch*, where one reading of the sentence satisfied the presupposition introduced by *auch*, whereas the other did not. The task, then, was to choose a paraphrase corresponding to the participants' understanding of the sentence. The second approach was to show unambiguous sentences with *auch* to the participants, which varied in whether the presupposition was satisfied or not. This study employed the self-paced-reading method, and participants simply had to read the sentences region by region and answer simple questions about them.

A few remarks are in order with respect to the particular choice of presupposition trigger made here. As mentioned above, the presuppositions introduced by many triggers can easily be accommodated. It certainly is a possibility to be considered that in an experimental setting participants are willing to accommodate just about any content, since the situation they are in is obviously artificial. Just compare this situation to reading an example sentence in a linguistics article. It might very well contain, say, a definite description. As a reader, there certainly is nothing odd about reading such a sentence, even if it is completely unclear and left open whether the relevant presuppositions are satisfied or not. The danger for an experimental inquiry into presuppositions in processing might be that they don't play any serious role at all, at least to the extent to which they can be accommodated without a problem. There are, however, a few presupposition triggers that are well-known to at least strongly resist accommodation (cf. Beaver and Zeevat to appear). One case in point is additive particles like *too* or German *auch*, which, roughly speaking, presuppose that there is another salient discourse entity of which the predicate in the sentence holds. If there is no such discourse entity, the utterance of the sentence will be infelicitous. This is illustrated by Kripke's famous example in (3-a) (Kripke 1991):

- (3) a. John is having dinner in New York tonight too.  
 b. Did you know that Bill is having dinner in New York tonight?

In an out of the blue context, the sentence in (3-a) is very odd, since there is no salient individual about whom it is already known in the discourse that they are having dinner in New York tonight. And even though it is completely uncontroversial that there are many people having dinner in New York every night, this presupposition failure cannot be remedied by accommodation. The utterance of (3-a) is only felicitous when there is some individual salient in the discourse that has the relevant property, e.g. in the context of (3-b). This type of presupposition trigger then lends itself to experimental investigation, as we have more control over whether presupposition failure takes place or not, without having to worry about the possibility of accommodation.

#### 3.1 Questionnaire Study on *auch*

##### 3.1.1 Methods and Materials

The basic strategy for the experimental items for the first study was to construct bi-clausal, ambiguous sentences consisting of a relative clause and a main clause. One of the readings is preferred based on well-known syntactic parsing preferences. The other reading was the one that satisfied the presupposition of *auch*, which appeared in the second clause. An example is given in (4):

- (4) Die Frau, die das Mädchen sah, hatte auch der Mann gesehen.  
The woman-N/A who-N/A the girl-N/A saw had also the man-N seen

'The woman that (saw the girl/ the girl saw) had also been seen by the man.'<sup>2</sup>

The relative clause is ambiguous due to the case-marking. In German, there is a strong and extremely well-studied parsing preference for interpreting such clauses as having a subject-object (SO) order (see, among many others, Hemforth 1993, Bader and Meng 1999, Schlesewsky, Fanselow, Kliegl and Krems 2000). In the main clause, the unambiguously nominative marked subject appears in final position. It is preceded by *auch*, which most naturally associates with the subject following it (*der Mann*), yielding the presupposition that someone else had seen the woman. This presupposition is not satisfied on the syntactically preferred interpretation (SO) of the relative clause. However, the syntactically dispreferred OS-reading of the relative clause (that the girl saw the woman) *does* satisfy this presupposition.

The task for the participants then was to choose a paraphrase that best matched their understanding of the sentence. The paraphrases for (4) would have been *The man and the girl saw the woman* and *The woman saw the girl and the man saw the woman*. This choice between paraphrases amounted to a choice between the syntactically preferred interpretation and the interpretation on which the presupposition of *auch* was satisfied. As a control condition, the same sentence was used but *auch* was replaced by *vorher* (*earlier*), which does not introduce any presupposition whose satisfaction depends on the interpretation of the relative clause. Two further conditions followed the same basic idea, but had the order of the clauses reversed, with *auch* appearing in the relative clause. An example is given in (5):

- (5) Die Frau sah das Mädchen, das auch den Mann gesehen hatte .  
The woman-N/A saw the girl-N/A who-N/A also the man-A seen had

'The woman saw the girl that had also seen the man.' or

'The woman was seen by the girl that had also seen the man.'

In this case, the matrix clause is ambiguous, and the relative clause contains *auch*. Note that this time the noun phrase *den Mann* (*the man*) in the relative clause is unambiguously marked accusative, so that the clause can only mean that the girl saw the woman. Also note that the first two noun phrases always were of distinct genders, so that there was no ambiguity with respect to which noun phrase the relative clause was modifying. As above, the ambiguous clause had a syntactic parsing preference for an SO-order, whereas the dispreferred OS-order satisfied the presupposition introduced by *auch* (that the girl saw someone else apart from the man). A control condition was again constructed by replacing *auch* by *vorher*.

The setup resulted in a 2 X 2 design, with the presence or absence of *auch* as the first factor and clause order as the second factor. For the questionnaire, 30 sentences were constructed with versions for each of the four conditions above (plus a fifth condition for an additional pilot, which is not discussed here). Five versions of the questionnaire were created, varying sentences across conditions, so that each list contained 6 sentences per condition, resulting in a fully counterbalanced design. The questionnaire was created in HTML and made available online. The sentences were followed by disambiguated paraphrases and participants were asked to choose the paraphrase that matched their understanding of the sentence or their preferred interpreta-

<sup>2</sup>N and A stand for nominative and accusative respectively. Here and below, the passive is only used in the English paraphrase to keep the word order similar to the German one. Note that the sentences given here as well as the ones given for the other study below are only used for illustration purposes and were not used in the actual studies. The complete materials used in the experiments reported in this paper are accessible online at <http://www.people.umass.edu/florian/materials.htm>.

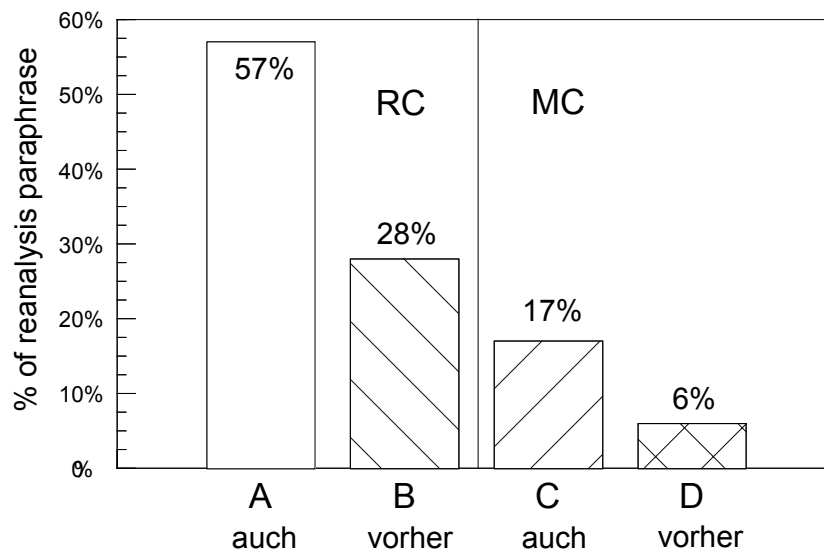


Figure 1: Percentage of OS-paraphrases per condition

tion of the sentence if more than one reading was possible. In addition to the experimental items, there were 3 items similar to the experimental ones, but preceded by a short text. Also, there were 20 unrelated filler items. Altogether, 90 native speakers of German completed the questionnaire.

### 3.1.2 Results

The results were analyzed with the percentage of the type of paraphrase chosen as the dependent variable, with the paraphrases corresponding to either the SO-order or the OS-order. The mean percentage of how often the OS-paraphrase was chosen is shown in Figure 3.1.2 for each condition.

The OS-interpretation was chosen more frequently in the *auch*-conditions (A and C) than in the corresponding control conditions with *vorher* (B and D). It was also chosen more frequently in general for the relative clause before matrix clause order (RC-MC) than in the matrix clause before relative clause order (MC-RC). A 2 x 2 ANOVA (*auch* vs. *vorher* and RC-MC vs. MC-RC) was performed. There was a main effect of *auch* ( $F_1(1, 89) = 112.3, p < .001, F_2(1, 29) = 277.2, p < .001$ ) and a main effect of clause type ( $F_1(1, 89) = 183.3, p < .001, F_2(1, 29) = 92.1, p < .001$ ). There also was an interaction between the two factors ( $F_1(1, 89) = 30.7, p < .001, F_2(1, 29) = 37.2, p < .001$ ). Two-tailed t-tests were carried out to test for simple effects of *auch* for the two types of clause orders. Both effects were significant (condition A vs. B:  $t_1(89) = 10.3, p < .001, t_2(29) = 13.2, p < .001$ , condition C vs. D:  $t_1(89) = 5.4, p < .001, t_2(29) = 7.3, p < .001$ ). This shows that the differences between the *auch* and *vorher* conditions are significant for each of the clause orders.

### 3.1.3 Discussion

The results from the questionnaire study clearly show that participants' choice of paraphrase is influenced by the presupposition introduced by *auch*. When it is present, as in conditions A and C, the otherwise dispreferred OS-paraphrase is chosen more frequently than when it is not, presumably because this order yields the *auch*-presupposition satisfied. This effect is present



and significant for both clause orders, but stronger in the RC-MC order. Altogether, the OS-paraphrase is chosen more frequently in the RC-MC order. This, together with the interaction, indicates that the effect of the presupposition interacts with other parsing factors.

One way of describing the process that readers might go through in reading these sentences is that they first commit themselves to an SO-interpretation of the ambiguous clause and then reanalyze that clause once they see that this renders the presupposition of *auch* satisfied. In the case of the ambiguous matrix clause, this reanalysis is most likely harder and involves at least one additional confounding factor: interpreting the clause initial DP as the object requires a special interpretation (e.g. as a topic), which is not supported by anything in the context. Therefore, it is altogether harder and less likely that participants will end up with the OS-interpretation for the MC-RC order, and the effect of the presupposition is smaller in the condition with this order. An interesting further result in the statistical analysis that was not mentioned above is that there was a learning effect reflected by a significant increase in the percentage of OS-paraphrases chosen for the MC-RC order in the second half of the questionnaire. For the RC-MC order, there was only a small numerical increase that was not significant. This supports the conclusion made above that it is harder to get the OS-order in the MC-RC order. Apparently, participants become more likely to choose the OS-interpretation after having been exposed to a number of these constructions and paraphrases for this clause order, whereas they start out at a fairly high level for the other clause order.

The interaction seen here between the effect of the presupposition and other parsing factors is a first indication that the issue of presupposition satisfaction plays a role in online processing, although we cannot draw any firm conclusions in this regard from an off-line questionnaire study. The study reported in the next section attempts to address this issue in a more direct way.

## 3.2 Self-Paced-Reading Study on *auch*

### 3.2.1 Methods and Materials

The second study used the self-paced-reading method to investigate the effect of presuppositions on the time people spent reading the relevant parts of the experimental sentences. For this study, the basic strategy was to present unambiguous versions of the materials in the first study, which varied in whether the presupposition of *auch* was satisfied or not. Since the effect in the questionnaire was larger for the RC-MC order, sentences using this order were used for the online study. An example illustrating the setup of the experimental items is given in (6):<sup>3</sup>

- (6) a. Die Frau,/ die der Junge sah,/ hatte auch der Mann gesehen.  
The woman-N/A who-N/A the boy-N saw had also the man-N seen  
'The woman that the boy saw had also been seen by the man.'
- b. Die Frau,/ die den Jungen sah,/ hatte auch der Mann gesehen.  
The woman-N/A who-N/A the boy-A saw had also the man-N seen  
'The woman that saw the boy had also been seen by the man.'

In the sentence in (6-a), the noun phrase in the relative clause (*der Junge, the boy*) is unambiguously marked nominative, which results in the clause having OS-order and meaning that the boy saw the woman. The main clause contains *auch*, which (again assuming that it associates with *der Mann (the man)*) introduces the presupposition that someone else saw the woman. Given

<sup>3</sup>The character '/' indicates the section breaks between the parts of the sentence that were displayed at one time in the moving-windows display (this is described in more detail below).

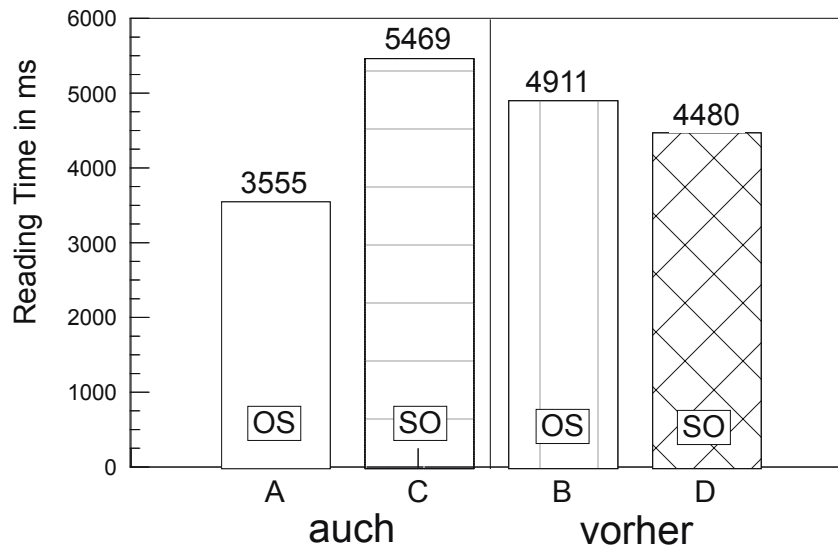


Figure 2: Reading time on final clause in ms

the meaning of the relative clause, this presupposition is satisfied. In (6-b), on the other hand, the noun phrase *den Jungen* (*the boy*) is unambiguously marked accusative, so that the clause has SO-order and can only be understood as the woman seeing the boy. The presupposition of the main clause is as in (6-a), and is therefore not satisfied by the relative clause.

As in the questionnaire study, control conditions were constructed by replacing *auch* with *vorher*. As in the first study, this resulted in a 2 x 2 design, again with the presence or absence of *auch* as the first factor and SO vs. OS-order as the second factor. The study included 24 sentences with versions in each of the four conditions. The sentences were counter-balanced across conditions in four lists. Participants only saw each sentence in one condition. The experiment was programmed using E-Prime software. The presentation order of the items was randomized. Sentences were presented using the moving-window technique. On the first screen, all characters were replaced by underscores. Participants had to press the space bar to see the first part of the sentence. When they pressed the space bar again, the first part was replaced by underscores, and the next part of the sentence was displayed. Reading times were recorded for each displayed phrase. After each sentence, a yes-no question about that sentence was presented, and participants had to push 's' to answer 'yes' and 'k' to answer 'no'. Both the responses and the response times were recorded. Apart from these experimental items, there were 72 items from unrelated experiments and 12 from a related experiment. Furthermore, there were 12 filler items. Subjects received instructions about the keys they had to press, and were told to only answer questions with 'yes' if this followed directly from the sentence in question. On average it took about 30 minutes to complete the experiment. 20 native speakers of German participated in the experiment.

### 3.2.2 Results

The measure of most interest was the reading times on the clause containing *auch* (or *vorher*). Their means are shown for each condition in Figure 3.2.2.

When *auch* was present (conditions A and C), the reading time in the OS condition (where the presupposition of *auch* was satisfied) was almost two seconds faster than in the SO-condition (where the presupposition was not satisfied). When *auch* was replaced by *vorher*, the SO con-

dition (D) had a small advantage over the OS condition (B). Interestingly, the *auch*-phrase was read almost 1.5 seconds faster than the *vorher* phrase in the OS-condition, but roughly one second slower in the SO-condition.

A 2x2 ANOVA revealed an interaction between the two factors ( $F_1(1, 19) = 26.00, p < .001, F_2(1, 23) = 17.81, p < .001$ ). In addition, there was a main effect of order (SO vs. OS) ( $F_1(1, 19) = 11.58, p < .01, F_2(1, 23) = 7.88, p = .01$ ), which was dominated by the interaction. A number of t-tests were also carried out to test for simple effects of *auch* vs. *vorher* and OS vs. SO separately. The difference between conditions A and C was significant ( $t_1(19) = -6.49, p < .001, t_2(23) = -4.58, p < .001$ ), which shows that there was a simple effect of SO vs. OS-order in the *auch*-conditions. There also was a significant difference between A and B ( $t_1(19) = -4.72, p < .001, t_2(23) = -5.03, p < .001$ ), i.e. a simple effect of *auch* in the OS-order conditions. The difference between C and D was significant by subject and near significant by items ( $t_1(19) = 3.07, p < .01, t_2(23) = 1.96, p = .06$ ), but the difference between B and D was not significant ( $t_1(19) = -1.28, p = .22, t_2(23) = 1.25, p = .23$ ). In terms of the statistical analysis, then, the main results are the interaction between the two factors and the simple effect of order in the relative clause. The simple effect of *auch* in the OS-order conditions is of interest as well, but its interpretation is less clear as it could in principle be due to a lexical effect involving *auch* and *vorher*.

Taken together, these results show that the reading times in the *auch* conditions were strongly influenced by SO vs. OS order (corresponding to whether the presupposition is satisfied or not), while the reading times in the *vorher* conditions were only slightly influenced by this factor, and in the opposite direction.

As additional measures, the response times and the accuracy rates for the yes-no questions following the display of the sentence were also analyzed. There was a main effect of order, with the OS conditions having roughly an advantage of one second over the SO conditions. No other effects were significant. The accuracy rates differed only numerically, with an overall average of 78.5 per cent. The condition with the unsatisfied *auch* presupposition had the lowest accuracy rate (73.3 per cent).

### 3.2.3 Discussion

The results from the self-paced-reading study clearly show that the reading time on the final clause containing *auch* was substantially affected by whether the presupposition of *auch* was satisfied or not. This is not merely an effect of parallel order in the two clauses, as the effect was reversed in the *vorher* conditions, in which no relevant presupposition interfered.

The effect of the presupposition is rather large, at almost two seconds difference between conditions A and C. It is very likely that this is due, at least in part, to the similarity between the conditions, and the relatively demanding task of answering the yes-no questions that followed the display of the sentence. Almost all subjects reported that it was quite difficult to keep in mind who did what to whom amongst the three people talked about in each sentence. When the presupposition did not match the content of the relative clause, it must have been even harder to keep this information straight, and this may have caused rather substantial delays when reading the final part of the sentence. One particularly telling comment from one participant in this respect was that she thought there were a number of spelling mistakes in the sentences, especially with the case marking on the final DP (e.g. *der Mann* rather than *den Mann*). Apparently, the expectation raised by the presupposition of *auch* was so strong that the mismatch was perceived as a mistake.

The strong effect on the reading time suggests that the presupposed content is evaluated online,

which lends further support to the speculative conclusion that the results from the questionnaire study are based on online effects of presuppositions. This finding is consistent with previous studies on the presuppositions of definite descriptions that were mentioned above (e.g. Crain and Steedman 1985, van Berkum et al. 2003). An additional point of interest here is that the reading times for the clause containing *auch*, preceded by the relative clause that satisfied the *auch*-presupposition (condition A), were faster than the reading times for the same clause with *vorher* preceded by the same relative clause (condition B). Although the possibility that this is a lexical effect cannot be excluded at the moment, this difference could be taken to tell us something interesting about the role of presupposed content in natural language. The advantage of the *auch* condition might be that the presupposed content facilitates the integration of new content into the contextual representation by connecting new and old information.

These results of these studies have some interesting theoretical implications and may provide new approaches for empirical research on presuppositions. I turn to these points in the next two sections.

## 4 Theoretical Implications

Ideally, results from psycholinguistic studies can contribute to theory in two directions, which correspond to the following two questions: What do the results tell us about (the relevant part of) linguistic theory, and what can we learn from them with respect to processing theories? I will focus on the implications for semantic theory, which I turn to in the next subsection. A few brief remarks about related processing issues are made in the final part of this section.

### 4.1 Implications for Semantic Theory

Let us take a closer look at the example sentences in order to understand what is going on in the processing study in slightly more refined semantic terms. The example sentence for condition A, where the presupposition of *auch* is satisfied by the relative clause, is repeated in (7):

- (7) a. Die Frau,/ die der Junge sah,/ hatte auch der Mann gesehen.  
 The woman-N/A who-N/A the boy-N saw had also the man-N seen  
 'The woman that the boy saw had also been seen by the man.'
- b. Presupposition of *auch* in general (Heim 1992)  
 $\Phi \text{ auch}_i [\alpha]_F$  presupposes  $x_i \neq \alpha \ \& \ \Phi(x_i)$
- c. Presupposition of *auch* in (a) (with focus on *der Mann*)  
 $\lambda x. \text{ see}(x, \text{woman}) \text{ auch} [\text{the man}]_F$  presupposes  
 $x_i \neq \text{the man} \ \& \ \text{see}(x_i, \text{woman})$

As the results from the self-paced-reading study show (and as is also intuitively clear), the relative clause satisfies the presupposition characterized in (7-c). As far as the processing perspective is concerned, it appears to be the case that this is something that takes place online, since the effect shows up in the reading time on the clause that contains the presupposition trigger. This suggests the conclusion that as one is reading the part of the sentence containing *auch*, one is aware of the content of the relative clause (of course, that also matches our intuitive sense of what happens when we read). When we look at processing in terms of update semantics, this is very interesting: to evaluate the presupposition of *auch* is to check whether the context entails it (and in the case of *auch*, something it also involves something like checking whether there is

an appropriate discourse referent having the relevant property). Since the the sentence is not at all problematic in any way (neither intuitively nor in terms of the reading time results), it seems to be the case that the content of the relative clause is already part of the context by the time the final part of the sentence, which contains the presupposition trigger *auch*, is semantically processed. In other words, it looks as if the context has been updated with the sentence initial DP, including the relative clause, by the time the rest of the matrix clause is interpreted and integrated into the context.

It is plausible to assume that if this is indeed what the processor is doing, the simplest assumption is that it does so by using the grammar (more on this issue below). If we think of context updates as only taking place on the level of a sentence or a full clause, we cannot explain how the initial DP can satisfy the presupposition: If we tried to apply the context change potential of the entire sentence to the neutral context, the update would fail, since the presupposition of *auch* is not satisfied in the initial context (and no repair would work, since the presupposition of *auch* cannot be accommodated). However, as I already mentioned in section 2, in the full version of update semantics of (Heim 1983b), contexts consist of sets of pairs of worlds and assignment functions and noun phrases denote atomic propositions and hence denote context change potentials of their own. The meaning of noun phrases is as in (8), with the difference between definite and indefinite ones being captured with the Novelty Condition in (8-b)<sup>4</sup>:

- (8) a. Let  $c$  be a context (here a set of assignment functions) and let  $p$  be an atomic formula, then, if defined:  

$$c + p = \{g : \text{DOM}(g) = \bigcup \text{Dom}(f) \text{ s.t. } f \in c \cup \{i : x_i \text{ occurs in } p\} \ \& \ g \text{ is an extension of one of the functions in } c \ \& \ g \text{ verifies } p \}$$
- b. The Novelty/Familiarity Condition  
 $c + p$  is only defined if for every  $NP_i$  that  $p$  contains,  
*if  $NP_i$  is definite, then  $x_i \in \text{Dom}(c)$ , and*  
*if  $NP_i$  is indefinite, then  $x_i \notin \text{Dom}(c)$ .*

With denotations such as these, the progression of updates for the sentences of condition A can proceed without a problem. First, the initial noun phrase is interpreted and its presupposition is evaluated with respect to the input context. It is not satisfied, but can be accommodated without a problem. Next, the rest of the matrix clause is interpreted, and the presupposition of *auch* is evaluated with respect to the local context. In this context it is satisfied, and the update can proceed smoothly. These steps are sketched in semi-formal terms in (9):

- (9) p: The woman  $x$  that the boy saw, q:  $x$  was also seen by the man
- a.  $c + p$  defined only if there is a unique woman that the boy saw
- b. after accommodation:  

$$c + p = \{g : g \text{ verifies } \text{woman}(x) \ \& \ \text{boy}(y) \ \& \ \text{see}(y)(x)\} = c'$$
- c.  $c' + q$  defined only if there is a  $z \neq$  the man in  $c'$  &  $\text{see}(z)(x)$   

$$c' + q = \{g : g \text{ verifies } \text{woman}(x) \ \& \ \text{boy}(y) \ \& \ \text{see}(y)(x) \ \& \ \text{man}(z) \ \& \ \text{see}(z)(x)\}$$

This contrasts with condition C, where the order in the relative clause has been switched around, so that even after the initial DP has become part of the context by the time the rest of the matrix clause is interpreted, the presupposition of *auch* is not satisfied, and there is no chance to accommodate it, since the presupposition of *auch* strongly resists accommodation. This problem is immediately present in processing, as reflected in the very slow reading times in that

<sup>4</sup>For simplicity, I restrict the formal representation of contexts to sets of assignment functions

condition.

Although there is clear evidence here that the processor deals with presupposed content online, a word of caution is in order with respect to what conclusions we can draw about how the processor goes about this. The results from the self-paced reading study are not fully conclusive with respect to the issue of whether the processor employs incremental updates using Heimian atomic propositions ‘on the fly’, since we are looking at the reading times for the sentence final region. It is possible that the context sensitive part of interpretation (and perhaps the compositional semantic process altogether) takes place once the entire sentence has been presented (even though this seems intuitively implausible). The slow-down in the reading time on the final region certainly is consistent with that. But even if it were the case that the integration of the content of the sentence with the context takes place at the very end of the clause, the results here show that, at that point, the procedural steps it goes through must be very much like the ones sketched in (9).

Therefore the results of the experiments presented here contribute a new kind of evidence to the theoretical discussion. They show that the processor goes about interpreting a sentence in steps very much like those assumed by dynamic semantic theories. If we continue to assume that the processor does this by using the system supplied by the grammar, working out the details of a theory of semantic processing based on something like update semantics should make further experimentally testable predictions, which can help us to broaden the empirical foundation of semantic analyses of presuppositions. One possible follow-up to the current study would remedy the problem of the critical region being the final region by breaking up the regions into smaller chunks and by adding a continuation. This could be done by employing sentences such as the following:

(10) The woman/ who saw the boy/ also saw/ the man/ yesterday/ on her way to work.

In addition to these considerations about the online study, we should also note the relevance of the findings of the questionnaire study in this respect. Assuming a model of the syntactic parser that only pursues one structural analysis at the time, we find a remarkable amount of effort put into reanalysis of the relative clause that already had been previously parsed with an SO-order, which is revised in order to satisfy the presupposition. The fact that this revision is even considered indicates that the meaning of the relative clause is already accessible to the parser at the time it encounters the presupposition.

## 4.2 Implications for Processing Theories

Let us now turn to some considerations about what the results reported here mean for a theory of semantic processing. At this point, we aren’t anywhere close to having a realistic idea of how compositional semantic processing takes place. One central question, of course, is at what point the processor actually goes through steps of semantic composition and at what point the content of the currently processed linguistic unit is integrated with the information present in the context (which crucially should involve the evaluation of presuppositions with respect to that context). Modulo the caveat about the possible conclusions of the present studies concerning the issue of whether the processor goes through the steps of updating the context on the fly’ or whether it does so at a later point, a viable hypothesis can be constructed from what has been said here: Apart from the level of full clauses, where we obviously are dealing with propositional units, updates also take place at the level of noun phrases. This amounts to a straightforward extension of update semantics to the theory of processing. Whether or not this can be upheld, it is the simplest assumption that the processor makes use of the system supplied

by the grammar, and it has the advantage of making predictions that should, at least in principle, be experimentally testable. Hopefully, this will also enable us to investigate further theoretical issues in presupposition theory in new ways.

Apart from these issues related immediately to semantic processing, the studies might also contribute to more general architectural questions in processing theory, although I can only make some brief remarks about these here. Let me just mention one particularly interesting point, namely that the results from the questionnaire study are most likely problematic for a simple version of a parallel parsing architecture along the lines of the one proposed by Crain and Steedman (1985). The idea in this work is that when the processor deals with an ambiguous structure, it considers all possible structures at the same time, with some structures being filtered out by certain principles. One central principle that they assume to account for the data mentioned above in (1) is the principle of parsimony, which only keeps those interpretations that have the fewest presuppositions violated. One of the more intriguing aspects of the questionnaire study discussed here was the interaction of how often subjects would choose the syntactically dispreferred structure (to have the presupposition of *auch* satisfied) with the order the clauses appeared in (which affected whether the matrix clause or the relative clause was ambiguous). If people were considering both interpretations of the ambiguous clauses at the same time, and then would choose one of them based on which one has the fewest presupposition violations, we would expect that they would choose the reading on which the *auch*-presupposition is violated more often (in the MC-RC condition with *auch*, they chose it only 17 per cent of the time, and even in the RC-MC order condition, they chose it only 57 per cent of the time). Furthermore, we would not expect that the two clause orders would differ so drastically in this respect.

## 5 Conclusion

I have argued that the results from the studies reported here suggest that the processor has access to and makes use of presupposed content in online processing and employs something like context updates at the level of noun phrases. In a sense, this means taking the ‘dynamic’ aspect of dynamic semantics quite literally by claiming that the linguistic processor employs dynamic updates in the process of interpreting a sentence compositionally. Bringing our theoretical frameworks and processing theories closer together in this way has the advantage of being temptingly simple. Whether or not this turns out to be realistic in the long run, it should enable us to come up with straightforward predictions that we can test in further work. This opens up the possibility of extending the empirical foundation for work in theoretical semantics and of addressing central issues in presupposition theory that often involve disputes about the intuitive status of presupposed content. Investigating these issues in a more direct empirical way will make an important contribution to the theoretical discussion. Once we have a better understanding of what kind of effects related to presuppositions there are in processing, we can hope to address more sophisticated questions in presupposition theory (e.g. the issue of local and global accommodation) in new ways.

## References

- Bader, M. and Meng, M.: 1999, Subject-object ambiguities in German embedded clauses: An across-the-board comparison, *Journal of Psycholinguistic Research* **28**(2), 121–143.
- Beaver, D.: 1997, Presupposition, in J. van Benthem and A. ter Meulen (eds), *The Handbook of Logic and Language*, Elsevier, Amsterdam, pp. 939–1008.

- Beaver, D. and Zeevat, H.: to appear, Accommodation, in G. Ramchand and C. Reiss (eds), *Oxford Handbook of Linguistic Interfaces*, Oxford University Press.
- Chambers, C. and Juan, V. S.: 2005, Accommodation and the interpretation of presupposition during referential processing. Poster presented at the 18th CUNY Sentence Processing Conference.
- Crain, S. and Steedman, M.: 1985, On not being led up the garden path. the use of context by the psychological parser, in D. R. Dowty, L. Karttunen and A. Zwicky (eds), *Natural Language Parsing: Psychological, Computational, and Theoretical Perspectives*, Cambridge University Press, Cambridge, pp. 320–358.
- Heim, I.: 1982, *The semantics of definite and indefinite noun phrases*, PhD thesis, University of Massachusetts.
- Heim, I.: 1983a, File change semantics and the familiarity theory of definiteness, in R. Baeuerle, R. Schwarze and A. von Stechow (eds), *Meaning, Use, and Interpretation of Language*, De Gruyter, Berlin, pp. 164–189.
- Heim, I.: 1983b, On the projection problem for presuppositions, in M. Barlow, D. Flickinger and M. Wescoat (eds), *WCCFL 2*, pp. 114–125.
- Heim, I.: 1992, Presupposition projection and the semantics of attitude verbs, *Journal of Semantics* **9**, 183–221.
- Hemforth, B.: 1993, *Kognitives Parsing: Repräsentation und Verarbeitung grammatischen Wissens*, Infix, Sankt Augustin.
- Kamp, H.: 1981, A theory of truth and semantic representation, in J. Groenendijk, T. Janssen and M. Stokhof (eds), *Formal Methods in the Study of Language: Proceedings of the Third Amsterdam Colloquium*, Vol. I, Mathematical Center, Amsterdam, pp. 227–321.
- Karttunen, L.: 1973, Presuppositions of compound sentences, *Linguistic Inquiry* **4**(2), 169–193.
- Karttunen, L.: 1974, Presupposition and linguistic context, *Theoretical Linguistics* **1**, 181–194.
- Kripke, S.: 1991, Presupposition and anaphora: Remarks on the formulation of the projection problem.
- Lewis, D.: 1979, Scorekeeping in a language game., in R. Baeuerle, U. Egli and A. von Stechow (eds), *Semantics from Different Points of View*, Vol. 172-187, Springer, Berlin.
- Noveck, I. and Sperber, D. (eds): 2004, *Experimental Pragmatics*, Palgrave Macmillan.
- Schlesewsky, M., Fanselow, G., Kliegl, R. and Krems, J.: 2000, The subject-preference in the processing of locally ambiguous wh-questions in German, in B. Hemforth and L. Konieczny (eds), *German sentence processing*, Kluwer, Dordrecht, pp. 65–93.
- Stalnaker, R.: 1973, Presuppositions, *Journal of Philosophical Logic* **2**, 447–457.
- Stalnaker, R.: 1974, Pragmatic presuppositions, in M. Munitz and P. Unger (eds), *Semantics and Philosophy*, New York University Press, New York, pp. 197–214.
- van Berkum, J. J. A., Brown, C. M. and Hagoort, P.: 1999, Early referential context effects in sentence processing: Evidence from event-related brain potentials, *Journal of Memory and Language* **41**, 147–182.



- van Berkum, J. J. A., Brown, C. M., Hagoort, P. and Zwitserlood, P.: 2003, Event-related brain potentials reflect discourse-referential ambiguity in spoken language comprehension, *Psychophysiology* **40**, 235–248.
- von Fintel, K.: 2004, Would you believe it? the king of france is back! (presuppositions and truth-value intuitions), in M. Reimer and A. Bezuidenhout (eds), *Descriptions and Beyond*, Oxford University Press, Oxford, pp. 315–341.



# WORD-MEANING AND SENTENCE-INTERNAL PRESUPPOSITION\*

Torgrim Solstad,  
University of Oslo

torgrim.solstad@ilos.uio.no

## Abstract

The German causal preposition *durch* ('by', 'through') poses a challenge to formal-semantic analyses applying strict compositionality. To deal with this challenge, a formalism which builds on recent important developments in Discourse Representation Theory is developed, including a more elaborate analysis of presuppositional phenomena as well as the integration into the theory of unification as a mode of composition. It is argued that that the observed unificational phenomena belong in the realm of pragmatics, providing an argument for presuppositional phenomena at a sentence- and word-internal level.

## 1 Introduction

There is a growing insight in the formal-semantic literature that not all linguistic phenomena can or should be expected to adhere to principles of strict compositionality (cf. e.g. Sailer 2004). In this paper, I will try to add further substance to such a view. The argument is supported by data involving causative and inchoative predicates used in combination with the German causal preposition *durch* ('durch'). The discussion centres around the status of the abstract element CAUSE. I will focus on what is the origin of CAUSE in identical complex semantic structures which can be argued to be differently composed.

Many of the formalisms introduced to handle phenomena which are taken to be problematic for strict compositionality, involve some sort of unification (Bouma 2006). Here, unification will also be of some importance. The data discussed in this article has, however, to my knowledge hardly been looked at from a unification perspective. Another contribution of the paper concerns the mechanisms argued to provide the means for an adequate analysis of the phenomena in question. These are argued to be of a pragmatic nature in the case of *durch*, involving presuppositional phenomena at a sentence- and word-internal level.

The paper is structured as follows: first, I present the intuitions behind the challenge of trying to build a compositional semantics for the combination of causal-instrumental *durch*-phrases with both causative and inchoative predicates (section 2). Second, after a brief discussion of some proposed solutions (section 3), I turn to my own analysis (section 4), which is held in a Discourse Representation Theory bottom-up formalism (Kamp 2001), applying unification as a mode of composition (Bende-Farkas and Kamp 2001, Sæbø to appear). Then, I turn to a discussion of how the unificational analysis can be restated in terms of presupposition verification and accommodation (section 5). The paper concludes with a brief outlook on further applications of the formalism presented here (section 6).

---

\*I would like to thank Cathrine Fabricius-Hansen, Atle Grønn, Hans Kamp, Elena Karagjosova, Manfred Krifka, Kjell Johan Sæbø and Henk Zeevat for valuable comments.

## 2 The variant problem

Certain kinds of adverbials do not only modify a predicate, they may also (radically) alter its properties. In this paper, I will mainly look at adverbials headed by the German causal-instrumental preposition *durch*, which have both these properties.<sup>1</sup> This twofold behaviour is seen as a challenge to strict compositionality and alternative ways of formalising the semantics of *durch* will be considered. In this section, the data concerning *durch* will be discussed. I will refer to *durch*'s syntactic complement as its semantic internal argument, and the modified phrase as *durch*'s semantic external argument. Syntactically, the *durch*-phrase can be adjoined to verbal, adjectival and nominal phrases. Only the two former syntactic configurations will appear here.

The function of causal-instrumental *durch* is to specify the causing event in a causal relation between events, as exemplified in (1)-(2).

- (1) *Ein Polizist wurde durch einen Schuss aus der eigenen Dienstwaffe getötet.*  
(A policeman was through a shot from the own service weapon killed.)  
'A policeman was killed by a shot from his own service weapon.'
- (2) *Durch bloßes Handauflegen versetzte sie den Sowjetmenschen in Glückseligkeit.*  
(Through mere laying-on-of-hands transferred she the Soviet individual in blessedness)  
'By a mere laying-on-of-hands she could induce a state of bliss in the Soviet individual.'

In (1), the causative predicate *töten* ('kill') is used. I will assume that the semantics of *töten* involves a causal relation between two events, one of which is the caused event, a transition of an individual to a state of being dead, and one of which is the causing event of this transition. The causing event is not specified in any way, concerning e.g. how the transition was brought about. I will thus refer to such causatives as *manner-neutral* causatives.

In (1), it can be seen in what way the contribution of the *durch*-phrase specifies the causing event: it is stated that the policeman was killed by *a shot from his own service weapon*. Thus, the *durch*-phrase specifies the manner of the causing event. A simplified semantic representation for *einen Polizisten töten* ('to kill a policeman'), could be as in (3), *p* representing the policeman, *e*<sub>2</sub> the caused transition and *e*<sub>1</sub> the causing event:

- (3)  $\lambda e_1 \exists e_2 [\text{BECOME}(\text{tot}(p))(e_2) \wedge \text{CAUSE}(e_2)(e_1)]$

Analysing a causative this way means that the *durch*-phrase only specifies *e*<sub>1</sub> in (3), contributing nothing else to the formula. Thus, a preliminary semantics of *durch* only needs to involve an identity relation between events, where the event of the *durch*-phrase is identified with the unspecified causing event of the causative predicate.

Common to the occurrences of *durch*-phrases with causative predicates is that the adverbial *durch*-phrase only seems to modify the predicate it is adjoined to, adding some conditions or restrictions (cf. Chung and Ladusaw 2004) to it (cf. (7) on page 319).

However, in addition to occurring with causative predicates, *durch* can also be used with inchoatives as illustrated in (4)-(5).

<sup>1</sup>In addition, *durch* has spatial, temporal and agentive uses.

- (4) *Ohnesorg starb durch einen gezielten Schuss.*  
 (Ohnesorg died through an accurate shot)  
 'Ohnesorg died through an accurate shot.'
- (5) *Der Verlust an Vielfalt und Eigeninitiative ist durch die Verstaatlichung  
 gesellschaftlicher Bedürfnisse in Schweden entstanden.*  
 (the loss of diversity and one's-own-initiative has through the nationalisation  
 social.GENITIVE needs in Sweden emerged)  
 'The loss of variety and initiative has resulted from the state taking over responsibility  
 for social needs in Sweden.'

For inchoative predicates like *sterben* ('die') as in (4), I assume a semantics as in (6), i.e. without an underlying CAUSE:

- (6)  $\lambda y \lambda e_2 \text{BECOME}(\text{tot}(y))(e_2)$

However, in the case of an example like (4), it is desirable to postulate a semantics after composition with *durch* like in (3), including a CAUSE and adding a specification for the causing event  $e_1$ : An accurate shot is the cause of Ohnesorg's death. The examples in (1) and (4) could be given a common semantic representation as indicated in (7):

- (7)  $\lambda e_1 \exists e_2 [\text{BECOME}(\text{tot}(p))(e_2) \wedge \text{CAUSE}(e_2)(e_1) \wedge \text{SHOOT}(e_1)]$

This means that the semantics of an inchoative predicate like *sterben*, which is not specified for a cause, and involves no agent, can be included in an expression where the resultant state expressed in *sterben* is caused to occur by some event, as with *töten*. If the event included in the *durch*-phrase is modified such that it is obvious that it is a deliberately performed event (e.g. by an adjective such as *accurate*), a CAUSE analysis seems as justified for (4) as for (1). In fact, sentence (4) makes stronger claims about agentivity and intentionality than (1). It is in the sense of adding a CAUSE-relation and the implication of an agent that the *durch*-adverbial is claimed to radically alter the predicate *sterben*.

However, the CAUSE element in the semantic representations for (1) and (4) must have different sources on the semantic representations assumed for causatives and inchoatives here. In (1) it originates in the predicate, whereas in (4) its source cannot be the predicate. But this would seem to enforce an assumption that, in the latter case, *durch* may introduce a CAUSE element of its own, it being the most plausible other candidate for such an introduction (see also section 3). After all, if the semantic representation of a sentence which contains a non-causative predicate is assumed to contain a CAUSE element, the source of this CAUSE cannot be the predicate itself. Under the assumption that we are not dealing with two CAUSE elements when *durch* is combined with a causative predicate, potentially yielding an interpretation of indirect causation in a CAUSE-TO-CAUSE-relation, this would seem to force us to postulate the existence of two different lexical items *durch*: one of which is used in combination with causatives, and one of which is used with inchoatives and other non-causative predicates, which do not include a CAUSE element on their own. I will refer to this as the *variant problem*.

But handling two different lexical items *durch* is clearly counterintuitive. The contribution of *durch* is much the same in the two cases, it specifies the causing event in a causal relation. To assume two lexical items *durch* to be able to represent both (1) and (4) as in (7) is not very desirable. The main motivation of the assumption of such an ambiguity would seem to lie in the restrictions of the formalism. It is thus preferable to look for ways to give a unified analysis of the two combinations in question.

### 3 Alternative approaches

There exist approaches which could be seen as avoiding the variant problem. I will briefly discuss two of these. It should be added that in these approaches, the semantics of *durch* is not discussed. A first alternative would be to assume a principle of *temporal coherence* as in Wunderlich (1997, p. 36). This way a CAUSE can enter into semantic composition whenever there is a constellation where a process (immediately) precedes a resultant state, where the predicate BECOME occurs. This way, the CAUSE element occurs as a result of the combination of a BECOME element in the representation for inchoatives like *sterben* in (6) and the event of the shot, introduced by the *durch*-phrase. This means that *durch* itself does not need to contain a CAUSE element for sentences with either inchoative or causative matrix verbs to come out much the same when combined with *durch*.

Another alternative would be to, somewhat simplified, assume that every change involves a CAUSE at some level, under the assumption that “even if no specific causing entity or action is expressed, something must be responsible for the change of state in the affected entity” (Härtl 2003, p. 899 ff.). Härtl assumes that the presence of a CHANGE relation may motivate the introduction of a CAUSE relation wherever relevant.

However, I think there are some facts concerning *durch* which render these approaches less attractive for the current purposes. In addition to the combinatorial possibilities of casual-instrumental *durch* briefly discussed in section 2, *durch* may also be combined with stative predicates, as in (8):

- (8) *Auch der durch diese Haltung hohe Luftwiderstand kann auf längeren Strecken ganz schön schlauchen.*  
 (Also the through this posture high air resistance may on longer distances quite much scrounge)  
 'The high air resistance due to this posture may put you through the mill over longer distances.'

In cases like (8), one gets an interpretation where the state expressed in the lexical anchor, *hoch* ('high'), is the resultant state of the eventuality expressed in the internal argument of *durch*, *Haltung* ('posture').<sup>2</sup> If the *durch*-phrase is left out, as illustrated in (9), the stative *hoch* should not be interpreted as a resultant state as such – though this could be achieved by focussing *hoch*, introducing a set of alternatives which are related to *high* through scales or negation:

- (9) *der hohe Luftwiderstand*  
 (the high air resistance)  
 'the high air resistance'

It can be concluded that *durch* has a similar effect here as with inchoatives. A CAUSE can be assumed to be present in examples such as (8), and *durch*'s internal argument expresses the causing event in the causing relation.

If one were to follow the above approaches, one would be left in a situation where the reinterpretation needed to achieve a plausible semantic representation (including a change of state and a cause relation), would be without any obvious triggers, since no change is present in the first hand.

I think an intuitively more plausible analysis can be achieved if we allow *durch* to introduce

<sup>2</sup>*Haltung* is an abstract noun, which has both a stative and an eventive reading. It has an eventive, intergressive (Egg 1995) reading in contexts where the position has to be upheld deliberately, as in (8).

the CAUSE element. This CAUSE element would be the driving force of reinterpretation. If a CAUSE relation is present, one would expect a stative predicate to be reinterpreted as being a resultant state (Kratzer 2006). The reinterpretation of the stative predicate would thus follow automatically from the presence of the CAUSE element in *durch*, as in standard counterfactual analyses.<sup>3</sup>

In light of examples such as (8) and the reinterpretational effects of *durch* in general, it seems reasonable to assume a CAUSE-predicate to be included in the semantics of *durch*.<sup>4</sup> In the next section, I will turn to a possible solution of the variant problem described in section 2, i.e. how this quality of *durch* can be retained for all its causal and instrumental uses, in such a way that one can deal in a compositional manner with the fact that *durch* includes a CAUSE-predicate which is not always needed or wanted, as with causatives.

#### 4 A unificational analysis

In what follows, I will present a compositional analysis of *durch*-adjuncts within Discourse Representation Theory (DRT) which avoids the assumption of lexical ambiguity between one *durch* variant including a CAUSE element and another without it.

I think it is fairly obvious that on standard strict compositional analyses, it is a considerable challenge to provide a general semantic analysis for *durch* in combination with all the above predicate types: causatives, inchoatives and statives. One is left in a situation where one either has to explain how the CAUSE of *durch* and the CAUSE of a causative are combined into one, or how a CAUSE element emerges with an inchoative or a stative predicate.

##### 4.1 DRT bottom-up unification-based construction

The analysis I base my own approach on is in some respects based on Sæbø (to appear), where *by*-adjuncts in English are analysed. However, my approach differs from the one in Sæbø's paper in several points, starting from the fact that my analysis of causation is based on events, and not propositions. This is partly due to another difference between *durch* and *by*. Whereas the internal argument of *durch* is an event noun, the one of the *by*-phrases in Sæbø's paper is a VP: *He killed him by shooting him in the back*.

I should add that in the formal analysis to be presented in this section, I will not consider tense or aspect and only to a limited degree voice, i.e. the details I discuss will mostly be limited to the VP level, assuming a Kratzer (1996) analysis of Voice. This means that a sentence like (10) will be assigned the simplified syntactic structure indicated in figure 1 on page 322. I assume that the *durch*-phrase is adjoined at VP level, below any possible agents.

- (10) *Der Polizist tötete einen Verbrecher durch einen Schuss.*  
 (the policeman killed a criminal through a shot)  
 'The policeman killed a criminal with a shot.'

Sæbø uses unification as a mode of composition within DRT to get a compositionally sound analysis of *by*-adjuncts in English. This is a fairly recent development within DRT, Bende-Farkas and Kamp (2001) being the first to my knowledge to advocate such an approach, although it is a such no radical shift within DRT.

<sup>3</sup>A further argument in favour of including a CAUSE-relation in *durch* is the fact that any internal arguments of *durch* of the semantic type of entities have to be reinterpreted as being an event, which would be expected since CAUSE is a relation between two events.

<sup>4</sup>A similar argument may be made with respect to anticausatives, cf. Solstad (forthcoming).

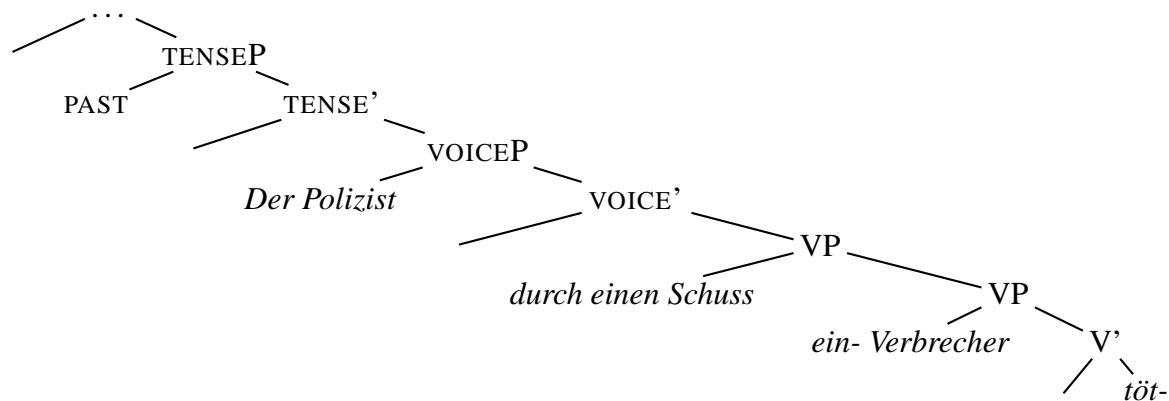


Figure 1: Simplified syntactic structure for the sentence *Der Polizist tötete einen Verbrecher durch einen Schuss*

Intuitively, the idea of formalising what is going on when combining *durch* with causatives or inchoatives in terms of unification, makes sense: the causative predicate and the *durch*-phrase describe one and the same event. The information they contribute should somehow be unified. If *durch* includes a CAUSE, unification might be used to formalise the fact that this CAUSE isn't added to the CAUSE of a causative.

There is as yet no coherent formalisation of all aspects relevant to the analysis promoted here, and many details will be left out. Though the derivation for two example sentences will be shown, the exact construction principles will only be discussed informally, but hopefully precisely enough to give a rough idea of the framework. As in Kamp (2001), a bottom-up compositional DRT analysis is applied, where Sæbø (to appear) was concerned only with the more general unificational principles of *by*-phrases with the gerunds they modify. The reader is referred to Kamp (2001, especially pp. 221-231) for more details concerning the formalisation.

The following general format, called a *semantic node representation*, is used for the semantic information attached to the tree nodes:<sup>5</sup>

$$(11) \quad \left\langle \overbrace{\left\langle \text{Variable, } \boxed{\text{Constraint}}, \text{Binding condition} \right\rangle}^{\text{STORE}}, \boxed{\text{CONTENT}} \right\rangle$$

The semantic node representation is a pair consisting of a CONTENT and a STORE element. The content representation is always a Discourse Representation Structure (DRS), whereas the STORE contains a set of one or more elements, each consisting of a triple of a variable, a constraint and a binding condition. The binding condition provides information on the possible bindings of a variable, and the constraint adds to this, often by stating the semantic content of the variable, e.g. as gender features necessary for the correct binding of pronouns. The motivation for dividing a semantic representation in STORE and CONTENT, as opposed to just having a main DRS, is that many of the variables which are introduced in (bottom-up) composition cannot be bound right away. A storage mechanism is needed.

I turn next to the composition of the semantics of (10), repeated as (12) for convenience:

<sup>5</sup>As will be obvious from the division in a STORE and a CONTENT part of the representation, Kamp's (2001) paper relies strongly on the seminal paper by van der Sandt (1992), dealing with presuppositional phenomena in DRT. Some aspects of van der Sandt's paper will be briefly discussed in section 5.



- (12) Der Polizist tötete einen Verbrecher durch einen Schuss.  
 'The policeman killed a criminal with a shot.'

The representation of the lexical head of the VP, the causative predicate *töten*, is as follows:

$$(13) \left\langle \left\{ \begin{array}{l} \langle e_1, \boxed{\text{CAUSE}(e_2)(e_1)}, \text{indef.} \rangle, \\ \langle e_2, \boxed{\text{CAUSE}(e_2)(e_1)}, \text{indef.} \rangle, \\ \langle t_{loc}, \text{loc.t.} \rangle \end{array} \right\}, \left. \begin{array}{l} \boxed{\text{CAUSE}(e_2)(e_1)} \\ \text{BECOME}(\text{dead}(y))(e_2) \\ \text{PATIENT}(y)(e_2) \end{array} \right\rangle$$

The CONTENT part to the right belongs to the invariant part of the semantics of the item in question, i.e. the information which will be part of the main DRS at the end of the update process. Following Kamp and Rossdeutscher (1994), it is referred to as the *lexical anchor* since it is the matrix verb of the sentence. Concerning the nominal arguments of the verb, only the semantic role of PATIENT is included in the representation, under the assumption that the AGENT appears outside the VP in a VOICE phrase projection, cf. the structure given in figure 1 on page 322. The predicate introduces three variables in the store, one for each of the two events, and one for temporal location. The variable for temporal location will be ignored in the following, with the exception of the final DRS.

The binding condition INDEF provides the information that the variables can, but need not enter binding relations with other variables. Importantly, when binding occurs, it is assumed that variables and constraints are unified. A variable with a INDEF binding condition will eventually be existentially bound at the relevant level.<sup>6</sup> As in the case of the location time variable, the binding condition of this variable will not be of any concern here. More binding conditions will be discussed below.

As was mentioned above, the constraints in the STORE part include information which is necessary for the correct binding of the variables. Thus, CAUSE(e<sub>2</sub>)(e<sub>1</sub>) occurring in both STORE and CONTENT does not mean that the semantics of the verb includes two CAUSE relation, but simply reflects the fact that this information is needed to be able to tell the two variables apart, since they relate differently to the CAUSE predicate. Technically, it would be possible to leave out the CAUSE relation in the content part, under the assumption that all information in the store will enter the content at some stage in the derivation. However, I include it there to indicate that it is an invariable part of the semantics of the verb. In the end, only constraint conditions for STORE variables which are not already present in the CONTENT part will enter it. Thus, no multiplication of conditions should occur.

*Durch* is represented as in (14) on page 323. Kamp (2001) has nothing to say about prepositional adjuncts, but I think it is rather uncontroversial to assume that *durch* on its own has no content, since it is not a lexical anchor:

$$(14) \left\langle \left\{ \begin{array}{l} \langle e_3, \boxed{\text{CAUSE}(e_4)(e_3)}, \lambda_1 \rangle, \\ \langle e_4, \boxed{\text{CAUSE}(e_4)(e_3)}, \lambda_2 \rangle \end{array} \right\}, \left. \begin{array}{l} \boxed{\phantom{\text{CAUSE}(e_4)(e_3)}} \\ \boxed{\phantom{\text{CAUSE}(e_4)(e_3)}} \end{array} \right\rangle$$

<sup>6</sup>For indefinite noun phrases, this level seems to be the topmost, CP-level of the sentence. Exactly where the binding of eventuality variables takes place, is not a settled matter (Kamp 2001, p. 288, fn. 20). It is reasonable to assume that eventuality variables are existentially bound no later than at the level of aspectual projections, though. This issue does, however, not affect the underlying principles of the present analysis.

(14) basically states that *durch* itself adds no content to the DRS, but that it involves a causal relation between two events. Here, a third binding condition,  $\lambda$ , is introduced. The binding condition  $\lambda$  indicates that the variable needs to enter a binding relation. In this paper, variables with  $\lambda$  binding conditions will be bound by variables with INDEF binding conditions, resulting in a variable with another INDEF condition. Variables with INDEF binding conditions will eventually be existentially bound, as discussed briefly above. I have opted for using  $\lambda$  to illustrate the fact that these variables need to be bound, as opposed to the INDEF variables, although abstraction as such is not involved. The subscripted numbers on  $\lambda_1$  and  $\lambda_2$  indicate the binding order of the two variables involved in *durch*. They are included to ensure the right binding order of the event variables in the CAUSE relation. This has its motivation in the fact that what modifies a predicate such as *töten* in example (12) on page 323, is a *durch*-phrase. Thus, the internal argument of *durch*, corresponding to the syntactic complement of the preposition, will be bound first, since this will already be present in the *durch*-phrase before it is adjoined to a VP.

For the internal argument of *durch*, the event noun *ein-Schuss*, the following representation is assumed:

$$(15) \quad \left\langle \left\{ \begin{array}{l} \langle e_5, \boxed{\text{SHOOT}(e_5)}, \text{indef.} \rangle, \\ \langle w, \boxed{\text{AGENT}(w)(e_5)}, \text{indef.} \rangle, \end{array} \right\}, \begin{array}{|c|} \hline \\ \hline \\ \hline \end{array} \right\rangle$$

The nominalisation derived from the predicate *schießen* ('shoot') is assumed to include the semantic role of an agent, but not that of a patient, since shooting events without patients are easily imaginable. The event expressed in *ein-Schuss* also needs to include a location time, but this will be ignored in the following.

The representation in (16) is the result of combining the representations for *durch* and *ein-Schuss*. The variable  $e_5$  will bind  $e_3$ , resulting in a INDEF binding condition for the unified variable from the representations in (14) and (15). It is as such of no importance whether the variable  $e_5$  in the representation of *ein-Schuss* or  $e_3$  of *durch* is retained for the causing event:

$$(16) \quad \left\langle \left\{ \begin{array}{l} \langle e_3, \boxed{\begin{array}{l} \text{CAUSE}(e_4)(e_3) \\ \text{SHOOT}(e_3) \end{array}}, \text{indef.} \rangle, \\ \langle e_4, \boxed{\text{CAUSE}(e_4)(e_3)}, \lambda_2 \rangle, \\ \langle w, \boxed{\text{AGENT}(w)(e_3)}, \text{indef.} \rangle, \end{array} \right\}, \begin{array}{|c|} \hline \\ \hline \\ \hline \end{array} \right\rangle$$

The representation of the two noun phrases, *der Polizist* ('the policeman') and *ein Verbrecher* ('a criminal') is as illustrated for *ein Verbrecher* in (17). They only differ in their binding condition, which is DEF in the case of the definite noun phrase, *der Polizist*.<sup>7</sup>

$$(17) \quad \left\langle \left\{ \langle u, \boxed{\text{CRIMINAL}(u)}, \text{indef.} \rangle \right\}, \begin{array}{|c|} \hline \\ \hline \\ \hline \end{array} \right\rangle$$

The VP *einen Verbrecher töten* ('kill a criminal'), which is modified by the *durch*-phrase, is

<sup>7</sup>In order to keep representations as simple as possible, the agent argument, *der Polizist*, will only occur in the final representation of sentence (12), cf. (21) on page 326.

represented as:

$$(18) \left\langle \left\{ \begin{array}{l} \langle e_1, \boxed{\text{CAUSE}(e_2)(e_1)}, \text{indef.} \rangle, \\ \langle e_2, \boxed{\text{CAUSE}(e_2)(e_1)}, \text{indef.} \rangle, \\ \langle v, \boxed{\text{CRIMINAL}(v)}, \text{indef.} \rangle, \end{array} \right\}, \left. \begin{array}{l} \boxed{\phantom{\text{CAUSE}(e_2)(e_1)}} \\ \text{CAUSE}(e_2)(e_1) \\ \text{BECOME}(\text{dead}(v))(e_2) \end{array} \right\rangle$$

The internal argument of *töten* gets a ‘placeholder’ inserted in the CONTENT DRS, whereas the content of the variable inserted in the DRS is specified along with the variable’s binding conditions in the STORE part. Combining the VP with the *durch*-phrase, *einen Verbrecher durch einen Schuss töten*, the following representation emerges before binding applies:

$$(19) \left\langle \left\{ \begin{array}{l} \langle e_1, \boxed{\text{CAUSE}(e_2)(e_1)}, \text{indef.} \rangle, \\ \langle e_2, \boxed{\text{CAUSE}(e_2)(e_1)}, \text{indef.} \rangle, \\ \langle e_3, \boxed{\begin{array}{l} \text{CAUSE}(e_4)(e_3) \\ \text{SHOOT}(e_3) \end{array}}, \text{indef.} \rangle, \\ \langle e_4, \boxed{\text{CAUSE}(e_4)(e_3)}, \lambda \rangle, \\ \langle v, \boxed{\text{CRIMINAL}(v)}, \text{indef.} \rangle, \end{array} \right\}, \left. \begin{array}{l} \boxed{\phantom{\text{CAUSE}(e_2)(e_1)}} \\ \text{CAUSE}(e_2)(e_1) \\ \text{BECOME}(\text{dead}(v))(e_2) \end{array} \right\rangle$$

Next,  $e_2$  will bind  $e_4$ . Needless to say, the variable types have to correspond for a binding to take place. Taking the constraints into consideration, which also have to match,  $e_4$  cannot be bound by  $e_1$  which could be a possible match, looking only at the binding conditions: they are simply not in the same argument positions for CAUSE. The variable  $e_4$  represents a caused event, whereas  $e_1$  represents a causing event.

Next  $e_1$  and  $e_3$  will be unified. This is not a binding in the sense of the binding which takes place between  $e_4$  and  $e_2$ , which is a necessary binding, where  $e_4$  not being bound would lead to an unresolved DRS. The variables  $e_1$  and  $e_3$  will be unified under the assumption that one should unify all variables which are a possible match. This solution might overgenerate, but I will not go into this here.

In addition, the constraints of the variables entering into binding relations will be merged, resulting in the preliminary representation in (20), before indefinites are existentially bound and enter the content part:

$$(20) \left\langle \left\{ \begin{array}{l} \langle e_1, \boxed{\begin{array}{l} \text{CAUSE}(e_2)(e_1) \\ \text{SHOOT}(e_1) \end{array}}, \text{indef.} \rangle, \\ \langle e_2, \boxed{\text{CAUSE}(e_2)(e_1)}, \text{indef.} \rangle, \\ \langle v, \boxed{\text{CRIMINAL}(v)}, \text{indef.} \rangle \end{array} \right\}, \left. \begin{array}{l} \boxed{\phantom{\text{CAUSE}(e_2)(e_1)}} \\ \text{CAUSE}(e_2)(e_1) \\ \text{BECOME}(\text{dead}(v))(e_2) \end{array} \right\rangle$$

The indefinites enter the DRS in accordance with the binding condition for indefinites. The result after existential binding of variables with INDEF binding conditions can be seen in (21):

$$(21) \left\langle \left\{ \begin{array}{|l|} \hline u \\ \hline \text{POLICEMAN}(u) \\ \hline \end{array} \right\}, \begin{array}{|l|} \hline e_1 \ e_2 \ n \ t_{(loc)} \ t'_{(ref)} \ v \\ \hline t' \prec n \\ t = t' \\ e_1 \subseteq t \\ \text{CAUSE}(e_2)(e_1) \\ \text{BECOME}(\text{dead}(v))(e_2) \\ \text{SHOOT}(e_1) \\ \text{CRIMINAL}(v) \\ \text{PATIENT}(v)(e_2) \\ \text{AGENT}(u)(e_1) \\ \hline \end{array} \right\rangle$$

The left part of the representation, consisting of  $\{ \langle \{u\}, \{\text{policeman}(u)\} \rangle \}$  is a presupposition, the noun phrase *Der Polizist* being definite. It has to be verified in a broader context or accommodated.

I will now turn to the analysis of inchoative predicates such as in (4), repeated as (22) for convenience. I will only look at the steps of the derivation differing from the previous example:

$$(22) \quad \textit{Ohnesorg starb durch einen gezielten Schuss.}$$

‘Ohnesorg died through an accurate shot.’

*Sterben* is represented as in (23):

$$(23) \left\langle \left\{ \langle e_2, \text{,indef.}, \rangle \right\}, \begin{array}{|l|} \hline \text{BECOME}(\text{dead}(y))(e_2) \\ \text{PATIENT}(y)(e_2) \\ \hline \end{array} \right\rangle$$

The representation of *sterben* differs from that of *töten* in (13) in two respects: First, *sterben* includes only one event. Second, *sterben* is not specified for any causal relation, and thus has no constraint for  $e_2$  (although it could be specified as involving a resultant state).

*Durch einen gezielten Schuss* (‘through an accurate shot’) is represented in (24), simplifying the semantics of *gezielt* (‘accurate’):

$$(24) \left\langle \left\{ \begin{array}{|l|} \hline \langle e_3, \begin{array}{|l|} \hline \text{CAUSE}(e_4)(e_3) \\ \text{SHOOT}(e_3) \\ \text{ACCURATE}(e_3) \\ \hline \end{array}, \text{,indef.}, \rangle \\ \langle e_4, \begin{array}{|l|} \hline \text{CAUSE}(e_4)(e_3) \\ \hline \end{array}, \lambda_2, \rangle \\ \langle w, \begin{array}{|l|} \hline \text{AGENT}(w)(e_3) \\ \hline \end{array}, \text{,indef.}, \rangle \\ \hline \end{array} \right\}, \begin{array}{|l|} \hline \\ \hline \end{array} \right\rangle$$

When combining the representation in (23) (with the addition of the proper name *Ohnesorg*) with (24), the result is the representation in (25), before binding applies:<sup>8</sup>

<sup>8</sup>The binding condition of the variable  $o$ , PROPER NAME, has similar properties to the DEF condition.

$$(25) \left\langle \left\{ \begin{array}{l} \langle e_2, \text{ ,indef.} \rangle, \\ \langle e_3, \begin{array}{|l} \text{CAUSE}(e_4)(e_3) \\ \text{SHOOT}(e_3) \\ \text{ACCURATE}(e_3) \end{array}, \text{ ,indef.} \rangle, \\ \langle e_4, \text{CAUSE}(e_4)(e_3), \lambda_2 \rangle, \\ \langle o, \text{OHNESORG}(o), \text{prop.name} \rangle, \\ \langle w, \text{AGENT}(w)(e_3), \text{ ,indef.} \rangle \end{array} \right\}, \begin{array}{|l} \text{BECOME}(\text{dead}(o))(e_2) \\ \text{PATIENT}(o)(e_2) \end{array} \right\rangle$$

The variable  $e_2$  will bind  $e_4$ , adding the constraint  $\text{CAUSE}(e_2)(e_3)$  to the variable  $e_2$ . Binding will be able to take place because there is nothing preventing it from taking place. Finally, the indefinites enter the DRS, resulting in the following representation for sentence (22), which should be compared to the one in (21) on page 326.

$$(26) \left\langle \left\{ \begin{array}{|l} o \\ \text{OHNESORG}(o) \end{array} \right\}, \begin{array}{|l} e_2 \ e_3 \ w \ n \ t_{(loc)} \ t'_{(ref)} \\ \hline t' \prec n \\ t = t' \\ e_3 \subseteq t \\ \text{CAUSE}(e_2)(e_3) \\ \text{BECOME}(\text{dead}(o))(e_2) \\ \text{SHOOT}(e_3) \\ \text{ACCURATE}(e_3) \\ \text{PATIENT}(o)(e_2) \\ \text{AGENT}(w)(e_3) \end{array} \right\rangle$$

These two derivations give the same result for the semantic composition for *töten* and *sterben* in combination with *durch*, cf. the representation in (21) on page 326. The event nominal *Schuss* introduces an agent of its own, and *durch* contributes the causal relation. This is all added in a compositional fashion to the semantics of *sterben*.

### 5 The semantics of *durch* as presupposition verification and accommodation

In the above analysis, the semantics of *durch* was claimed to be characterised by an empty CONTENT part. *Durch* was said to *involve* a causal relation, however. In this section, I will attempt to specify how this involvement may be understood. Given the fact that the formalism which is applied here was introduced by van der Sandt (1992) and further developed by Kamp (2001) to handle presuppositional phenomena, an obvious question is: Could the causal relation in *durch* be described as a presupposition? And what would the implications for presupposition theory be? I will only be able to give a partial answer to the latter question here.

I would like to argue that the treatment of *durch* presented above does indeed amount to analysing the implicit CAUSE element of *durch* as an *intrasentential* presupposition. A *durch*-phrase can be said to *assert* the event included therein and *presuppose* that this event is a cause of some other event. The common basis for generally assumed mechanisms for presuppositional behaviour and the compositional unification-based analysis of *durch* is as follows: When combined with causatives, *durch* seems to lack a meaning of its own. This is due to the unification of the CAUSE of *durch* with the CAUSE of the predicate, which is parallel to presupposition

verification. In combination with inchoatives, however, *durch* does seem to make a greater contribution, where a CAUSE predicate is introduced by the causal preposition itself. Here, a parallel to context accommodation can be observed. And finally, with statives, the contribution of the *durch*-phrase to the complex semantic formula seems to be even greater, leading to a reinterpretation of the state as being a resultant state.

Importantly, a pragmatic account of the combinatorial potential of *durch* can capture some further properties of the preposition which have previously been ignored or not correctly identified. Two additional pragmatic mechanisms involved are *bridging* and *acceptability*. In (8), repeated here for convenience as (27), bridging (in the wider sense of Bittner (2001) can be argued to take place, where the CAUSE associated with the preposition forces a reinterpretation of the state described in the predicate *hoch* ('high') as being a caused resultant state:<sup>9</sup>

(27) *Auch der durch diese Haltung hohe Luftwiderstand kann auf längeren Strecken ganz schön schlauchen.*

'The high air resistance due to this posture may put you through the mill over longer distances.'

In (28), it can be seen that claims made in the literature that *durch* generally cannot be combined with manner-specific causatives (Härtl 2001) are not correct:

(28) a. *??Er wurde durch einen Schuss erschossen.*

(He was through a shot shot dead)

'He was shot dead by a shot'

b. *Er wurde durch einen Genickschuss erschossen.*

(He was through a shot-to-the-neck shot dead)

'He was shot dead with a shot to the neck.'

The well-formedness of such combinations should not be explained by reference to the semantics of *durch*. A more general account of the distribution in (28) is achieved by assuming that composition is restrained by a general pragmatic mechanism of acceptability as described by van der Sandt (1992, pp. 367 ff.). The verb *erschließen* ('shoot dead') is a *manner-specific* causative predicate, where the causing event is specified as being a shooting event. Modifying a predicate such as *erschließen* ('shoot dead') by an adjunct like *durch einen Schuss* ('with a shot') as in (28a) is uninformative and thus unacceptable. The adjunct contains no information which is not included in the predicate. However, a specification such as *durch einen Genickschuss* ('with a shot to the neck') as in (28b) renders the adjunct more specific than the shooting event described in the predicate, adding to the content. A shot to the neck describes not only a shooting event, but also specifies the direction of the shot. Thus, the distribution of *durch*-phrases in combination with manner-specific causatives does not have to be accounted for by reference to the semantics of *durch* itself, but can be seen as fully determined by acceptability restrictions.

It should be emphasised that in the above examples, all pragmatic mechanisms assumed to account for the compositional behaviour of *durch* apply purely sentence-internally. What is more, the presupposition resolution which has been argued for here, occurs at a word-internal level, involving a decomposition of the semantics of lexical items by means of the predicates CAUSE and BECOME. Thus, the above approach can be said to truly involve lexical pragmatics (Blutner 2004), where not only the pragmatic aspects of some lexical items are discussed, but lexical composition itself is viewed as being pragmatic in nature.

It might be questioned whether this is really a kind of presupposition. At this point, I have

<sup>9</sup>This is standardly described as *coercion* in the semantic literature on aspect.

nothing much to say in my defence, this part of the article indeed being work in progress. It is however, not straightforward to establish this relation, since many of the normally applied tests for presuppositions are not applicable in the case of *durch*. The pragmatic mechanisms which are argued to be relevant here, apply at word-level, whereas most presuppositional phenomena which have been treated in the literature, belong to the sentence-level. They can only be evaluated at the top-most CP-level and often only apply intersententially. But the resolution of the CAUSE-presupposition of *durch* can be argued to occur at VP-level, before the topmost eventuality is existentially closed. Thus, traditional tests involving e.g. embeddedness do not make much sense in the case of word-internal pragmatics.

Also of relevance to this point, since the presupposition justification of *durch* applies at a word-internal level, effects involving global, local or intermediate accommodation (Beaver and Zeevat to appear) are not expected, either.

One test which does seem to be more or less straightforwardly applicable, though, is the negation test, which involves a non-entailing context, in which a presupposition should still be true:

- (29) *Er starb nicht durch einen gezielten Schuss.*  
 (He died not through an accurate shot)  
 'He did not die through an accurate shot.'

It does not make sense to consider the truth of CAUSE alone, but it can be observed that the CAUSE of *durch* does seem to survive negation: The most obvious interpretation of (29) is one where the person in question dies, but where the cause of his death is not an accurate shot, i.e. the negation has narrow scope over the *durch*-adjunct. Importantly, (29) is interpreted as claiming that there was a cause for the person's death, but that the reason was not an accurate shot.<sup>10</sup>

Summing up, the above arguments indicate that a presuppositional analysis of *durch* is plausible and that the consequence of this is an extension of the phenomena and linguistic levels for which presuppositions seem to be relevant. In the next section, I will briefly discuss the generality of the above approach discussing some further data.

## 6 Outlook

An approach as sketched above has applications beyond the analysis of *durch*. First, unification as a mode of composition has been applied in an analysis of the semantics of *by* in English (Sæbø to appear). Second, there are causal prepositions in other languages which show a similar behaviour to *durch*. In English, *through* can also be combined with both causative and inchoative predicates. More interestingly, given the close relationship between English *through* and German *durch*, a language more remotely related to German such as Bulgarian also has a preposition which combines with causatives and inchoatives, *ot* ('from'):

- (30) a. *Toj be ubit ot tri kurshuma.*  
 (He was killed from three bullets)  
 'He was killed with three shots.'  
 b. *Toj sagina ot tri kurshuma.*  
 (He died from three bullets)  
 'He died from three shots.'

<sup>10</sup>It is possible to get a sentential negation reading of *nicht* ('not') in (29), but it is rather dispreferred in (29). The reason for this could be that it does not make sense to add a causal adjunct like *by a shot* if one wants to express that a person did not die (cf. Solstad forthcoming).

Third, there are other types of adverbial modification, where the above analysis can be applied plausibly, as illustrated in (31):<sup>11</sup>

- (31) a. *Sie ging in das Haus hinein.*  
(She went in the house inside)  
'She went into the house.'
- b. *Sie ging in das Haus.*  
'She went into the house.'
- c. *Sie ging hinein.*  
'She went inside.'

In (31a) the adverbials *in das Haus* ('into the house') and *hinein* ('inside' in addition to view-point information) specify a single path of movement. They are not interpreted as describing two paths which are combined. There is a double specification of an *in* movement (i.e. *into* as opposed to *out of*), both in the preposition *in* and in the *hinein* element. In addition, directionality is specified twice: in the combination of the preposition with accusative case, as well as in the *hinein* element. As can be seen from (31b)-(31c), either of the adverbials in (31a) can occur without the other. In the spirit of the analysis presented here, the *hinein* element would be assumed to carry the presupposition that there is an object into which movement takes place. In (31a) this presupposition is sentence-internally verified, whereas it will have to be verified in a wider context or accommodated in (31c). The information on directionality and inwards movement of the two adverbials is unified whenever they both occur.

In sum, these data suggest that the presuppositional analyses of Kamp (2001) and van der Sandt (1992) in combination with unification-based composition can be suitably applied in analysing lexical items other than e.g. particles and factive verbs, which are often analysed in terms of presuppositions.

## 7 Conclusion

In this paper, it was argued that an analysis applying strict compositionality is not always a viable option. The varying compositional impact of German adverbials headed by the causal-instrumental preposition *durch* was argued to be better rendered in a unificational framework. It was further argued that pragmatic mechanisms are important in describing the combinatorial distribution of some lexical items, and that what seems to be unification may be argued to be rather word-internal presuppositional phenomena.

## References

- Beaver, D. and Zeevat, H.: to appear, Accommodation, in G. Ramchand and C. Reiss (eds), *Oxford Handbook of Linguistic Interfaces*, Oxford University Press, Oxford.
- Bende-Farkas, A. and Kamp, H.: 2001, Indefinites and Binding: From Specificity to Incorporation. Revised version of the lecture notes from a course given at the 13th ESSLI in Helsinki, Finland.  
\*<http://www.helsinki.fi/esslli/courses/readers/K29.pdf>
- Bittner, M.: 2001, Surface composition as bridging, *Journal of Semantics* 18(2), 127–177.

<sup>11</sup>Thanks are due to Christopher Habel for pointing my attention to this example.



- Blutner, R.: 2004, Pragmatics and the lexicon, in L. R. Horn and G. Ward (eds), *Handbook of Pragmatics*, Blackwell, Oxford, pp. 488–519.
- Bouma, G.: 2006, Unification: Classical and default, in K. Brown (ed.), *Encyclopedia of language & linguistics*, Elsevier, Amsterdam. A manuscript version is available online.  
\*[http://www.let.rug.nl/gosse/papers/encyclopedia\\_unification.pdf](http://www.let.rug.nl/gosse/papers/encyclopedia_unification.pdf)
- Chung, S. and Ladusaw, W. A.: 2004, *Restriction and Saturation*, MIT Press, Cambridge, Mass.
- Egg, M.: 1995, The intergressive as a new category of verbal aktionsart, *Journal of Semantics* **12**, 311–356.
- Härthl, H.: 2001, CAUSE und CHANGE: thematische Relationen und Ereignisstrukturen in Konzeptualisierung und Grammatikalisierung, Akademie-Verlag, Berlin.
- Härthl, H.: 2003, Conceptual and grammatical characteristics of argument alternations: the case of decausative verbs, *Linguistics* **41**(5), 883–916.
- Kamp, H.: 2001, The Importance of Presupposition, in C. Rohrer, A. Roßdeutscher and H. Kamp (eds), *Linguistic Form and its Computation*, CSLI, Stanford, pp. 207–254.
- Kamp, H. and Rossdeutscher, A.: 1994, Remarks on Lexical Structure and DRS Construction, *Theoretical Linguistics* **20**(2/3), 97–164.
- Kratzer, A.: 1996, Severing the External Argument from its Verb, in J. Rooryck and L. Zaring (eds), *Phrase Structure and the Lexicon*, Kluwer, Dordrecht, pp. 109–137.
- Kratzer, A.: 2006, Building resultatives, in C. Maienborn and A. Wöllstein-Leisten (eds), *Event Arguments in Syntax, Semantics and Discourse*, Niemeyer, Tübingen, pp. 177–212.
- Sailer, M.: 2004, Past tense marking in afrikaans, in C. Meier and M. Weisgerber (eds), *Proceedings of the Conference sub8 – Sinn und Bedeutung*, Universität Konstanz, pp. 233–247.
- van der Sandt, R. A.: 1992, Presupposition Projection as Anaphora Resolution, *Journal of Semantics* **9**(4), 333–377.
- Solstad, T.: forthcoming, *Lexikalische Pragmatik: Spezifikation und Modifikation kausaler Relationen am Beispiel von durch* [Lexical pragmatics: the specification and modification of causal relations], PhD thesis, University Of Oslo.
- Sæbø, K. J.: to appear, The structure of criterion predicates, in J. Dölling and T. Heyde-Zybatow (eds), *Event Structures in Linguistic Form and Interpretation*, Mouton de Gruyter, Berlin.
- Wunderlich, D.: 1997, Cause and the structure of verbs, *Linguistic Inquiry* **28**(1), 27–68.



# WHY A FEW? AND WHY NOT \*A MANY?\*

Stephanie D. Solt,  
The CUNY Graduate Center

ssolt@gc.cuny.edu

## Abstract

The expressions *few* and *a few* are typically considered to be separate quantifiers. I challenge this assumption, showing that with the appropriate definition of *few*, *a few* can be derived compositionally as  $a + \textit{few}$ . The core of the analysis is a proposal that *few* has a denotation as a one-place predicate which incorporates a negation operator. From this, argument interpretations can be derived for expressions such as *few students* and *a few students*, differing only in the scope of negation. I show that this approach adequately captures the interpretive differences between *few* and *a few*. I further show that other such pairs are blocked by a constraint against the vacuous application of *a*.

## 1 Introduction

The starting point for the present paper is the often-overlooked contrast exemplified below:

- (1) a. Few students came to the party.  
b. A few students came to the party.
- (2) a. Many students came to the party.  
b. \*A many students came to the party.

The expressions *few* and *many* have long been recognized as problematic for treatments of quantification, on account of their vagueness and context dependence (or even ambiguity), and their resistance to classification on the standard dimension of strong versus weak (Milsark 1974; Barwise & Cooper 1981; Westerståhl 1985; Keenan & Stavi 1986; Lappin 1988, 2000; Partee 1989; Herburger 1997).

But one idiosyncrasy of *few* that has received little serious attention (though see Kayne 2005) is that it forms a pair with the superficially similar expression *a few*, the only such pair in the English count noun quantifier system. In particular, while *few* and *many* otherwise exhibit very similar properties, there is no *\*a many* in parallel to *a few*.

My goal in this paper is to present some interesting facts and contrasts relating to the semantics of *few* and *a few*, to show that, despite their differences, *a few* can be derived from *few*, and finally to address why *a few* does not have a counterpart in *\*a many*. I also discuss some broader implications for the semantics of *few* and *many*, and of the indefinite article.

### 1.1 Does $a \textit{few} = a + \textit{few}$ ?

It is not immediately clear that *a few* should receive a compositional treatment at all. And in particular, it is not obvious that *a few* is composed of the *a* in *a student* plus the *few* in *few students*. Within basic accounts of generalized quantifiers (e.g., Keenan & Stavi 1986) as

---

\* My thanks to Bill McClure for his encouragement and guidance in pursuing this research, to Bob Fiengo, Rachel Szekely and Erika Troseth for valuable comments, and to the audience at Sinn und Bedeutung 10 for helpful questions and discussion. All errors are of course my own.

well as introductory semantics texts (e.g., Gamut 1990), the standard if unspoken assumption would seem to be that *a few* is an idiom, that is, a fixed, unanalyzable unit.

But on closer examination, it is clear that *a few* does not always function as a unit: *a* and *few* may be separated by an adverb (as in (3)) or, more interestingly, by an adjective modifying the head noun (as in (4)):

- (3) a. A very few students got perfect scores on the test.  
 b. An incredibly few collectors have the good fortune to own one.
- (4) a. A lucky few students will get fellowships.  
 b. We spent a happy few days at John's house in the country.

The conclusion must be that *a few* is composed of an independent *a* and *few* which combine in the syntax; in light of this, a compositional semantic treatment is desirable as well.

## 1.2 Outline of the paper

The organization of the paper is the following. I begin in Section 2 by presenting some facts in the semantics of *few* and *a few* that must be captured by a compositional account. In Section 3, I introduce two further properties of *few* that will prove crucial to the present analysis. Section 4 is the core of the paper, where I present a proposal regarding the semantics of *few* and the derivation of *a few*. In Section 5, I address the obvious question that arises: why *a few* does not have a counterpart in *\*a many*. I summarize in Section 6 with some conclusions and questions for further study.

## 2 The Interpretation of *Few* and *A Few*

### 2.1 Basic facts

Considering again examples (1a) and (1b), it can be observed that these sentences have overlapping truth conditions: Both are true if some small but unspecified number of students attended the party. But from there, the interpretations of *few* and *a few* diverge.

Specifically, diagnostics such as those proposed by Horn (1989, 2003) show that *few* is defined by its upper bound. That is, *few* means at most some maximum value. Thus for example “few students came to the party” can be followed felicitously by “in fact, hardly any did” and so forth, but not by “in fact, many did” or the like, evidence that the former but not the latter are encompassed within the possible interpretations of *few*:

- (5) a. Few students came to the party; in fact, hardly any/almost none/only one did.  
 b. Few students came to the party; in fact, *\*many/\*lots/\*dozens* did.

Likewise, (6) can only mean that I'm surprised that more students did not come to the party:

- (6) I'm surprised that few students came to the party.

Furthermore, although speakers' intuitions differ with regards to this point, similar diagnostics show that *few* can even be *none*. Thus suppose I make you the bet in (7). If it later turns out that no students come to the party in question, it would seem that I have won the bet.

- (7) I'll bet you that few students will come to the party.

*Few* is therefore monotone decreasing in its right argument, as seen by the validity of the entailment in (8a), and thus licenses negative polarity items, as in (8b):

- (8) a. Few students in the class own cars.  $\Rightarrow$  Few students in the class own red cars.  
 b. Few students in the class have ever owned a car.

*A few*, by comparison, has essentially mirror image semantics relative to *few*. *A few* is defined by its lower bound. It is existential (in that it must be non-zero), and marginally allows an “at least” reading, similar to the cardinal numbers. Thus for example “a few students came to the party” can be continued with “in fact, many did,” but not with “in fact, none did” or “in fact, one did”:

- (9) a. A few students came to the party; in fact, many/lots/dozens/over twenty did.  
b. A few students came to the party; in fact, \*none/\*one/(?) two did.

Similarly, (10) seems to mean that I am surprised that any students at all came to the party (or perhaps that I am surprised that some particular students attended, a point that I will not address here).

- (10) I’m surprised that a few students came to the party.

On its “at least” reading, *a few* is therefore monotone increasing (as seen in (11a)), and thus does not license negative polarity items (as in (11b)):

- (11) a. A few students in the class own red cars.  $\Rightarrow$  A few students in the class own cars.  
b. \*A few students in the class have ever owned a car.

Finally, for completeness, I consider also *many*, which will be relevant below. As seen through the contrasts in (12), *many* is lower bounded like *a few*, but of course specifies a larger number of individuals:

- (12) a. Many students came to the party; in fact, dozens/hundreds did.  
b. Many students came to the party; in fact, \*none/\*one/\*a few did.

Within a generalized quantifier framework (Barwise & Cooper 1981), the above facts might as a first approximation be summed up by the expressions in (13) as the denotations of *few*, *a few* and *many*.

- (13) a.  $\llbracket \text{few} \rrbracket = \lambda P \lambda Q (|P \cap Q| \leq n, \text{ where } n \text{ is some small number})$   
b.  $\llbracket \text{a few} \rrbracket = \lambda P \lambda Q (|P \cap Q| \geq m, \text{ where } m \text{ is some small number } \geq 2)$   
c.  $\llbracket \text{many} \rrbracket = \lambda P \lambda Q (|P \cap Q| \geq p, \text{ where } p \text{ is some large number})$

But this approach does not provide an account of the relationship of *a few* to *few*. Nor is it apparent why *a few* does not have a counterpart in *\*a many*.

## 2.2 Some additional complexities

Beyond these issues, there are some further subtleties that the expressions in (13) do not adequately capture. As is now well known, the semantics of *few* is notoriously difficult to specify precisely (Partee 1989). In some contexts, *few* would appear to have a proportional interpretation. For example, the intuition seems to be that *few Americans* in (14a) could refer to a larger number of individuals than *few senators* in (14b), which in turn could be a larger number than *few students in my class* in (14c) (assuming a class of ten students or so).

- (14) a. Few Americans voted for Ralph Nader in 2004.  
b. Few senators supported the bill.  
c. Few students in my class solved the problem.

In fact, (14a) is clearly true – and perfectly felicitous – in a situation where one hundred thousand Americans (out of millions) voted for Nader in 2004. These facts could be readily be captured by giving *few* proportional semantics, so that *few N* is interpreted as “a small proportion of the Ns.”

But the situation is not as simple as this: In other contexts, *few* has a purely cardinal interpretation, where *few N* could be paraphrased as “a small number of Ns.” On this reading, *few N* could even be all of the Ns. Thus for example (15) could best be paraphrased as “a small number of truly qualified candidates applied,” rather than “a small proportion of all qualified candidates applied.”

(15) Few truly qualified candidates applied for the position.

In fact, (15) could be judged true if there were only a small number of really qualified candidates (perhaps because the job requirements were particularly onerous), and all of them applied.

Likewise, (16), an example from Partee (1989), could be true if there were only a small number of faculty children in 1980, and all of them were at the picnic.

(16) There were few faculty children at the 1980 picnic.

The possibility of a cardinal reading for *few* is particularly clear when it appears in object position. Thus (17) means that my reasons are small in number, not that of all such reasons I subscribe to only a small proportion.

(17) I have few reasons to trust John.

Along with its difficult-to-specify interpretation, *few* also exhibits inconsistent formal properties. On the most simple test, namely allowability in *there*-insertion contexts (Milsark 1974), *few* can be classified as weak, patterning with other weak determiners such as *some* or *no*:

(18) There are few cars in the parking lot.

But as is well known, *few* does not possess the properties characteristic of prototypical weak determiners (Barwise & Cooper 1981; Lappin 1988, 2000; Partee 1989). One such property is symmetry. As an example of symmetry, the two sentences in (19a) are logically equivalent. But it is not as clear that the equivalence in (19b) holds, and it is obvious that the one in (19c) does not:

- (19) a. Some students are anarchists.  $\Leftrightarrow$  Some anarchists are students.  
 b. ?Few students are anarchists.  $\Leftrightarrow$  Few anarchists are students.  
 c. Few women are great-grandmothers.  $\nLeftrightarrow$  Few great-grandmothers are women.

Similar issues arise with other characteristic properties of weak determiners, such as intersection and persistence/antipersistence (upward/downward monotonicity in a determiner's left argument).

Finally, *few* does not even appear to possess the property of conservativity, long argued to be a universal characteristic of natural language determiners (Barwise & Cooper 1981). Thus consider (20), based on a well-known example from Westerstahl (1985).

(20) Few Americans have won the Nobel Prize in Physics.

The number of Americans who have won the Nobel Physics prize – and certainly the proportion – is without doubt small. Nevertheless, on one reading, (20) could be judged false if Americans make up a large proportion of the winners. But if the cardinality of the predicate is factored into the truth conditions of a sentence such as this, conservativity does not obtain.

Importantly, the interpretation of *a few* is largely free of these complexities. To start with, *a few* is purely cardinal. Regardless of the context or the nominal expression with which it combines, *a few* specifies a small number of individuals in an absolute sense. Thus (21a-c) could all be judged true if a handful of individuals within the domain (*Americans, senators or students in my class*) satisfied the predicate:

- (21) a. A few Americans voted for Ralph Nader in 2004.  
 b. A few senators supported the bill.  
 c. A few students in my class solved the problem.

Furthermore, in a situation in which one hundred thousand Americans voted for Nader in 2004, (21a) is pragmatically odd if not actually untrue, evidence that *a few* does not exhibit the proportionality that I have shown is characteristic of *few*.

*A few*, like *few*, can be classified as weak, as seen by the acceptability of (22a). But unlike *few*, it displays the characteristic properties of this class, such as symmetry, as seen by the equivalence in (22b):

- (22) a. There are a few cars in the parking lot.  
 b. A few senators are anarchists.  $\Leftrightarrow$  A few anarchists are senators.

Finally, *a few* is clearly conservative; for example, the truth or falsity of (23) cannot depend on the total number of prize winners.

- (23) A few Americans have won the Nobel Prize in Physics.

In short, *a few* is altogether a better-behaved expression than *few*. Any attempt to establish a compositional relationship between the two must capture this fact.

### 3 Two Crucial Properties

In this section, I introduce two further properties of *few* (and in parallel, *many*) that will serve as the starting point for the analysis to follow.

#### 3.1 *Few and many are adjectives*

Within a standard generalized quantifier framework (Barwise & Cooper 1981), all noun phrases are uniformly represented as objects of semantic type  $\langle\langle e,t \rangle, t\rangle$ , such that “quantificational determiners” – including *few* and *many* – must have the semantic type  $\langle\langle e,t \rangle, \langle\langle e,t \rangle, t\rangle\rangle$ . But this uniform approach has been challenged in other frameworks which distinguish indefinites from truly quantificational expressions, holding that the former are not inherently quantificational (Kamp 1981; Heim 1982; Landman 2004).

While the status of *few* and *many* with regards to this dichotomy is not completely clear (an issue which itself merits further investigation), in one respect there is clear evidence that these terms do not always have the semantics of determiners which produce generalized quantifiers: In many respects, *few* and *many* exhibit the morphological properties and syntactic distribution of adjectives rather than determiners (Hoeksema 1983; Partee 1989; Kayne 2005).

To begin with the most basic facts, both *few* and *many* pattern with adjectives in having comparative and superlative forms:

- (24) fewer, fewest; more, most (cf. taller, tallest)

Both may combine with degree modifiers:

- (25) so few/many; too few/many; very few/many (cf. so/too/very tall)

Both may appear in predicative position:

- (26) His good qualities are few/many (cf. numerous/evident/remarkable)

Both may be sequenced after determiners other than *a*:

- (27) a. The few/many advantages of his theory (cf. the important advantages)  
 b. His few/many friends (cf. his close friends)  
 c. Those few/many students who understood the problem (cf. those smart students...)

Finally, perhaps the most convincing evidence, both may be conjoined with other adjectives:

- (28) a. Study shows few – and small – inheritances for baby boomers.  
 b. Precious and few are the moments we two can share.  
 c. ... the many and complex processes involved in the development of an organism...

Since *few* and *many* exhibit the morphosyntactic behavior of adjectives, it is also desirable to represent them semantically as adjectives (i.e., noun modifiers), rather than as determiners. (For a related proposal, see Partee 1989, where *few* and *many* in their cardinal interpretations are associated with adjectival semantics.) Such an approach aligns these expressions within the broader treatment of indefinites as not inherently quantificational. In particular, this view of *few* and *many* finds a parallel in recent semantic analyses of cardinal numbers as noun modifiers lacking in quantificational force (Link 1983; Krifka 1999; Ionin & Matushansky 2004; Landman 2004).

### 3.2 *Few* is negative

A second crucial fact about *few* is that it is negative. This is in one sense an obvious point, and certainly not a new one. As early as Barwise & Cooper (1981) we find the proposal that *few* can be defined as “not many”:

- (29) Semantic Postulate:  $\llbracket \text{few} \rrbracket = \neg \llbracket \text{many} \rrbracket$

More recently, McNally (1998) proposes that *few* is equivalent to a variant of *many* which has the morphosyntactic licensing condition that it appear within the scope of clausal negation.

But not all accounts have treated *few* as explicitly negative. An alternate approach is to represent *few* and *many* as opposites, related as  $\leq$  is related to  $>$ . Thus for example Partee (1989) proposes the following as a first approximation of the semantics of *few* and *many* in their cardinal interpretations:

- (30)  $\llbracket \text{few } N \rrbracket = \{X: |X \cap N| \leq n\}$ , where  $n$  is some small number  
 $\llbracket \text{many } N \rrbracket = \{X: |X \cap N| > n\}$ , where  $n$  is some large number

Lappin (1988, 2000) similarly remarks that the denotation of *few* can be obtained from that of *many* by replacing  $>$  with  $\leq$  in the relevant formula.

Now, it is not immediately apparent that the distinction between Partee’s and Lappin’s approach (*few* and *many* as opposites) and that of Barwise & Cooper and McNally (*few* as the negation of *many*) is an important one. After all, there is an obvious equivalence between the two, stemming from the equivalence of a formula of the form  $|X \cap N| \leq n$  to one of the form  $\neg |X \cap N| > n$ . Thus we can of course move transparently from one type of definition to the other. But on another level, the difference between these two approaches is a more fundamental one. In the expressions in (30), *few* and *many* are of equal status; either one can be viewed as the opposite of the other. But with semantics such as Barwise & Cooper’s (29), *many* is the primary term, while *few* is derived from it. Or to put this differently, the denotation of *few* includes an additional element that is not present in that of *many*, namely a negation operator. This is a basic asymmetry between the two expressions, which we might predict would have syntactic or semantic consequences. Thus it seems to matter which of these two approaches to *few* we choose.

I would like to argue that there is ample evidence that *few* is in fact negative, and should be represented as such. As a first point of support, the syntactic distribution of *few* parallels that of explicitly negative expressions. On standard tests for negativity (e.g., Klima 1964), *few* patterns with overtly negative quantifiers such as *no*, rather than positive quantifiers such as *some* or *many*. For example, *few*, like *no*, takes *either* rather than *too* tags:



- (31) a. Some men like Brussels sprouts, and some women do, ✓*too*/*\*either*. (POS)  
 b. Many men like Brussels sprouts, and many women do, ✓*too*/*\*either*. (POS)  
 c. No men like Brussels sprouts, and no women do, *\*too*/✓*either*. (NEG)  
 d. Few men like Brussels sprouts, and few women do, *\*too*/✓*either*. (NEG)

*Few* is also similar to *no* and other negative expressions in being somewhat awkward in object position, at least in colloquial speech. In either case, the most natural way to express the same proposition would be by means of an explicit negator higher in the clause:

- (32) a. ?He has no books. → He doesn't have any books.  
 b. ?He has few books. → He doesn't have many books.

Perhaps the most compelling evidence that the representation of *few* contains a negative component is provided by the existence of so-called “split scope” readings (Jacobs 1980) when it appears in the scope of an intensional verb or modal operator. For example, the most natural reading of (33a) is roughly that given by the paraphrase in (33b), where negation is interpreted outside the scope of the verb *need*, while *many reasons* is interpreted as within its scope. This is distinct from the narrow scope or *de dicto* reading in (33c), where both negation and *many reasons* are within the scope of *need*, and which could be paraphrased as “to fire you, they need it to be the case that they have not many (i.e. a small number of) reasons.” It is also distinct from the true wide scope or *de re* interpretation in (33d), where both negation and *many reasons* scope outside of *need*, and which could be paraphrased as “to fire you, there are not many (specific) reasons such that they need them.”

- (33) a. They need few reasons to fire you.  
 b. “to fire you, it is not the case that they need many reasons”  
     ¬ > need > many reasons  
 c. “to fire you, they need there to be not many reasons”  
     need > ¬ > many reasons  
 d. “to fire you, there are not many (specific) reasons such that they need them”  
     ¬ > many reasons > need

Similarly, (34a) could be best paraphrased by (34b), where negation outscopes the modal operator, which in turn outscopes *many reasons*:

- (34) a. You can have few reasons to doubt my story.  
 b. “it is not possible that you have many reasons....”  
     ¬ > ◇ > many reasons

In light of these facts, as well as the previously discussed distributional patterns, I propose that at the level of logical form, *few* must be decomposed into a negation operator and a positive term.

#### 4 The Semantics of *Few* and the Derivation of *A Few* (Or: Why *A Few*?)

In this section, I build on the conclusions of the previous discussion with a proposal for the formal semantics of *few*, which I show addresses many of the difficulties discussed above, and also allows *a few* to be derived in a compositional manner.

##### 4.1 *Few*

I begin with the lattice theoretic framework of Link (1983), in which the domain of individuals is extended to include plural individuals formed as the sums over sets of atomic individuals. Within this framework, the cardinal numbers may be represented as follows (e.g. Landman 2004):

$$(35) \quad \llbracket \text{three} \rrbracket = \lambda x [|x|=3]$$

Here, *three* is defined as a one-place cardinality predicate, that is, an expression of type  $\langle e,t \rangle$ .

I propose that a similar approach can be applied to *few* and *many*, the primary difference being that these terms require a contextual component to their interpretations. My proposal for the semantics of *many* and *few* is given in formal terms in (36):

$$(36) \quad \begin{array}{l} \text{a. } \llbracket \text{many} \rrbracket = \lambda x [\text{large}^C(|x|)] \\ \text{b. } \llbracket \text{few} \rrbracket = \lambda x [\neg \text{large}^C(|x|)] \end{array}$$

Here  $\text{large}^C$  is a contextually defined value that may reflect the size of the domain of quantification, contextual information, prior expectations, and perhaps other factors. To paraphrase (36) in less formal language, *few* and *many* thus denote sets of (plural) individuals of (contextually specified) small or large cardinality, respectively.

I further follow Link (1983) in introducing the pluralization operator  $*$ , defined as follows for any one-place predicate  $P$ :

$$(37) \quad *P = \{x \in D : \exists Z \subseteq P : x = \sqcup Z\}, \text{ where } \sqcup Z \text{ is the sum of the elements in } Z$$

With this in place, *few* and *many* may combine with a plural noun such as *students* by intersective modification, giving the following for *few*:

$$(38) \quad \begin{aligned} \llbracket \text{few students}_{\langle e,t \rangle} \rrbracket &= \llbracket \text{few} \rrbracket \cap \llbracket \text{students} \rrbracket \\ &= \lambda x [\neg \text{large}^C(|x|) \ \& \ * \text{student}(x)] \end{aligned}$$

The resulting expression is again of semantic type  $\langle e,t \rangle$ , a one-place predicate or set of plural individuals (cf. previous non-quantificational treatments of indefinites, e.g. McNally 1998; de Swart 2001; Landman 2004; among other). Beyond this, I assume that the plural morphology on the noun restricts the denotation of *few students* to proper plural (i.e., non-atomic) individuals; that morphological pluralization can have this effect is seen through the contrast in (39), where (39a) must refer to a single student, while (39b) must be two or more:

- (39) a. some student  
b. some students


The advantages of this approach to the semantics of *few* and *many* are several. First and most obviously, the vagueness and context-sensitivity of their interpretations can be accounted for. In particular, both cardinal and proportional readings of *few* can be obtained with the appropriate choice of  $\text{large}^C$ , as can the “reverse” reading available for examples such as (20). Secondly, the non-determiner-like properties of *few* – notably lack of conservativity – receive an explanation: *Few* is not a determiner, and so it is not surprising that it does not behave like one.

It should be mentioned that there are two important questions that I am not addressing here, the first being precisely how  $\text{large}^C$  receives its value within a particular context, and the second being whether the denotations of *few* and *many* should reference the same or different values. There is much of interest to pursue here, but the definitions in (36) are sufficient for the present purposes.

An issue that must be addressed in this sort of treatment is that, within a classical generalized quantifier framework, an expression of type  $\langle e,t \rangle$  such as (38) is not the appropriate type to appear in argument position. Within “adjectival” theories of indefinites, the standard approach to resolving this issue is to invoke a shift to type  $\langle \langle e,t \rangle, t \rangle$ , an operation that has come to be known as existential closure (Partee 1986; de Swart 2001; Landman 2004). I follow this approach here, using the following definition of existential closure:

- (40) Existential closure (EC)  
 For any one-place predicate P:  
 $EC(P) = \lambda Q \exists x [P(x) \ \& \ Q(x)]$

I further propose that under existential closure, the negation operator in the underlying semantic representation of *few* is able to detach and take higher scope, above the existential operator. The necessity of such an operation is separately motivated by the existence of split scope readings, discussed in Section 3.2 above, which provide evidence that the negative component of *few* is able to take separate scope from the remainder of the expression (though I should note that the precise mechanism by which this occurs requires further investigation).

- (41)  $\llbracket \text{few students}_{\langle\langle e,t \rangle, t \rangle} \rrbracket = \lambda Q \neg \exists x [ \text{large}^C(|x|) \ \& \ *student(x) \ \& \ Q(x)]$
- 

To paraphrase (41), *few students* at the generalized quantifier level denotes the set of sets (properties) that do not contain an element of large cardinality composed of students, but that may contain a small plural individual composed of students, an atomic member of the set *student*, or no elements of the set *student* at all. This seems to capture the meaning of *few* as it was outlined above; it also correctly follows from (41) that *few* is monotone decreasing.

## 4.2 A few

With the analysis I have proposed above for *few*, the derivation of *a few* – the primary objective of this paper – is now straightforward.

As a first step, it is necessary to take a position on the semantics of the indefinite article *a*. While one standard approach would be to say that *a* introduces existential quantification, here I will again follow recent theories of indefinites as non-quantificational (e.g. Heim 1982; Landman 2004), and propose that the existential force of an expression such as *a student* (or for that matter, *a few students*) originates externally, again via an operation of existential closure. As a first approximation (to be revised below), we could therefore view *a* as a modifier (type  $\langle\langle e,t \rangle, \langle e,t \rangle\rangle$ ) which is semantically vacuous.

Under this view, the semantics of an expression such as *a few students* at the set level (type  $\langle e,t \rangle$ ) can now be derived in one of two ways. As the first option, *few* may first combine with *students* as above, with *a* then applying to the resulting combination:

- (42)  $\llbracket \text{students} \rrbracket = \lambda x [*student(x)]$   
 $\llbracket \text{few students}_{\langle e,t \rangle} \rrbracket = \lambda x [\neg \text{large}^C(|x|) \ \& \ *student(x)]$   
 $\llbracket \text{a few students}_{\langle e,t \rangle} \rrbracket = \lambda x [\neg \text{large}^C(|x|) \ \& \ *student(x)]$

In this version of the derivation, *a few* is not a constituent. While this might initially seem counterintuitive, this option is necessary to account for the possibility of positioning a noun modifier between *a* and *few*, as in *a lucky few students*.

As the second option, *a* may first combine with *few*, with the resulting expression then combining with *students*:

- (43)  $\llbracket \text{few} \rrbracket = \lambda x [\neg \text{large}^C(|x|)]$   
 $\llbracket \text{a few} \rrbracket = \lambda x [\neg \text{large}^C(|x|)]$   
 $\llbracket \text{a few students}_{\langle e,t \rangle} \rrbracket = \lambda x [\neg \text{large}^C(|x|) \ \& \ *student(x)]$

Here the constituency of *a few* has been restored, a welcome outcome from an intuitive point of view; this option will prove necessary below.

In either case, existential closure may apply to the resulting set expression to yield a generalized quantifier interpretation. Importantly, in this case, I propose that the presence of the indefinite article *a* blocks the raising of the negator over the existential operator, as occurs in (41). As evidence that *a* may have this effect, note that a similar pattern is seen when the overt negator *not* appears within the scope of *a*. For example, (44a) must mean that some students solved the problem; it cannot be true in the case where no students did so, as would be the case if the negator had scope over the existential operator. In this, (44a) contrasts directly with (44b), where negation has sentential scope, and which is clearly true in the case where there were no problem-solvers.

- (44) a. A not large number of students solved the problem.  
 b. It is not the case that a large number of students solved the problem.

I propose that a similar pattern obtains in the case of *a few*. This gives (45) as the derivation of the generalized quantifier interpretation of *a few students*:

$$(45) \quad \llbracket a \text{ few students}_{\langle(e,t),t\rangle} \rrbracket = \text{EC}(\llbracket a \text{ few students}_{\langle e,t \rangle} \rrbracket) \\
= \lambda Q \exists x [\neg \text{large}^C(|x|) \ \& \ * \text{student}(x) \ \& \ Q(x)]$$

To express this less formally, *a few students* is interpreted as the set of sets (properties) that contain a plural individual of not-large cardinality made up of students.

Thus the *a* of *a few* does have a semantic contribution, namely to ensure wide scope for the existential operator (that is, to maintain the ordering  $\exists \neg$  rather than  $\neg \exists$ ).

Before proceeding, it should be noted that the expression in (45) accurately captures the semantics of *a few* as discussed in Section 2 above.

First, the “at least” interpretation of *a few* falls out from the semantics of the existential operator: If there is some large plural student individual *y* within the denotation of the predicate *Q*, there also must be a not-large plural student individual *y'* (an individual part of *y*) within its denotation. This in turn establishes that *a few* is monotone increasing, as demonstrated above.

Second, regardless of how  $\text{large}^C$  is interpreted in a given context, the existential in (45) is only guaranteed to pick out the minimal element of the set *few students*, namely an element of cardinality two. This means that the proportionality or context dependence inherent to *few* is not passed along to *a few*. Thus with this analysis we have captured the fact that *a few*, unlike *few*, has a purely cardinal interpretation, and thus patterns consistently with weak determiners.

In short, the present analysis of *few* allows a compositional derivation of *a few*, and provides a neat account for the interpretive differences between the two.

In turn, facts relating to *a few* provide further support for the proposal that the denotation of *few* must include a negation operator. To see this, consider the expressions in (46):

- (46) a. Not every student solved the problem.  
 b. Not many students solved the problem.  
 c. Not a student solved the problem.  
 d. Not five minutes later, the professor walked in.  
 e. Not a few students solved the problem.

We have here a puzzling contrast. In (46a-d), *not* + quantifier + N specifies a number of individuals smaller than would be specified by quantifier + N. Thus *not every student* is less than every student, *not many students* is less than many students, *not five minutes later* is less than five minutes later, and so forth. But oddly, in (46e) *not a few students* means more than a few students.

Under the present proposal, an explanation suggests itself: In *not a few students*, the negator in *few* is able to cancel with *not*. To capture this formally, I begin with the standard assumption that *not* is interpreted logically as the negation operator:

$$(47) \quad \llbracket \text{not} \rrbracket = \neg$$

Then the denotation of *not a few students* can be derived as follows:

$$(48) \quad \begin{aligned} \llbracket \text{a few} \rrbracket &= \lambda x[\neg \text{large}^C(|x|)] \\ \llbracket \text{not a few} \rrbracket &= \lambda x\neg [\neg \text{large}^C(|x|)] \\ &= \lambda x[\text{large}^C(|x|)] \\ \llbracket \text{not a few students}_{\langle e,t \rangle} \rrbracket &= \lambda x[\text{large}^C(|x|) \ \& \ *student(x)] \\ \llbracket \text{not a few students}_{\langle \langle e,t \rangle, t \rangle} \rrbracket &= \lambda Q\exists x[\text{large}^C(|x|) \ \& \ *student(x) \ \& \ Q(x)] \end{aligned}$$

This can be paraphrased as the set of sets (properties) that contain a plural individual of large cardinality composed of students. We can compare this back to the denotation of *a few students*, which references “a plural individual of not-large cardinality,” to see that this gets the facts right, giving us an interpretation of *not a few* that is more than *a few*. Importantly, if we had not derived *a few* from *few*, as proposed, and if we had not specified that *few* incorporates a negation operator, it is not clear how we could approach capturing the facts in (46).

### 5 Constraints on the Distribution of A (Or: Why Not \*A Many?)

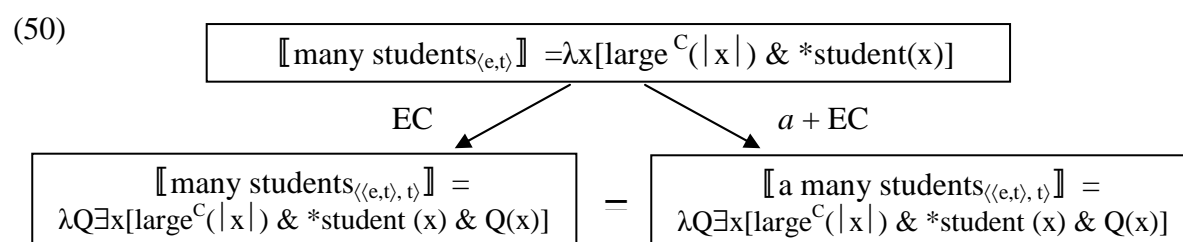
An obvious question arises from the preceding discussion, which can be simply stated as follows: “Why is there no *a many*?” If the indefinite article *a* is able to combine with a set of plural individuals such as *few* or *few students*, we would predict that this process would be more widespread. But of course examples such as the following are bad:

- (49) a. \*An every student came to the party.
- b. \*A most students came to the party.
- c. \*A many students came to the party.
- d. \*A three students came to the party.

Now, there is a relatively simple explanation for the ungrammaticality of (49a-b). *Every student* and *most students* are presumably interpretable only at the generalized quantifier level (type  $\langle \langle e,t \rangle, t \rangle$ ), not the appropriate type to combine with *a*.

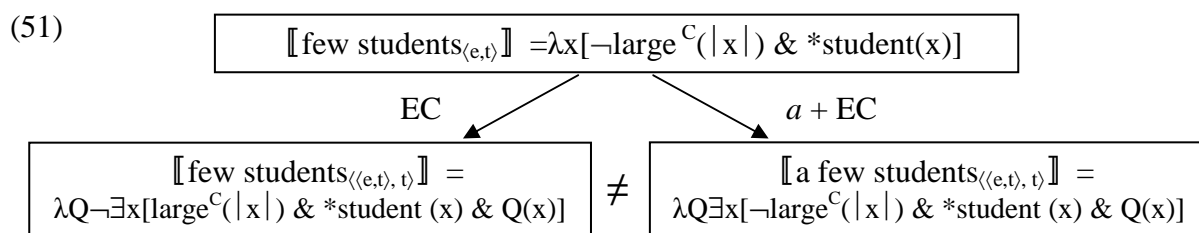
But (49c-d) are more problematic for the present account. Under the theory proposed here, expressions such as *many students* and *three students* – like *few students* – have interpretations at the level of sets (type  $\langle e,t \rangle$ ). But this implies that they should be able to combine with *a*, which in fact they do not.

In addressing this issue, note first that from the set *many students*, either existential closure alone or the application of *a* followed by existential closure would produce the same generalized quantifier. This is illustrated in (50):



Thus in the case of a nominal expression containing *many*, *a* does not make a semantic contribution beyond that which obtains through a non-lexical operation of existential closure alone. And the same point could be made for expressions involving the cardinal numbers, such as *three students*.

This contrasts directly with the case of *few*. The diagram in (51) recaps the material presented in the previous section. As is seen here, from the set *few students*, two different generalized quantifiers may be formed: a monotone decreasing expression derived via existential closure (namely *few students*), and a monotone increasing expression derived via the application of *a* followed by existential closure (namely *a few students*).



In light of these observations, I propose the following generalization: The distribution of *a* is limited by a requirement that *a*, when present, make a semantic contribution. This constraint effectively blocks the derivation of *\*a many students* or *\*a three students*, since in these cases *a* would not do any semantic “work” for us. However, it is not invoked in the case of *few*, since the generalized quantifiers *few students* and *a few students* have different semantics.

Thus here we see the source of the uniqueness of the pair *few/a few*: *Few* is the only lexically simple quantifying expression of the appropriate semantic type whose interpretation is such that the application of *a* is not vacuous; this follows from the presence of the negation operator, which allows for two different scope relationships between existential operator and negator.

## 6 Conclusions and Further Questions

In this paper, I have proposed an analysis of *few* as a one-place predicate that incorporates a negation operator. I have shown that this approach allows the compositional derivation of *a few* as *a + few*, and accurately captures the differences in interpretation and formal properties between expressions such as *few students* and *a few students*. I have further shown that parallel expressions such as *\*a many* and *\*a five* can be blocked by a constraint against the vacuous application of *a*.

In concluding, I will mention several further questions that arise from this analysis. The first relates to an apparent exception to the above-described restriction on the distribution of *a*: While *a* cannot directly precede *many* or the cardinal numbers, this is possible if a modifier intervenes (Ionin & Matushansky 2004; Kayne 2005):

(52) *\*(A) great many students came to the party.*

(53) a. *\*(A) lucky five students will win fellowships.*

b. *It cost me \*(a) whole ten dollars.*

c. *\*(An) incredible ten thousand soldiers died in the battle.*

What is particularly interesting about these cases is that *a* is not just allowed, it is required. For example, *a lucky five students* is fine, but *lucky five students* is not allowed. One possible explanation is that *a* is required here for some independent (e.g., syntactic) reason, in which case the existence of these constructions would be further evidence that *a* may combine with a plural expression. A second possibility is based on the observation that, in their requirement for an overt indefinite article, expressions such as *great many students* or *lucky five students*

show precisely the behavior of singular count nouns such as *student*, raising the question of whether they could in some respect be singular.

Finally, this paper began with a particular contrast between *few* and *many*. There are several other puzzling contrasts of this nature that also would benefit from further investigation. For example (Kayne 2005):

- (54) a. He visits every few/\*many days.  
 b. Another few/\*many students won fellowships.  
 c. The same few/\*many students always get the best scores.

One approach would be to explore whether the present account of *a few* versus *\*a many* could be extended to capture these facts as well. However, there is one fact that suggests a different analysis will be required: With respect to combination with *a*, the cardinal numbers pattern with *many* rather than *few*, but in the constructions in (54), they pattern with *few* (e.g., such that *every five days* is entirely acceptable). I must leave this question as a topic for future research.

## References

- Barwise, J. and Cooper, R.: 1981, Generalized quantifiers and natural language, *Linguistics and Philosophy* **4**, 159-219.
- Gamut, L. T. F.: 1990, *Logic, language and meaning*. Chicago: University of Chicago Press.
- Heim, I. R.: 1982, *The semantics of definite and indefinite noun phrases*. Ph.D. dissertation, University of Massachusetts, Amherst.
- Herburger, E.: 1997, Focus and weak noun phrases, *Natural Language Semantics* **5**, 53-78.
- Hoeksema, J.: 1983, Plurality and conjunction, in A.G.B. ter Meulen (ed), *Studies in Model-Theoretic Semantics*, Foris, pp. 63-83.
- Horn, L. R.: 1989, *A natural history of negation*. Chicago: University of Chicago Press.
- Horn, L. R.: 2003, The border wars: a neo-Gricean perspective. Talk given at *The First International Workshop on Current Research in the Semantics-Pragmatics Interface*, Michigan State University.
- Ionin, T. and Matushansky, O.: 2004, A singular plural. Talk given at *WCCFL 23*, U.C. Davis.
- Jacobs, J.: 1980, Lexical decomposition in Montague Grammar, *Theoretical Linguistics* **7**, 121-136.
- Kamp, H.: 1981, A theory of truth and semantic representation, in J. Groenendijk, T. Janssen and M. Stokhof (eds), *Formal Methods in the Study of Language: Proceedings of the Third Amsterdam Colloquium. Mathematical Centre Tracts*, pp. 277-322.
- Kayne, R. S.: 2005, On the syntax of quantity in English, in R.S. Kayne, *Movement and Silence*, Oxford University Press, pp. 176-214.
- Keenan, E. L. and Stavi, J.: 1986, A semantic characterization of natural language determiners. *Linguistics and Philosophy* **9**, 253-326.

- Klima, E. S., 1964, Negation in English, in J. A. Fodor & J. J. Katz (eds.), *The Structure of Language*, Prentice-Hall, pp. 246-323.
- Landman, F.: 2004, *Indefinites and the type of sets*. Oxford: Blackwell.
- Lappin, S.: 1988, The semantics of 'many' as a weak determiner, *Linguistics* **26**, 977-998.
- Lappin, S.: 2000, An intensional parametric semantics for vague quantifiers, *Linguistics and Philosophy* **23**, 599-620.
- Link, G.: 1983, The logical analysis of plurals and mass terms: a lattice-theoretical approach, in R. Bäuerle et al. (eds), *Meaning, Use, and Interpretation of Language*, de Gruyter, pp. 302-323.
- McNally, L.: 1998, Existential sentences without existential quantification, *Linguistics and Philosophy* **21(3)**, 353-392.
- Milsark, G.: 1974, *Existential sentences in English*. Ph.D. dissertation, MIT.
- Partee, B. H.:1986, Noun phrase interpretation and type-shifting principles, in J. Groenendijk, D. de Jongh and M. Stokhof (eds), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, Foris, pp. 115-143.
- Partee, B. H.: 1989, Many quantifiers, in J. Powers and K. de Jong (eds), *Proceedings of the 5th Eastern States Conference on Linguistics*, Ohio State University, pp. 383-402.
- de Swart, H.: 2001, Weak readings of indefinites: type shifting and closure, *The Linguistic Review* **18**, 69-96.
- Westerståhl, D.: 1985, Logical constants in quantifier languages, *Linguistics and Philosophy* **8**, 387-413.



# QUANTIFICATIONAL READINGS OF INDEFINITES WITH FOCUSED CREATION VERBS\*

Tamina Stephenson,  
Massachusetts Institute of Technology

tamina@mit.edu

## Abstract

This paper looks at sentences with “quantificational indefinites,” discussed by Diesing (1992) and others. I propose that these sentences generate sets of alternatives of the form {*p*, not *p* and it’s possible that *p*}, which restrict the quantification by an extension of familiar focus principles. For example, in the sentence *I usually read a book about slugs* (on the relevant reading), *usually* quantifies over pairs  $\langle x, t \rangle$  such that *x* is a book about slugs, *t* is a time interval, and one alternative is true from the set {I read *x* at *t*, I can but do not read *x* at *t*}. In addition to accounting for a well-known contrast between creation and non-creation verbs, this also explains a second contrast that Diesing’s analysis cannot account for.

## 1 “Quantificational” Readings of Indefinites

### 1.1 The relevant reading

The central data for this paper involves the availability or unavailability of a certain reading of indefinite objects in English sentences. This kind of reading comes up in sentences with adverbial quantifiers such as *usually*, and can be brought out most clearly in examples like (1).

- (1) I usually love a sonata by Dittersdorf. [Diesing (1992): 113]

The salient reading of (1) is, roughly, that in most cases when I hear a sonata by Dittersdorf, I love it. I’ll follow Diesing (1992) and others in referring to this kind of reading of an indefinite object as a “quantificational” reading. The key property of this reading is that the adverb seems to be quantifying (in some sense) over individuals that satisfy the description in the indefinite. For example, in (1), *usually* is quantifying in some sense over sonatas by Dittersdorf.

### 1.2 First contrast: creation vs. non-creation verbs

Diesing observes that a quantificational reading is possible with verbs like *read* but not with creation verbs like *write*. That is, while (2) allows two readings, (3) only allows one.

- (2) I usually read a book about slugs.  
(i)  $\approx$  [On Tuesdays] What I usually do is read a book about slugs.  
(ii)  $\approx$  When I encounter a book about slugs, I usually read it.

---

\* I’d like to give special thanks to Irene Heim and Kai von Fintel for their extensive discussion and guidance. I’d also like to thank Marcelo Ferreira, Danny Fox, Sabine Iatridou, Polly Jacobson, Roger Schwarzschild, my classmates in the fall 2004 workshop course at MIT, the MIT Syntax/Semantics Reading Group, and the audience at Sinn und Bedeutung for useful comments and discussion.

- (3) I usually write a book about slugs.  
 (i)  $\approx$  [In the summer] What I usually do is write a book about slugs.  
 (ii)  $\neq$  When I encounter a book about slugs, I usually write it  
 / I'm usually the one who wrote it

I will assume, following Diesing and others, that the difference between the two readings has to do with whether the indefinite object serves as part of the first argument of the quantifier (the restrictor) or the second (the nuclear scope). In quantificational readings (ii), the indefinite somehow serves as the restrictor, with the rest of the clause serving as the nuclear scope. In existential readings (i), on the other hand, the restrictor comes from elsewhere (in some cases from context) and the whole clause is the nuclear scope.

### 1.3 Diesing's approach: a preexistence requirement

Diesing tries to account for the contrast in (2)-(3) by introducing a preexistence requirement on indefinites in restrictors. This in effect restricts the quantification in these sentences on the quantificational reading (but not the existential reading) to preexisting books about slugs, that is, books that exist before the reading or writing is done to them. With a verb like *read*, a quantificational reading is still allowed, because in any case it only makes sense to read books that are already written. With a creation verb like *write*, however, this renders the quantificational reading nonsensical, since it only makes sense to write books that *aren't* already written. This account correctly predicts that quantificational readings are impossible with creation verbs, and seems to have a fair amount of intuitive appeal; nevertheless I'll show that it's empirically inadequate.

### 1.4 Problem for preexistence: FOCUSED creation verbs

The problem with a preexistence approach is that it also rules out the sentences in (4), on the indicated readings. These have contrastive focus on a verb of creation.<sup>1</sup>

- (4) (a) I usually [HANDWRITE]<sub>FOC</sub> a book about slugs.  
 = When I write a book about slugs, I usually do it by hand.  
 (b) I usually [KNIT]<sub>FOC</sub> a scarf.  
 = When I make a scarf, I usually do it by knitting.

For example, (4.b) clearly quantifies in some sense over a set of scarves, saying that I knit most of them (as opposed to, say, crocheting them). Since *knit* is a creation verb, the quantification must be over scarves that don't exist until after the knitting has occurred, which should be impossible on the preexistence view.

### 1.5 Outline of paper

This paper will be structured as follows: In Sections 2-3, I'll lay out some assumptions about adverbial quantifiers and quantificational indefinites. Then in Section 4 I'll show how sentences with focused creation verbs like (4) can be derived using independently motivated principles of focus and quantification. In Section 5, I'll extend these principles in a new way to apply to quantificational readings without contrastive focus, giving intuitively correct truth conditions for these sentences. In Sections 6-7, I'll show how this captures the original contrast between creation and non-creation verbs in sentences like (2)-(3).

<sup>1</sup> The focus literature contains many examples with focused verbs, of course, including some that happen to be creation verbs, but I haven't seen this particular issue about Diesing's predictions pointed out.

## 2 Preliminary Assumptions

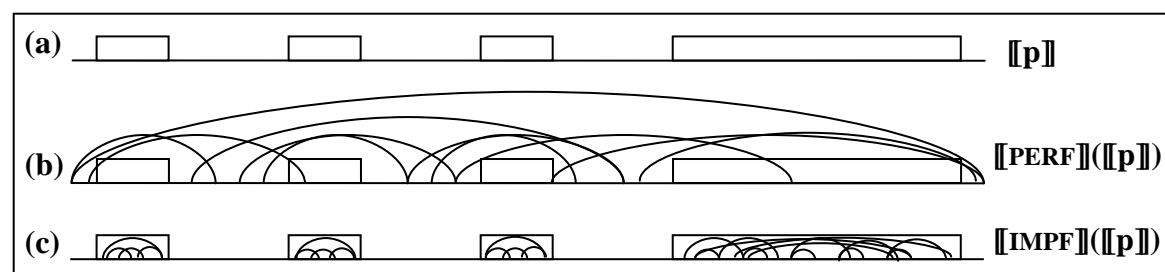
### 2.1 Contribution of aspect

One assumption I'll make is that tensed clauses always have either perfective or imperfective aspect. The aspect morphemes will be abbreviated PERF and IMPF, respectively, and their lexical entries are given in (5).<sup>2</sup>

- (5) (a)  $[[\text{PERF}]] = [\lambda f_{\langle i, t \rangle} . [\lambda t . \exists t' [t' \subseteq_{\text{int}} t \text{ and } f(t')=1]]]$   
 (b)  $[[\text{IMPF}]] = [\lambda f_{\langle i, t \rangle} . [\lambda t . \exists t' [t' \supseteq_{\text{int}} t \text{ and } f(t')=1]]]$   
 [where  $\subseteq_{\text{int}}$  and  $\supseteq_{\text{int}}$  represent the sub- and superinterval relations]

In effect, PERF takes a set of intervals and yields the set containing those intervals plus all of their superintervals; IMPF does the same thing except that it adds the subintervals. This is shown pictorially in (6).

### (6) Effect of perfective and imperfective aspect



### 2.2 Basic use of *usually* / *always*

I assume that on its basic reading, *usually* is a quantifier over times, construed as intervals. For example, I analyze the sentences in (7) as having the truth conditions given in (7'). (I take the *when*-clause to have imperfective aspect and the main clause to have perfective aspect.)

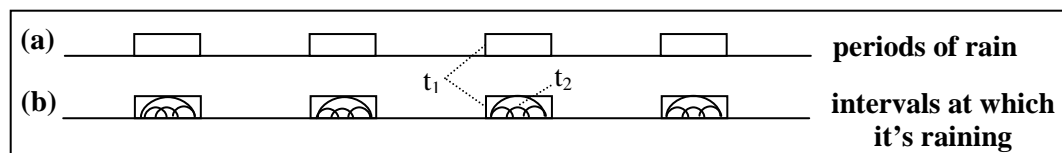
- (7) (a) When it's raining I usually call my mother.  
 (b) When it's raining I always call my mother.
- (7')  $[[\text{(a)/(b)}]] = [\text{Given some relevant time span } T] \text{ for most/all intervals } t \text{ such that } t \subseteq_{\text{int}} T \text{ AND } t \text{ is a maximal interval at which it's raining, there is some subinterval } t' \text{ of } t \text{ such that I call my mother at } t'.$   
 $\approx$  during most /all periods of rain, I call my mother at some point

### 2.3 Maximal intervals

In (7') there's a reference to "maximal intervals" at which it's raining.<sup>3</sup> This is important for the following reason: suppose that we counted all intervals of rain, that is, not only the intervals where it starts raining, rains for a while, and then stops, but the subintervals of those as well. Then we would be quantifying over a set of intervals that looked like (8.b).

<sup>2</sup> I'm ignoring the "imperfective paradox" (see, e.g., Landman 1992, Portner 1998, and Parsons 1990).

<sup>3</sup> I'm assuming that *when* makes no truth conditional contribution. Johnston (1994) argues against this; but in any case the quantification has to somehow be restricted to maximal intervals in this kind of example.

**(8) Intervals of rain**

Now consider the intervals marked  $t_1$  and  $t_2$ . For (7.b) to be true, for one thing I would have to call my mother at some subinterval of  $t_1$ . Then for another thing I would have to call my mother at some subinterval of  $t_2$ . When this is repeated for all the intervals illustrated in (8.b), the result is that I have to call my mother at multiple overlapping intervals – an infinite number of them, if we assume that time is dense. Intuitively, though, the sentence only requires that I call my mother once during each entire period of rain (when it starts, rains for a while, and then stops) – i.e., the intervals in (8.a).

**2.4 The first lexical entry for *usually***

A lexical entry for the basic meaning of *usually* that will yield the truth conditions in (7') is given below in (9). Basic meanings for other temporal quantifiers such as *always* and *rarely* would be exactly parallel. I've included the "relevant time span" as a parameter.<sup>4</sup>

$$(9) \quad \llbracket \text{usually}_1 \rrbracket^T = [\lambda p_{\langle i, t \rangle} \cdot [\lambda q_{\langle i, t \rangle} \cdot \text{For most times } t \in \text{Max}(T^p \cap p_S), q(t)=1] ] \\ = [\lambda p \cdot [\lambda q \cdot | \text{Max}(T^p \cap p_S) \cap q_S | \text{ is a sufficiently large fraction of } | \text{Max}(T^p \cap p_S) | ] ]$$

The requirement that intervals be maximal is enforced in (9) using an operator  $\text{Max}$ , which is defined in (10).

**(10) Definition of  $\text{Max}$ :**

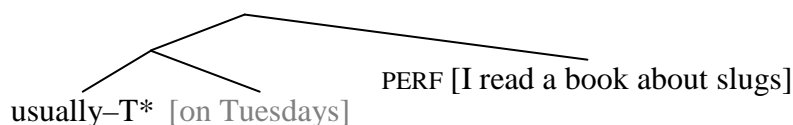
For any set of intervals  $S$ ,  $\text{Max}(S) = \{t: t \in S \text{ and } \sim \exists t' [t \subset_{\text{int}} t' \text{ and } t' \in S]\}$ ,  
where  $\subset_{\text{int}}$  is the proper subinterval relation

Informally, (9) says that, given a relevant time span  $T$ , *usually* takes two sets of intervals as arguments (where  $p_S$  is the restrictor and  $q_S$  is the nuclear scope); the resulting sentence is true just in case, counting only subintervals of  $T$ , most of the members of  $p_S$  that are maximal in the sense defined in (10) are also members of  $q_S$ .

**2.5 Example of an indefinite object with *usually*<sub>1</sub>: the existential reading**

To see how the lexical entry for *usually* in (9) works, consider (11.a) on its existential reading (i). Assuming that the interpreted structure is (11.b), the predicted meaning is as in (11.c). (I also assume that  $T^*$  stands for "these days" and the restriction *on Tuesdays* comes from context.)

- (11) (a) I usually read a book about slugs. [= (2)]  
reading (i)  $\approx$  [On Tuesdays] What I usually do is read a book about slugs.

**(b) LF:**

<sup>4</sup> For a function of type  $\langle \alpha, t \rangle$ ,  $f_S$  = the set characterized by  $f$  (though sometimes I'll use sets and their characteristic functions interchangeably).  $T^p$  is the power set of  $T$ , that is, the set of sets of points in time that are part of  $T$ . This includes non-intervals, but intersecting this with  $p_S$  will yield only intervals.

(c) **Meaning:**

$\llbracket (11.a) \rrbracket = 1$  iff for most maximal intervals  $t$  that are subintervals of  $T^*$  and are on Tuesday (i.e., entire Tuesdays within  $T^*$ ), there is some subinterval of  $t$  at which I read a book about slugs.

There are two points to notice about (11). First, the perfective aspect (PERF) is crucial because without it the reading of each book would have to last all day. With the perfective aspect, a Tuesday only needs to be a superinterval of some time when I read a book about slugs to satisfy the quantification. Second, each Tuesday only counts once: for example, if I were to read four books about slugs some Tuesday, that wouldn't get me off the hook for the rest of the month.

**3 More Assumptions****3.1 Unselective binding**

I assume that adverbs like *usually* and *always* have a second lexical entry which is responsible for quantificational readings of indefinites. This second meaning is produced by extending the basic meaning in (9) to quantify over something other than just times. This is a version of the unselective binding approach to adverbial quantification (Lewis 1975). On this general view, there are various possibilities as to what the adverb could quantify over. Probably the simplest option is for it to quantify over individuals, but Percus (1999) shows that this is wrong. One crucial example he discusses is (12).

- (12) [Context: Ursula is the subject of an experiment where blue-eyed bears walk in front of her one at a time, and she's supposed to judge whether each bear is intelligent.]

Ursula usually knew whether a blue-eyed bear was intelligent.

[Percus (1999): (17)]

If each bear only walked out once, then (12) would be equivalent to saying that for most of the bears, Ursula knew whether they were intelligent. That might lead us to think that the adverb is quantifying over individuals. But judgments change if we consider the possibility that a single bear could walk out more than once. In that case, it would be possible for Ursula to know for most *bears* whether they were intelligent and yet not know for most *trials* whether the bear in that trial was intelligent. (This would happen if the few bears whose intelligence she was unsure of came out many times while the many bears whose intelligence she was sure of came out few times.) Percus observes that in this kind of scenario, (12) is interpreted as quantifying over trials rather than bears. This means that the adverb can't be quantifying over individuals, and so I'll follow Percus in rejecting that analysis.

Given that the second meaning of adverbs can't quantify over individuals, I'll assume instead that it quantifies over pairs  $\langle x, t \rangle$  of individuals and times. Again, this second meaning is an extension of the basic meaning in (9), which just quantifies over times. In (13) I give an example that will use this second lexical entry, deriving the meaning given in (13.b-c). The truth conditions given in (13) are only a first pass, though. In particular, at this point they turn out to be equivalent to quantifying over individuals, in effect ignoring the time part of the pairs; but this will change once other ingredients of the analysis are added in.

- (13) (a) I usually / always love a sonata by Dittersdorf.  
 (b) = [Given a relevant time span  $T$ ] 1 iff for most / all pairs  $\langle x, t \rangle$  such that  $x$  is a sonata by Dittersdorf and  $t$  is maximal, I love  $x$  at  $t$ .

- (c) = [Given a relevant time span T] 1 iff for most / all pairs  $\langle x, T \rangle$  such that  $x$  is a sonata by Dittersdorf (where  $T$  is the entire relevant time span), I love  $x$  at  $T$ .  
 = 1 iff I love most /all sonatas by Dittersdorf within the relevant time span  $T$ .

Again, the truth conditions given in (13.b-c) are only preliminary. Specifically, the step from (b) to (c) will become invalid once I adopt the crucial assumption in Section 5.

### 3.2 A second lexical entry for *usually*

A second lexical entry for *usually* that will yield the truth conditions in (13) is given in (14). Secondary meanings for other adverbs such as *always* and *rarely* would again be parallel.

- (14)  $[[\text{usually}_2]]^T = [\lambda P_{\langle e, it \rangle} . [\lambda Q_{\langle e, it \rangle} . \text{For most pairs } \langle x, t \rangle \text{ such that } t \in \text{Max}(T^P \cap P(x)_S), Q(x)(t)=1]]$ , where  $\text{Max}$  is defined as in (10) above.

Informally, (14) says that, given a relevant time span  $T$ , *usually* takes two sets of pairs of individuals and times (where  $P_S$  is the restrictor and  $Q_S$  is the nuclear scope); the resulting sentence is true just in case, counting only subintervals of  $T$ , most of the members  $\langle x, t \rangle$  of  $P_S$  such that  $t$  is maximal with respect to  $x$  are also members of  $Q_S$ . To be a maximal member of  $P_S$  “with respect to  $x$ ” is just to be a maximal member of  $P(x)_S$ , which is to say maximality is defined separately for each individual  $x$  in the pairs  $\langle x, t \rangle$ .

### 3.3 The restriction

An additional assumption is needed to allow an indefinite object to be the restrictor argument of a quantifier. In particular, indefinites have to be able to denote sets of pairs of individuals and times. To accomplish this, I’ll assume that an indefinite such as *a book about slugs* has the meaning shown in (15.a), corresponding to the meaning for the indefinite determiner *a* in (15.b). This is in addition to its normal existential meaning, whether that involves existential quantification, choice functions, or something else. Of course it’s a somewhat ad hoc move to give indefinites this secondary meaning, but anyone claiming that quantificational indefinites are part of the restrictor of quantifiers would need to make some assumption about how this comes about, and this is one way of doing that.

- (15) (a)  $[[a_2 \text{ book about slugs}]] = [\lambda x . [\lambda t . \exists t' [x \text{ is a book about slugs at } t']]]$   
 =  $\{\langle x, t \rangle : x \text{ is a book about slugs at some time } t'\}$   
 (b)  $[[a_2]] = [\lambda P_{\langle e, it \rangle} . [\lambda x . [\lambda t . \exists t' [P(x)(t') = 1]]]]$

Informally, this says that *a book about slugs*, on its second meaning, denotes the set of pairs  $\langle x, t \rangle$  such that  $x$  is a book about slugs and  $t$  is any time whatsoever.

An obvious question to ask is why the existential quantifier over times  $t'$  is introduced in (15). It would seem much more natural to say that *a book about slugs* simply denotes the set of pairs  $\langle x, t \rangle$  such that  $x$  is a book about slugs *at*  $t$ . The reason I can’t do this is that it would effectively reintroduce Diesing’s preexistence requirement. (In fact, it would impose an even stronger requirement). We have already seen that this would incorrectly rule out sentences with focused creation verbs such as (4).

### 3.4 The nuclear scope

Finally, I need to assume that the remaining part of the clause under *usually* – for example, *I read* – can be the nuclear scope. The meaning needed is given in (16). This can be achieved by movement of the indefinite object and abstraction over the trace, or some other means.

$$(16) \quad \llbracket I \text{ read } \_ \rrbracket = [\lambda x . [\lambda t . I \text{ read } x \text{ at } t] ] \\ = \{ \langle x, t \rangle : I \text{ read } x \text{ at } t \}$$

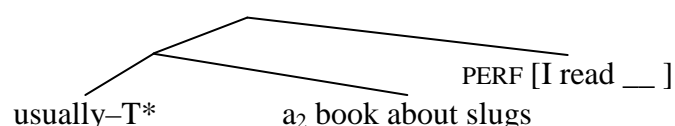
This just says that *I read*  $\_$  denotes the set of pairs  $\langle x, t \rangle$  such that I read  $x$  at  $t$ .

### 3.5 Example of an indefinite object with *usually*<sub>2</sub>: the quantificational reading

With these assumptions in place, we can now see how a sentence with a quantificational indefinite is derived. I assume that (17.a) has the structure in (17.b), so the predicted meaning is as in (17.c-d).

- (17) (a) I usually read a book about slugs. [= (2)]  
           reading (ii)  $\approx$  When I encounter a book about slugs, I usually read it.

(b) **LF:**



(c) **Meaning:**

$$\llbracket (17.a) \rrbracket = \llbracket \text{usually}_2 \rrbracket^{T^*} ( \llbracket a_2 \text{ book about slugs} \rrbracket ) ( \llbracket \text{PERF} [ I \text{ read } \_ ] \rrbracket ) \\ = \llbracket \text{usually}_2 \rrbracket^{T^*} ( [\lambda x . [\lambda t . \exists t' [x \text{ is a book about slugs at } t'] ] ] ) \\ ( [\lambda x . [\lambda t . \exists t' [t' \subseteq_{\text{int}} t \text{ and } I \text{ read } x \text{ at } t'] ] ] )$$

= 1 iff for most  $\langle x, t \rangle$  such that  $x$  is a book about slugs at some  $t'$ ,  $t$  is a subinterval of  $T^*$ , and  $t$  is maximal (in the relevant sense), there is some subinterval of  $t$  at which I read  $x$ .

- (d) = 1 iff for most  $\langle x, T^* \rangle$  such that  $x$  is a book about slugs at some  $t'$ , there is some subinterval of  $T^*$  at which I read  $x$ .

= 1 iff I read most books about slugs during  $T^*$ .

Again, once the final parts of my analysis are added, the step from (c) to (d) will be invalid.

## 4 Introducing Focus Sensitivity

### 4.1 The focus restriction

It has been observed that focus plays a special role in restricting quantification (see, e.g., Rooth 1985 and von Stechow 1994). The principle in effect is roughly that in (18).

- (18) Focus restriction:  
 Domains of quantification are restricted to cases where one focus alternative is true.

I'll make this clearer using an example. Consider the sentence in (19).

- (19) John usually shaves [in the SHOWER]<sub>FOC</sub>.

What (19) seems to mean is that usually when John shaves, he's in the shower. That is, the quantification is restricted to times when John shaves. Let's assume that the alternatives to *in*

*the shower* are {in the shower, at the sink}. For simplicity, let's also assume that there are just seven relevant times,  $t_1, t_2, \dots, t_7$ . Now suppose the facts are as follows: John shaves in the shower at  $t_1, t_2$ , and  $t_3$ , and he shaves at the sink at  $t_4$ . He doesn't shave at all, either in the shower or at the sink, at  $t_5, t_6$ , or  $t_7$ . Now we can construct the domain of quantification in steps. The first step is to give the set of alternatives for each of the relevant times  $t_1 - t_7$ , as shown in (20).

(20) Step 1:

- $t_1$ : {John shaves in the shower at  $t_1$ , John shaves at the sink at  $t_1$ }
- $t_2$ : {John shaves in the shower at  $t_2$ , John shaves at the sink at  $t_2$ }
- $t_3$ : {John shaves in the shower at  $t_3$ , John shaves at the sink at  $t_3$ }
- $t_4$ : {John shaves in the shower at  $t_4$ , John shaves at the sink at  $t_4$ }
- $t_5$ : {John shaves in the shower at  $t_5$ , John shaves at the sink at  $t_5$ }
- $t_6$ : {John shaves in the shower at  $t_6$ , John shaves at the sink at  $t_6$ }
- $t_7$ : {John shaves in the shower at  $t_7$ , John shaves at the sink at  $t_7$ }

The second step is to check, for each time  $t_i$ , whether either of the alternatives are true. Given the facts assumed above, the result is as in (21), where the true alternatives are in bold and underlined.

(21) Step 2:

- $t_1$ : {**John shaves in the shower at  $t_1$** , John shaves at the sink at  $t_1$ }
- $t_2$ : {**John shaves in the shower at  $t_2$** , John shaves at the sink at  $t_2$ }
- $t_3$ : {**John shaves in the shower at  $t_3$** , John shaves at the sink at  $t_3$ }
- $t_4$ : {John shaves in the shower at  $t_4$ , **John shaves at the sink at  $t_4$** }
- ~~$t_5$ : {John shaves in the shower at  $t_5$ , John shaves at the sink at  $t_5$ }~~
- ~~$t_6$ : {John shaves in the shower at  $t_6$ , John shaves at the sink at  $t_6$ }~~
- ~~$t_7$ : {John shaves in the shower at  $t_7$ , John shaves at the sink at  $t_7$ }~~

This is where the focus restriction from (18) comes in: since there's no true alternative for times  $t_5, t_6$ , or  $t_7$ , they are eliminated from the domain of quantification, leaving only  $t_1, t_2, t_3$ , and  $t_4$ . This means that three out of four cases satisfy the quantification, so sentence (19) is correctly predicted to be true in the context given. Notice that if all seven times were included in the domain, only three out of seven cases would satisfy the quantification and the sentence would be predicted to be false.

## 4.2 Applying the focus restriction to quantificational indefinites

Now let's see how the focus restriction applies in a more complicated case. Consider (22).

- (22) I usually [ $\text{KNIT}$ ]<sub>FOC</sub> a scarf. [= (4.b)]  
 ≈ When I make a scarf, I usually do it by knitting.

Let's assume for simplicity that there are just four relevant scarves,  $s_1, s_2, s_3$ , and  $s_4$ , and four relevant times,  $t_1, t_2, t_3$ , and  $t_4$  (where these times don't overlap). Let's also assume that the relevant alternatives to *knit* are {knit, crochet, sew}. Now suppose the facts are as follows: I knitted  $s_1$  during  $t_1$ ,  $s_2$  during  $t_2$ , and  $s_3$  during  $t_3$ ; I sewed  $s_4$  during  $t_4$ ; and I didn't make any other relevant scarves during the relevant times. Again we can construct the domain of quantification in steps. The first step is to include all possible pairs of books and times and give the set of alternatives for each, as shown in (23).

(23) Step 1:

- $\langle s_1, t_1 \rangle$ : { I knit  $s_1$  at  $t_1$ , I crochet  $s_1$  at  $t_1$ , I sew  $s_1$  at  $t_1$  }
- $\langle s_1, t_2 \rangle$ : { I knit  $s_1$  at  $t_2$ , I crochet  $s_1$  at  $t_2$ , I sew  $s_1$  at  $t_2$  }



<s <sub>1</sub> ,t <sub>3</sub> >:	{ I knit s <sub>1</sub> at t <sub>3</sub> , I crochet s <sub>1</sub> at t <sub>3</sub> , I sew s <sub>1</sub> at t <sub>3</sub> }
<s <sub>1</sub> ,t <sub>4</sub> >:	{ I knit s <sub>1</sub> at t <sub>4</sub> , I crochet s <sub>1</sub> at t <sub>4</sub> , I sew s <sub>1</sub> at t <sub>4</sub> }
<s <sub>2</sub> ,t <sub>1</sub> >:	{ I knit s <sub>2</sub> at t <sub>1</sub> , I crochet s <sub>2</sub> at t <sub>1</sub> , I sew s <sub>2</sub> at t <sub>1</sub> }
<s <sub>2</sub> ,t <sub>2</sub> >:	{ I knit s <sub>2</sub> at t <sub>2</sub> , I crochet s <sub>2</sub> at t <sub>2</sub> , I sew s <sub>2</sub> at t <sub>2</sub> }
<s <sub>2</sub> ,t <sub>3</sub> >:	{ I knit s <sub>2</sub> at t <sub>3</sub> , I crochet s <sub>2</sub> at t <sub>3</sub> , I sew s <sub>2</sub> at t <sub>3</sub> }
<s <sub>2</sub> ,t <sub>4</sub> >:	{ I knit s <sub>2</sub> at t <sub>4</sub> , I crochet s <sub>2</sub> at t <sub>4</sub> , I sew s <sub>2</sub> at t <sub>4</sub> }
<s <sub>3</sub> ,t <sub>1</sub> >:	{ I knit s <sub>3</sub> at t <sub>1</sub> , I crochet s <sub>3</sub> at t <sub>1</sub> , I sew s <sub>3</sub> at t <sub>1</sub> }
<s <sub>3</sub> ,t <sub>2</sub> >:	{ I knit s <sub>3</sub> at t <sub>2</sub> , I crochet s <sub>3</sub> at t <sub>2</sub> , I sew s <sub>3</sub> at t <sub>2</sub> }
<s <sub>3</sub> ,t <sub>3</sub> >:	{ I knit s <sub>3</sub> at t <sub>3</sub> , I crochet s <sub>3</sub> at t <sub>3</sub> , I sew s <sub>3</sub> at t <sub>3</sub> }
<s <sub>3</sub> ,t <sub>4</sub> >:	{ I knit s <sub>3</sub> at t <sub>4</sub> , I crochet s <sub>3</sub> at t <sub>4</sub> , I sew s <sub>3</sub> at t <sub>4</sub> }
<s <sub>4</sub> ,t <sub>1</sub> >:	{ I knit s <sub>4</sub> at t <sub>1</sub> , I crochet s <sub>4</sub> at t <sub>1</sub> , I sew s <sub>4</sub> at t <sub>1</sub> }
<s <sub>4</sub> ,t <sub>2</sub> >:	{ I knit s <sub>4</sub> at t <sub>2</sub> , I crochet s <sub>4</sub> at t <sub>2</sub> , I sew s <sub>4</sub> at t <sub>2</sub> }
<s <sub>4</sub> ,t <sub>3</sub> >:	{ I knit s <sub>4</sub> at t <sub>3</sub> , I crochet s <sub>4</sub> at t <sub>3</sub> , I sew s <sub>4</sub> at t <sub>3</sub> }
<s <sub>4</sub> ,t <sub>4</sub> >:	{ I knit s <sub>4</sub> at t <sub>4</sub> , I crochet s <sub>4</sub> at t <sub>4</sub> , I sew s <sub>4</sub> at t <sub>4</sub> }

The second step is to check for each pair whether any of the alternatives are true. The result is shown in (24), with true alternatives in bold and underlined.

(24) Step 2:

<s <sub>1</sub> ,t <sub>1</sub> >:	{ <b><u>I knit s<sub>1</sub> at t<sub>1</sub></u></b> , I crochet s <sub>1</sub> at t <sub>1</sub> , I sew s <sub>1</sub> at t <sub>1</sub> }
<s <sub>1</sub> ,t <sub>2</sub> >:	<del>{ I knit s<sub>1</sub> at t<sub>2</sub>, I crochet s<sub>1</sub> at t<sub>2</sub>, I sew s<sub>1</sub> at t<sub>2</sub> }</del>
<s <sub>1</sub> ,t <sub>3</sub> >:	<del>{ I knit s<sub>1</sub> at t<sub>3</sub>, I crochet s<sub>1</sub> at t<sub>3</sub>, I sew s<sub>1</sub> at t<sub>3</sub> }</del>
<s <sub>1</sub> ,t <sub>4</sub> >:	<del>{ I knit s<sub>1</sub> at t<sub>4</sub>, I crochet s<sub>1</sub> at t<sub>4</sub>, I sew s<sub>1</sub> at t<sub>4</sub> }</del>
<s <sub>2</sub> ,t <sub>1</sub> >:	<del>{ I knit s<sub>2</sub> at t<sub>1</sub>, I crochet s<sub>2</sub> at t<sub>1</sub>, I sew s<sub>2</sub> at t<sub>1</sub> }</del>
<s <sub>2</sub> ,t <sub>2</sub> >:	{ <b><u>I knit s<sub>2</sub> at t<sub>2</sub></u></b> , I crochet s <sub>2</sub> at t <sub>2</sub> , I sew s <sub>2</sub> at t <sub>2</sub> }
<s <sub>2</sub> ,t <sub>3</sub> >:	<del>{ I knit s<sub>2</sub> at t<sub>3</sub>, I crochet s<sub>2</sub> at t<sub>3</sub>, I sew s<sub>2</sub> at t<sub>3</sub> }</del>
<s <sub>2</sub> ,t <sub>4</sub> >:	<del>{ I knit s<sub>2</sub> at t<sub>4</sub>, I crochet s<sub>2</sub> at t<sub>4</sub>, I sew s<sub>2</sub> at t<sub>4</sub> }</del>
<s <sub>3</sub> ,t <sub>1</sub> >:	<del>{ I knit s<sub>3</sub> at t<sub>1</sub>, I crochet s<sub>3</sub> at t<sub>1</sub>, I sew s<sub>3</sub> at t<sub>1</sub> }</del>
<s <sub>3</sub> ,t <sub>2</sub> >:	<del>{ I knit s<sub>3</sub> at t<sub>2</sub>, I crochet s<sub>3</sub> at t<sub>2</sub>, I sew s<sub>3</sub> at t<sub>2</sub> }</del>
<s <sub>3</sub> ,t <sub>3</sub> >:	{ <b><u>I knit s<sub>3</sub> at t<sub>3</sub></u></b> , I crochet s <sub>3</sub> at t <sub>3</sub> , I sew s <sub>3</sub> at t <sub>3</sub> }
<s <sub>3</sub> ,t <sub>4</sub> >:	<del>{ I knit s<sub>3</sub> at t<sub>4</sub>, I crochet s<sub>3</sub> at t<sub>4</sub>, I sew s<sub>3</sub> at t<sub>4</sub> }</del>
<s <sub>4</sub> ,t <sub>1</sub> >:	<del>{ I knit s<sub>4</sub> at t<sub>1</sub>, I crochet s<sub>4</sub> at t<sub>1</sub>, I sew s<sub>4</sub> at t<sub>1</sub> }</del>
<s <sub>4</sub> ,t <sub>2</sub> >:	<del>{ I knit s<sub>4</sub> at t<sub>2</sub>, I crochet s<sub>4</sub> at t<sub>2</sub>, I sew s<sub>4</sub> at t<sub>2</sub> }</del>
<s <sub>4</sub> ,t <sub>3</sub> >:	<del>{ I knit s<sub>4</sub> at t<sub>3</sub>, I crochet s<sub>4</sub> at t<sub>3</sub>, I sew s<sub>4</sub> at t<sub>3</sub> }</del>
<s <sub>4</sub> ,t <sub>4</sub> >:	{ I knit s <sub>4</sub> at t <sub>4</sub> , I crochet s <sub>4</sub> at t <sub>4</sub> , <b><u>I sew s<sub>4</sub> at t<sub>4</sub></u></b> }

The pairs with no true alternatives are eliminated, leaving just the four pairs shown in (25).

(25) Result:

<s <sub>1</sub> ,t <sub>1</sub> >:	{ <b><u>I knit s<sub>1</sub> at t<sub>1</sub></u></b> , I crochet s <sub>1</sub> at t <sub>1</sub> , I sew s <sub>1</sub> at t <sub>1</sub> }
<s <sub>2</sub> ,t <sub>2</sub> >:	{ <b><u>I knit s<sub>2</sub> at t<sub>2</sub></u></b> , I crochet s <sub>2</sub> at t <sub>2</sub> , I sew s <sub>2</sub> at t <sub>2</sub> }
<s <sub>3</sub> ,t <sub>3</sub> >:	{ <b><u>I knit s<sub>3</sub> at t<sub>3</sub></u></b> , I crochet s <sub>3</sub> at t <sub>3</sub> , I sew s <sub>3</sub> at t <sub>3</sub> }
<s <sub>4</sub> ,t <sub>4</sub> >:	{ I knit s <sub>4</sub> at t <sub>4</sub> , I crochet s <sub>4</sub> at t <sub>4</sub> , <b><u>I sew s<sub>4</sub> at t<sub>4</sub></u></b> }

It turns out that three out of four cases satisfy the quantification, so sentence (22) is correctly predicted to be true in the context given. Again, notice that if all 16 pairs were included in the domain, then only three out of 16 cases would satisfy the quantification and the sentence would be predicted to be false.

The reader can verify that this result generalizes to sentences with contrastive focus on other constituents such as the subject in (26) or the adverbial modifier in (27).

- (26)  $[I]_{\text{FOC}}$  usually knit a scarf.  
 ≈ when someone knits a scarf, I'm usually the one who does it.
- (27) I usually knit a scarf [when it's RAINING] $_{\text{FOC}}$ .  
 ≈ when I knit a scarf, it's usually raining.

## 5 Extending Focus Sensitivity

I propose that in general, sentences with quantificational indefinites such as (28) are subject to a restriction parallel to the focus restriction, even when there is no narrow focus on the verb or another constituent.

- (28) I usually read a book about slugs. [=(2)]  
 reading (ii) ≈ When I encounter a book about slugs, I usually read it.

Informally speaking, what I propose is that a sentence like (28) is interpreted as if *read* were focused, but the alternatives to read were {read, fail to read}. This is formulated as a principle in (29).<sup>5</sup>

- (29) Principle of default focus: For the purposes of principle (18), if a sentence *S* has no overt contrastive focus, it's taken to have the alternative set {*S*, FAIL-TO *S*}, where  
 FAIL-TO *p* = NOT *p* and POSSIBLE *p* =  $\sim p$  &  $\diamond p$

This principle involves an operator "FAIL-TO," which is essentially negation plus a possibility modal. The modality involved is something like opportunity. Using Kratzer's semantics for modals (Kratzer 1977, 1991), this means that the modal base is restricted to worlds where all the facts up to the specified point in time are the same as in the actual world. Requirements of a deontic or other nature also need to be included so that, for example, seeing a book about slugs in the window of a closed bookstore doesn't count as an opportunity to read it, even if it would be possible to get the book by smashing the window. Formally, though, FAIL-TO just includes propositional negation and a possibility modal.

Now we can see how the principle of default focus in (29) works, using (28) as an example. As before, let's assume for simplicity that there are just four relevant books about slugs,  $b_1$ ,  $b_2$ ,  $b_3$ , and  $b_4$ , and four relevant times,  $t_1$ ,  $t_2$ ,  $t_3$ , and  $t_4$ . Now suppose that I had the opportunity to read  $b_1$  at  $t_1$ ,  $b_2$  at  $t_2$ ,  $b_3$  at  $t_3$ , and  $b_4$  at  $t_4$ . I actually read  $b_1$  at  $t_1$ ,  $b_2$  at  $t_2$ , and  $b_3$  at  $t_3$ , and I didn't read or have the opportunity to read any other relevant books at relevant times. We can construct the domain of quantification as before, except that the alternatives are generated by the principle of default focus in (29). The first step is to list all the possible pairs of books and times, with their alternatives, as shown in (30).

- (30) Step 1:
- |                              |   |
|------------------------------|---|
| $\langle b_1, t_1 \rangle$ : | { I read $b_1$ at $t_1$ , I FAIL-TO read $b_1$ at $t_1$ } |
| $\langle b_1, t_2 \rangle$ : | { I read $b_1$ at $t_2$ , I FAIL-TO read $b_1$ at $t_2$ } |
| $\langle b_1, t_3 \rangle$ : | { I read $b_1$ at $t_3$ , I FAIL-TO read $b_1$ at $t_3$ } |
| $\langle b_1, t_4 \rangle$ : | { I read $b_1$ at $t_4$ , I FAIL-TO read $b_1$ at $t_4$ } |
| $\langle b_2, t_1 \rangle$ : | { I read $b_2$ at $t_1$ , I FAIL-TO read $b_2$ at $t_1$ } |
| $\langle b_2, t_2 \rangle$ : | { I read $b_2$ at $t_2$ , I FAIL-TO read $b_2$ at $t_2$ } |
| $\langle b_2, t_3 \rangle$ : | { I read $b_2$ at $t_3$ , I FAIL-TO read $b_2$ at $t_3$ } |
| $\langle b_2, t_4 \rangle$ : | { I read $b_2$ at $t_4$ , I FAIL-TO read $b_2$ at $t_4$ } |

<sup>5</sup> Principle (29) is reminiscent of Johnston's (1994) idea that for a case to count in quantification, it must be "a fair question" whether the nuclear scope holds of that case. (29) could also be seen as a modification of Ahn's (2005) idea that the minimal restriction of a quantifier consists of the disjunction of the "polar alternatives" of the nuclear scope.

$\langle \mathbf{b}_3, \mathbf{t}_1 \rangle$ :	{ I read $\mathbf{b}_3$ at $\mathbf{t}_1$ , I FAIL-TO read $\mathbf{b}_3$ at $\mathbf{t}_1$ }
$\langle \mathbf{b}_3, \mathbf{t}_2 \rangle$ :	{ I read $\mathbf{b}_3$ at $\mathbf{t}_2$ , I FAIL-TO read $\mathbf{b}_3$ at $\mathbf{t}_2$ }
$\langle \mathbf{b}_3, \mathbf{t}_3 \rangle$ :	{ I read $\mathbf{b}_3$ at $\mathbf{t}_3$ , I FAIL-TO read $\mathbf{b}_3$ at $\mathbf{t}_3$ }
$\langle \mathbf{b}_3, \mathbf{t}_4 \rangle$ :	{ I read $\mathbf{b}_3$ at $\mathbf{t}_4$ , I FAIL-TO read $\mathbf{b}_3$ at $\mathbf{t}_4$ }
$\langle \mathbf{b}_4, \mathbf{t}_1 \rangle$ :	{ I read $\mathbf{b}_4$ at $\mathbf{t}_1$ , I FAIL-TO read $\mathbf{b}_4$ at $\mathbf{t}_1$ }
$\langle \mathbf{b}_4, \mathbf{t}_2 \rangle$ :	{ I read $\mathbf{b}_4$ at $\mathbf{t}_2$ , I FAIL-TO read $\mathbf{b}_4$ at $\mathbf{t}_2$ }
$\langle \mathbf{b}_4, \mathbf{t}_3 \rangle$ :	{ I read $\mathbf{b}_4$ at $\mathbf{t}_3$ , I FAIL-TO read $\mathbf{b}_4$ at $\mathbf{t}_3$ }
$\langle \mathbf{b}_4, \mathbf{t}_4 \rangle$ :	{ I read $\mathbf{b}_4$ at $\mathbf{t}_4$ , I FAIL-TO read $\mathbf{b}_4$ at $\mathbf{t}_4$ }

The second step, checking each pair for true alternatives, is shown in (31).

(31) Step 2:

$\langle \mathbf{b}_1, \mathbf{t}_1 \rangle$ :	{ <u>I read <math>\mathbf{b}_1</math> at <math>\mathbf{t}_1</math></u> , I FAIL-TO read $\mathbf{b}_1$ at $\mathbf{t}_1$ }
$\langle \mathbf{b}_1, \mathbf{t}_2 \rangle$ :	<del>{ I read <math>\mathbf{b}_1</math> at <math>\mathbf{t}_2</math>, I FAIL-TO read <math>\mathbf{b}_1</math> at <math>\mathbf{t}_2</math> }</del>
$\langle \mathbf{b}_1, \mathbf{t}_3 \rangle$ :	<del>{ I read <math>\mathbf{b}_1</math> at <math>\mathbf{t}_3</math>, I FAIL-TO read <math>\mathbf{b}_1</math> at <math>\mathbf{t}_3</math> }</del>
$\langle \mathbf{b}_1, \mathbf{t}_4 \rangle$ :	<del>{ I read <math>\mathbf{b}_1</math> at <math>\mathbf{t}_4</math>, I FAIL-TO read <math>\mathbf{b}_1</math> at <math>\mathbf{t}_4</math> }</del>
$\langle \mathbf{b}_2, \mathbf{t}_1 \rangle$ :	<del>{ I read <math>\mathbf{b}_2</math> at <math>\mathbf{t}_1</math>, I FAIL-TO read <math>\mathbf{b}_2</math> at <math>\mathbf{t}_1</math> }</del>
$\langle \mathbf{b}_2, \mathbf{t}_2 \rangle$ :	{ <u>I read <math>\mathbf{b}_2</math> at <math>\mathbf{t}_2</math></u> , I FAIL-TO read $\mathbf{b}_2$ at $\mathbf{t}_2$ }
$\langle \mathbf{b}_2, \mathbf{t}_3 \rangle$ :	<del>{ I read <math>\mathbf{b}_2</math> at <math>\mathbf{t}_3</math>, I FAIL-TO read <math>\mathbf{b}_2</math> at <math>\mathbf{t}_3</math> }</del>
$\langle \mathbf{b}_2, \mathbf{t}_4 \rangle$ :	<del>{ I read <math>\mathbf{b}_2</math> at <math>\mathbf{t}_4</math>, I FAIL-TO read <math>\mathbf{b}_2</math> at <math>\mathbf{t}_4</math> }</del>
$\langle \mathbf{b}_3, \mathbf{t}_1 \rangle$ :	<del>{ I read <math>\mathbf{b}_3</math> at <math>\mathbf{t}_1</math>, I FAIL-TO read <math>\mathbf{b}_3</math> at <math>\mathbf{t}_1</math> }</del>
$\langle \mathbf{b}_3, \mathbf{t}_2 \rangle$ :	<del>{ I read <math>\mathbf{b}_3</math> at <math>\mathbf{t}_2</math>, I FAIL-TO read <math>\mathbf{b}_3</math> at <math>\mathbf{t}_2</math> }</del>
$\langle \mathbf{b}_3, \mathbf{t}_3 \rangle$ :	{ <u>I read <math>\mathbf{b}_3</math> at <math>\mathbf{t}_3</math></u> , I FAIL-TO read $\mathbf{b}_3$ at $\mathbf{t}_3$ }
$\langle \mathbf{b}_3, \mathbf{t}_4 \rangle$ :	<del>{ I read <math>\mathbf{b}_3</math> at <math>\mathbf{t}_4</math>, I FAIL-TO read <math>\mathbf{b}_3</math> at <math>\mathbf{t}_4</math> }</del>
$\langle \mathbf{b}_4, \mathbf{t}_1 \rangle$ :	<del>{ I read <math>\mathbf{b}_4</math> at <math>\mathbf{t}_1</math>, I FAIL-TO read <math>\mathbf{b}_4</math> at <math>\mathbf{t}_1</math> }</del>
$\langle \mathbf{b}_4, \mathbf{t}_2 \rangle$ :	<del>{ I read <math>\mathbf{b}_4</math> at <math>\mathbf{t}_2</math>, I FAIL-TO read <math>\mathbf{b}_4</math> at <math>\mathbf{t}_2</math> }</del>
$\langle \mathbf{b}_4, \mathbf{t}_3 \rangle$ :	<del>{ I read <math>\mathbf{b}_4</math> at <math>\mathbf{t}_3</math>, I FAIL-TO read <math>\mathbf{b}_4</math> at <math>\mathbf{t}_3</math> }</del>
$\langle \mathbf{b}_4, \mathbf{t}_4 \rangle$ :	{ I read $\mathbf{b}_4$ at $\mathbf{t}_4$ , <u>I FAIL-TO read <math>\mathbf{b}_4</math> at <math>\mathbf{t}_4</math></u> }

The resulting domain is just the four pairs shown in (32).

(32) Result:

$\langle \mathbf{b}_1, \mathbf{t}_1 \rangle$ :	{ <u>I read <math>\mathbf{b}_1</math> at <math>\mathbf{t}_1</math></u> , I FAIL-TO read $\mathbf{b}_1$ at $\mathbf{t}_1$ }
$\langle \mathbf{b}_2, \mathbf{t}_2 \rangle$ :	{ <u>I read <math>\mathbf{b}_2</math> at <math>\mathbf{t}_2</math></u> , I FAIL-TO read $\mathbf{b}_2$ at $\mathbf{t}_2$ }
$\langle \mathbf{b}_3, \mathbf{t}_3 \rangle$ :	{ <u>I read <math>\mathbf{b}_3</math> at <math>\mathbf{t}_3</math></u> , I FAIL-TO read $\mathbf{b}_3$ at $\mathbf{t}_3$ }
$\langle \mathbf{b}_4, \mathbf{t}_4 \rangle$ :	{ I read $\mathbf{b}_4$ at $\mathbf{t}_4$ , <u>I FAIL-TO read <math>\mathbf{b}_4</math> at <math>\mathbf{t}_4</math></u> }

As with the previous example, three out of these four pairs satisfy the quantification, so (28) is correctly predicted to be true in the context given. Once again, if all 16 pairs were included, the sentence would incorrectly be predicted to be false.

More generally, when the principles of focus restriction (18) and default focus (29) are added to the assumptions from Section 3, sentence (28) is predicted to have the meaning shown in (33) below. Note that in (33),  $T^*$  is the entire relevant interval of time, and  $\mathbf{FR}$  is standing in for the focus restriction (that is, in this case it stands for the set of pairs  $\langle x, t \rangle$  such that I had the opportunity to read  $x$  at  $t$ ).

$$\begin{aligned}
 (33) \quad & \llbracket \text{I usually}_2 \text{ read } a_2 \text{ book about slugs} \rrbracket &= \llbracket (28) \rrbracket \\
 &= \llbracket \text{usually}_2 \rrbracket^{T^*} ( \llbracket a_2 \text{ book about slugs} \rrbracket \cap \mathbf{FR} ) ( \llbracket \text{PERF}[\text{I read } (\_\_)] \rrbracket ) \\
 &= 1 \text{ iff for most } \langle x, t \rangle \text{ such that } x \text{ is a book about slugs (at some } t' \text{), } t \subseteq_{\text{int}} T, \\
 &\text{and } t \text{ is a maximal interval at which I have the opportunity to read } x, \\
 &\text{I read } x \text{ at some subinterval of } t.
 \end{aligned}$$

Note that this is no longer equivalent to quantifying over books because the maximal intervals of opportunity can, and normally will, be smaller than T.

Informally, then, the relevant reading of (28) can be paraphrased as, “Usually, when I have the opportunity to read a particular book about slugs, I read it.” Recall that the paraphrase given to it earlier was, “Usually, when I encounter a book about slugs, I read it.” This makes sense given that the opportunity to read a book normally involves encountering it somehow.

Similarly, my proposal predicts that sentence (1), *I usually love a sonata by Dittersdorf*, can be paraphrased as, “Usually, when I have the opportunity to love a sonata by Dittersdorf, I love it.” The paraphrase given earlier was, “Usually, when I hear a sonata by Dittersdorf, I love it.” This again makes sense because loving a sonata normally requires hearing it. Parallel predictions are made for other examples with quantificational indefinites.

## 6 Predictions of the Analysis

In this section, I’ll show how my proposal accounts for the two crucial contrasts discussed at the beginning, between creation and non-creation verbs on the one hand, and between focused and unfocused creation verbs on the other.

### 6.1 Creation verbs vs. non-creation verbs

Recall that a quantificational reading of an indefinite is not available in sentences like (34).

- (34) I usually write a book about slugs. [= (3)]  
       ≠ When I encounter a book about slugs, I usually write it  
       / I’m usually the one who wrote it

To see how my proposal accounts for this fact, consider what would have to be the case for a particular pair  $\langle x, t \rangle$  to be included in the domain of quantification for *usually*. First,  $x$  must be a book about slugs. Second,  $t$  must be a time at which I had the opportunity to write  $x$ . But consider this: for any interval in the actual world when a person has the time, resources, and so on to write a book about slugs (that is, some book or other), there will normally be many different compatible worlds where they write a book as a result of this opportunity. These possible books might be very different from each other: they could include different facts or events, be different lengths, have different writing styles, and so on. So in order to have the opportunity to write a particular book, it needs to be possible to individuate that book out of this vast class of possible alternative books. Put another way, there needs to be a way to tell which different possible books should be thought of as the same book, and which ones should be thought of as different books. There’s no reason to believe that the context will generally provide this, however, and I suggest that in most cases it doesn’t. When this happens, it will simply not be possible to resolve the domain of quantification, and so the relevant reading of the sentence will not be available. In other words, a quantificational reading is unavailable for the indefinite in (34) because the example doesn’t give enough contextual information to individuate the relevant possible books.

### 6.2 The freelance writer context

I’ve argued that the reason quantificational indefinites are not generally possible with creation verbs is that context doesn’t generally provide enough information to individuate possible books. By the same token, though, if we could set up a context where the relevant books that someone had the opportunity to write were sufficiently individuated, then a quantificational reading should be possible with a creation verb such as *write*. This prediction is borne out, as seen by (35). Similar examples can be constructed with other verbs of creation.

- (35) [Context: I'm a freelance writer who gets requests from clients to write books, articles, and so on to various specifications.]

I usually write a book about slugs.

= When I get a request for a book about slugs, I usually take the job.

In this case, it's clear that when I get a request to write a book, that counts as an opportunity to write a specific book. That is, possible books from different worlds count as the same book just in case they were written in response to the same request.

Notice that if we adopted Diesing's view using a preexistence requirement (putting aside its problems for a moment), the only way to explain examples like (35) would be to say that in such contexts, books can count as "existing" for the purposes of the preexistence requirement before they're actually written. This may or may not be a problem depending on how one's theory deals with the host of issues relating to existence, incomplete objects, and possible individuals in general.<sup>6</sup> However, it should be noted that my proposal accounts for examples like (35) in a way that is independent of any particular view of these issues.

### 6.3 Focused vs. unfocused creation verbs

Recall that when a creation verb is focused as in (36), the natural reading is parallel to other examples of quantificational indefinites.

- (36) I usually [KNIT]<sub>FOC</sub> a scarf. [= (4.b)]  
= When I make a scarf, I usually do it by knitting.

An account like Diesing's, using a preexistence requirement, incorrectly predicts that this reading should be unavailable. My proposal, on the other hand, straightforwardly accounts for sentences like (36) because in this case, a set of salient alternatives to the focused item must be available – for example, {knit, crochet, sew}. This means that the normal focus restriction (18) applies without the default focus principle (29), so the problem of determining what counts as an opportunity to knit a particular scarf doesn't arise.

## 7 Conclusions

My proposal about quantificational indefinites has two main ingredients. The first ingredient is the idea that quantification is restricted by focus alternatives, adopted from work by Rooth, von Stechow, and others and set forth as principle (18). The second ingredient is the principle of default focus in (29), which provides sets of default alternatives of the form {p, FAIL-TO p} to sentences with quantificational indefinites. Once these default alternatives are present, the focus restriction can apply in the normal way. Since FAIL-TO has a modal component, the result is that quantificational indefinites come with a certain kind of modal restriction, which seems to capture the intuitive truth conditions of the relevant sentences.

Besides giving a plausible semantics for quantificational indefinites, this proposal explains why they behave differently with creation verbs than with non-creation verbs. I assume that in these sentences, the objects being quantified over are pairs  $\langle x, t \rangle$  of individuals and times. The crucial restriction involves modality, which makes it necessary to determine how to identify individuals across worlds, and it's typically difficult to do this in contexts involving creation verbs. Therefore quantificational readings of indefinites are normally impossible with creation verbs. On the other hand, there are some contexts involving creation verbs that do include enough information about how to identify individuals across worlds, in which case a quantificational reading is possible.

<sup>6</sup> For some recent discussion, see, e.g., von Stechow (2001).

Finally, my proposal explains why quantificational readings of indefinites are possible when the verb is focused, regardless of whether or not it's a creation verb. This is because the verb has focus alternatives of its own, so the default alternatives of the form {p, FAIL-TO p} are never generated. This takes away the modal component and the resultant problem of identifying individuals across worlds.

## References

- Ahn, D. D., 2005. Presupposition incorporation in adverbial quantifier domains. In E. Maier, C. Bary, and J. Huitink (eds.), *Proceedings of SuB9*, pp. 16-29, [www.ru.nl/ncs/sub9](http://www.ru.nl/ncs/sub9).
- Diesing, M., 1992. *Indefinites*. Linguistic Inquiry Monograph 20. Cambridge, Massachusetts: MIT Press.
- von Fintel, K., 1994. *Restrictions on Quantifier Domains*. Ph.D. dissertation, University of Massachusetts, Amherst. GLSA Publications.
- Johnston, M., 1994. *The Syntax and Semantics of Adverbial Adjuncts*. Ph.D. dissertation, University of California, Santa Cruz.
- Kratzer, A., 1977. What 'must' and 'can' must and can mean. *Linguistics and Philosophy* 1, 337-355.
- Kratzer, A., 1991. 'Modality'/'Conditionals.' In A. von Stechow and D. Wunderlich (eds.), *Semantik. Ein internationales Handbuch der zeitgenössischen Forschung*, de Gruyter, pp. 639-659.
- Landman, F., 1992. The progressive. *Natural Language Semantics* 1, 1-32.
- Lewis, D., 1975. Adverbs of quantification. In E. L. Keenan (ed.), *Formal Semantics of Natural Language*, Cambridge University Press, pp. 3-15.
- Parsons, T., 1990. *Events in the Semantics of English: A Study in Subatomic Semantics*. Cambridge, Massachusetts: MIT Press.
- Percus, O., 1999. A more definite article. *Quaderni del Dipartimento di Linguistica*, 2001, University of Florence.
- Portner, P., 1998. The progressive in modal semantics. *Language* 74, 760-787.
- Rooth, M. E., 1985. *Association with Focus*. Ph.D. dissertation, University of Massachusetts, Amherst. GLSA Publications.
- von Stechow, A., 2001. Temporally opaque arguments in verbs of creation. In C. Cecchetto, G. Chierchia, and T. Guasti (eds.), *Semantic Interfaces: Reference, Anaphora, and Aspect*, CSLI, pp. 278-319.

# FEATURE-PLACING, LOCALIZABILITY, AND THE SEMANTICS OF EXISTENTIAL SENTENCES

Rachel Szekely,  
The Graduate Center, CUNY<sup>1</sup>

rszekely@gc.cuny.edu

## 1 Introduction

Many analyses of existential sentences have focused attention on determining which of its elements constitutes the logical subject and predicate, and this has proven to be a not uncontroversial topic of research. Some, from both syntactic and semantic points of view, have argued that *there* is a subject (cf. Williams 1994) others that it is a predicate (cf. Moro 1997). Similarly, some have argued that the associate NP is a logical subject, others that it is a predicate (Higginbotham 1987).

One logical possibility that has not (to my knowledge) been pursued in the linguistics literature is that these statements are not of the form subject-predicate, a possibility that has been taken up in the philosophical literature by P.F. Strawson (1959)<sup>2</sup>. He claims that there are such statements and that their form is simpler than that of subject-predicate statements because it does not, and cannot, involve an expression that makes reference to an individual. Not involving reference to an individual, these sentences are therefore made true by different means than a subject-predicate statement whose truth, in the simplest cases, depends on the denotation of the subject being a member of the denotation of the predicate. Of interest from the point of view of the present discussion is his claim that existential statements are examples of this kind of statement, which he calls a *feature-placing statement*. The truth of a statement of the form *feature-placer* requires that something with the set of features denoted by the associate NP exist at the location or coordinates expressed by the placer. In an existential sentence we can take the associate NP as the feature-denoting expression and the coda-XP as the placer.

(1) There is a man<sub>associate NP/feature-denoting NP</sub> in the garden<sub>coda XP/placer</sub>.

---

<sup>1</sup> I would like to thank Robert Fiengo for his comments and discussion of the ideas presented here, as well as to the audiences at SuB 10 and the CUNY Syntax Supper.

<sup>2</sup> It seems to me that the *thetic judgment* of Brentano and Marty (and later Kuroda) is a related notion to the one I am about to introduce, not in the least because it assumes that subject-predicate is not the only kind of statement, and that existential sentences are of an alternate form. However, there are important differences between Strawson's *feature-placing statement* and the thetic judgement. A full discussion of this issue is impossible here, but I note that the sentence types that authors such as Kuroda (1972) claim to be used to make thetic judgments are of a substantially wider class than those being claimed here to be of the form feature-placer. For Kuroda (1972), generic sentences and (certain) copular sentences are assumed to be thetic, in addition to existential sentences. Both of these are outside the scope of what is being claimed here for feature-placing statements. See Ladusaw (1994) for another discussion of Brentano and Kuroda's work with respect to the semantics of existential sentences.

## 2 What are features?

According to Strawson, features are those characteristics that make something a member of a kind, without the additional information required to re-identify a particular individual of the kind. He explains the difference between expressions that denote features and referential expressions by discussing two possible scenarios in what he calls “the naming game”.

Playing the naming game may be compared with one of the earliest things which children do with language – when they utter the general name for a kind of thing in the presence of a thing of that kind, saying ‘duck’ when there is a duck, ‘ball’ when there is a ball, etc . . . But now what of the criteria of reidentification? Does the concept of the cat-feature include a basis for this? If so, what is the substance of the phrase ‘a basis for criteria’? Is it not merely an attempt to persuade us that there is a difference, where there is none, between the concept of the cat-feature and the sortal universal, cat? This is the crucial question. I think the answer to it is as follows. The concept of cat-feature does indeed provide a basis for the idea of reidentification of particular cats. For that concept includes the idea of a characteristic shape, of a characteristic pattern for the occupation of space; and this idea leads naturally enough to that of a continuous path traced through space and time by such a characteristic pattern; and this idea in its turn provides the core of the idea of particular-identity for basic particulars. But this is not to say that the possession of the concept of the cat-feature entails the possession of this idea. Operating with the idea of reidentifiable particular cats, we distinguish between the case in which a particular cat appears, departs and reappears, and the case in which a particular cat appears and departs and a different cat appears. But one could play the naming game without making this distinction. Someone playing the naming game can correctly say ‘More cat’ or ‘Cat again’ in both cases; but someone operating with the idea of particular cats would be in error if he said ‘Another cat’ in the first case or ‘The same cat again’ in the second. The decisive conceptual step to cat-particulars is taken when the case of ‘more cat’ or ‘cat again’ is subdivided into the case of ‘another cat’ and the case of ‘the same cat again’. [Strawson (1959) p. 206-208]

Given this description, it is possible to understand in what sense Strawson considers feature-denoting expressions and feature-placing statements to be different and also simpler than those that contain identifying reference to an individual. The claim is that making identifying reference to an individual requires something above and beyond registering that an individual is an example of a kind. By examining some well-known properties of the associate NP in existential sentences (as will be done below), the correspondence between the expressions allowed as the associate NP and Strawson’s notion of feature will become clear and will allow me to further define and formalize the notions of feature and feature-placing.

### 2.1 The definiteness effect

It is a well-known property of existential sentences that the associate NP may not be a definite NP, a fact widely discussed in the literature under the heading of the *definiteness effect*<sup>3</sup>.

---

<sup>3</sup> I will not discuss the so-called *list existentials* here (e.g. A: *What is there in the fridge for dinner?* B: *Well, there’s the leftover beef stroganoff*), or other environments where a definite NP is fine in the existential construction. Some of these will require another treatment. Other environments seem to be cases (like superlatives) where in spite of the definite morphology an indefinite interpretation seems to obtain (e.g. *There’s the cutest little bunny in the garden.*). See Abott (1997), Rando and Napoli (1978), among others, for discussion.



- (2) There is a man in the garden.  
 (3) \*There is the man/John/the king of France in the garden.

If we consider the existential sentence to disallow (in the associate position) an expression that makes identifying reference to an individual, the restriction on definite NPs in this position becomes clearer. The following discussion will provide further support for this understanding of the definiteness effect and begin to formalize a constraint that disallows these DPs.

## 2.2 Heim (1987): Questions from existential sentences

Based on the unavailability of pronouns in existential sentences, Heim (1987) proposes that individual variables count as strong NPs (i.e., they trigger the definiteness effect) and proposes that the following constraint is operative in existential sentences:

- (4) \*There is you in the garden.  
 (5) \*There-be  $x$ , when  $x$  is an individual variable.

This constraint is in line with what has been proposed here with regards to the ban on expressions that introduce individuals into the discourse, and her supporting evidence also provides support for that claim. This evidence concerns *wh*-questions, constructions that involve movement of the *wh*-operator or entire *wh*-phrase; this movement has been held to leave behind a variable in the position of the moved element at some level of representation. Assuming that individual variables are excluded from *there*-contexts, how can we explain the grammaticality of the following example? (Heim discusses the full range of *wh*-phrases; I will limit my discussion to *what* for brevity.)

- (6) What is there in Austin?

Of the *wh*-phrases one might examine, *what* is certainly one that is likely to involve an individual variable in the position of the moved element. After all, this is the case in other *what*-questions, like *what are you holding?* The content of such a question might be represented as the  $x$  such that *you are holding  $x$* . Is this the case for the *what*-question in the existential case above? Heim suggests that it is not, and I agree. In the case above, one suitable answer could be:

- (7) There are lots of restaurants and places to hear live music.

A person using the question above need not be looking for a particular item(s). After all, there are many things in Austin, so the person is probably not looking for *the thing that there is in Austin*. Instead, they are interested in the *kinds of things* that there are<sup>4</sup>. For this reason, Heim argues that here *what* should not be analyzed as *which  $x$*  but as *such an  $x$* , that is, the variable left behind would not be ranging over individuals but over kinds. Following the treatment of *such* by Carlson (1977), she suggests that *such an  $N$*  is interpreted in *wh*-questions as *of kind  $x$* . That is, the existential sentence *what is there in Austin* corresponds to something like:

- (8) There are/is such stuff/such things/such a thing in Austin.

The interpretation of *wh*-questions provides evidence in support of an analysis that takes the definiteness effect to be explained as a ban on expressions that introduce individuals in the associate NP position of existential sentences. Importantly, it also aligns the behavior and interpretation of the associate NP with that of kinds. Before moving to formalize these notions, consider an example that makes a similar point: *one*-anaphora.

<sup>4</sup> Again, I am abstracting away from the list reading, another possible answer to the question *what is there in Austin?* A list-reading response could be something like the following: *There's that movie theater where they let you bring in beer, the restaurant where we met your cousin, etc.*

### 2.3 *One-anaphora*

As discussed by Heim (1987), bound variable anaphora is not allowed in existential sentences. One kind of anaphora that works in these sentences, however, is *one*-anaphora. As is well-known, *one*-anaphora makes a connection not to the entire NP but only the noun head and optionally its modifiers. For example:

- (9) Mary has a green shirt and Jane has one, too.

Here, *one* is substituting for the N' and not the entire NP, that is, Jane is understood to have a shirt *of the same kind*, namely a green one, and not *the same shirt* as Mary. *One*-anaphora is thus not a connection with a referential NP. As mentioned, unlike bound variable anaphora, *one*-anaphora is possible in existential sentences:

- (10) There is a man asleep and there is one sick, too.  
 (11) \*There is a man asleep and there is he/him sick, too.

The fact that *one*-anaphora is available in *there*-sentences supports the idea that the associate NP is feature-denoting, where features are like kinds, in a way to be made precise.

### 2.4 Quantification and the strong-weak distinction

Milsark (1974) observed that cardinal and strong quantificational NPs differ in their ability to be licensed in an existential sentence, cardinal quantifiers being licensed while strong quantifiers are not. Examples like (14), however, which have also been noted in the literature, show that the ban on strong quantificational NPs is not absolute.

- (12) There are three/few/many/several/some cats in the garden.  
 (13) \*There is/are most/every/each cat(s) in the garden.  
 (14) There is every kind of wine at this shop.

In order to understand the difference between (13) and (14) let us first discuss the case of (12) with respect to the idea of feature-placing. In the feature-placing statement, I claim that the contribution of the cardinal quantifier is to indicate *how many times the features denoted by the NP must be (successfully) placed in that location in order to satisfy the truth conditions of the sentence*, i.e., *there are several cats in the garden* is true only if there are *several* things with the cat-feature(s) in the garden. Now, what of the ungrammaticality of (13)? On its usual interpretation the quantifier *every* ranges over the set of individuals corresponding to the head noun, and its truth conditions are fulfilled if every individual N in the set is a member of the denotation of the predicate; in feature-placing terms, one might say the truth conditions contributed by *every* are satisfied if every member of the set was placed at the location specified by the placer. Remember, however, that based on the definiteness-effect facts as well as those observed for *wh*-questions by Heim (1987), it has been proposed that the NP in existential sentences does not introduce individuals into the discourse, only kinds. Therefore, a strong quantificational determiner that ranges over individuals, for example, the determiner that would take (13) to mean *every individual cat*, is therefore not grammatical in this position. A quantificational determiner that ranges over not individuals but kinds, however, as in (11), is fine. Note also that to the extent that the NP in (13) can be interpreted as *every kind of cat*, it is also felicitous.

The present analysis, then, leads one to the conclusion that the strong-weak distinction as originally formulated should be recast in terms of individuals and kinds. Those expressions that are allowable in the associate NP position of an existential sentence denote, or quantify over, kinds. Those that are not denote, or quantify over, individuals. Theoretically speaking, this is a desideratum; it allows us to provide a uniform account of why both definite and

strong quantificational NPs (in the relevant interpretations) are disallowed in existential sentences.

## 2.5 Presupposition

Before moving on, it is necessary to address another influential account of the strong-weak distinction in existential sentences that relies on presupposition. Zucchi (1995) points out that the class of NPs that is banned from existential sentences coincides with the class of NPs that are presuppositional. Therefore, the definiteness effect in existential sentences can be captured by positing a felicity condition that requires the NP associate to be non-presuppositional. This requirement is also in line with the fact that the existential sentence is an assertion of the existence and hence incompatible with the presupposition of existence.

This approach in many ways is in line with the semantics of the associate NP that will be proposed here, in that the class of NPs that denote features seems to coincide with the class which is not presuppositional. One problem for a purely presuppositional approach to the strong-weak distinction in existential sentences, however, is the existence of cases, like (14), in which “presuppositional” determiners are fine in this context. For this reason, an approach that takes the strong-weak distinction to be a result not of a condition on the presuppositional qualities of NP but on its semantic form may be preferred.

## 2.6 Formalization of features and kinds

So far it has been claimed that the position of the associate NP in existential sentences is reserved for nominal expressions that are feature-denoting and therefore do not introduce individuals. This can be stated formally as follows: The requirement for a feature-denoting NP equates to the requirement for a set-denoting NP, i.e., an expression of type  $\langle e, t \rangle$ , *where the set contains features, not individuals* (i.e., although set-denoting, they are not properties, the prototypical predicate expression). As shown above, this move is in line with the interpretation of NPs that can appear in this position, and allows for a reformulation of the strong-weak distinction. The idea that the associate NP is set-denoting has also been proposed and defended by McNally (1998) and Landman (2004).

### Is this NP in a predicate position? Is it a predicate?

Having claimed that the associate NP is a set-denoting expression, the question now arises as to whether it should also be considered a predicate NP. Unlike Higginbotham (1987), but in line with Landman (2004), I do not take this expression, although set-denoting, to be a predicate. The reason that I do not is because unlike Higginbotham (1987), who takes the expletive *there* to be a subject, I do not take this expression to be associated with a subject (and nor do I take it to be the subject of some higher predicate, as in McNally 1998). This hypothesis is in line with Strawson’s claim that the sentence is not of the form subject-predicate, and in fact, Landman (2004) provides evidence against the claim that these are predicates. As he points out, although the associate NP observes many of the same restrictions that a predicate NP does (ban on quantificational NPs, the narrow scope restriction), definite NPs, which are licensed in predicate position, are banned in the position of the associate NP. Furthermore, I take it that the associate NP denotes a set of features, not a set of individuals, which is what a predicate/property denotes. The NP associate is thus a kind-denoting NP, with kind-denoting in this account being equivalent to set-denoting where the set is a set of features.

### Summary:

- The associate NP is an expression of type  $\langle e, t \rangle$ , i.e., set-denoting
- It denotes a set of features (not individuals)

- The associate may not presuppose the existence of individuals (vs. kinds)
- The associate is not a predicate (not a subject, either)
- The strong-weak distinction can be reformulated as a distinction between individuals and kinds

### 3 What are placers?

The second part of the equation in a feature-placing statement is the placer. I take the expressions that are allowed in the coda position, PPs like *in the garden* and APs like *sick*, to be placers, and take the truth of a feature-placing statement to depend on whether there is something with feature denoted by the NP is at the coordinates denoted by the placer.

At this point, however, it is necessary to address the fact that an existential sentence can perfectly well stand with no coda XP, as in sentences like *there is a Santa Claus*. In such cases, I take it that a default location is interpreted: either the universe (or world, depending on the semantics that is to be adopted) or in the contextually salient situation or location. In the sentence *there is a Santa Claus*, for example, the location defaults to the actual world. In the sentence *there is a problem*, the location seems to default to the salient situation.

(15) There is a Santa Claus.

(16) There is a problem.

In the following section I will discuss how the idea of placing can help us understand the restrictions on the items that occupy coda position.

#### 3.1 The predicate restriction

The predicate restriction (or stage-level / individual-level distinction) that is found in this position then depends, on this account, on whether the item can be successfully used as a placer.

(17) There is a man in the garden. predicate restriction

(18) \*There is a man fat.

Of course, some of the items (PPs) we find in this position are more obviously locational than others (APs). Although other options might be pursued, I will argue here that there is reason to believe that, although it is more obvious in the PP cases than in the AP cases, the expressions in the coda-XP position are, in a relevant sense, items that can locate other items, and thus can be considered placers.

It seems that one property of things that are coordinate denoting is that they themselves can be located with respect to another location. This property, which I will call *localizability*, seems to distinguish among the predicates that are and are not felicitous as the coda in existential sentences. I formalize these notions below:

(19) A predicate can *localize* something if and only if the property it denotes is *localizable*.

(i.e., a thing which *localizes* something must itself be *localizable*)

(20) Only predicates that are localizable are licensed in the coda of the existential construction.

There is some evidence that the codas allowed in the existential construction are localizable. For example:

Predicates that are felicitous in the coda allow for further spatial modification

- (21) There is a man sick in the next room.  
 (22) There is a man available at the Phoenix office/on the 4<sup>th</sup> week of every month.  
 (23) \*There is a wall red in certain patches.  
 (24) \*There is a man tall in the garden.

Similarly, predicates that are felicitous in the coda naturally allow for *where* questions

- (25) There is a man sick.  
 (26) Where is there a man sick?  
 (27) There is a man available.  
 (28) Where is there a man available?  
 (29) \*There is a wall red.  
 (30) \*Where is there a wall red?  
 (31) \*There is a man tall.  
 (32) \*Where is there a man tall?

As a further example of the ability of a predicate that *locates* to be *localized*, notice the differing behavior of the names of the properties denoted by certain localizing predicates in the associate NP position.

- |      |                           |  |
|------|---------------------------|--|
| (33) | There is a man sick.      | > There is (a) sickness in New York.       |
| (34) | There is a man available. | > There is availability on Sunday.         |
| (35) | *There is a wall red.     | > There is red(ness) on the wall.          |
| (36) | The wall is red.          | =There is a patch/spot of red on the wall. |
| (37) | *There is a man tall.     | > *There is tallness in Sweden.            |

While the correspondence between properties (e.g. *tall*) and their names (e.g. *tallness*) is admittedly not always precise (cf. Chomsky 1970), the above are examples where names of the properties denoted by predicates that are licit in the coda of existential sentences that may be localized as the associate NP in an existential sentence, whereas names of properties that are illicit in the coda either may not stand as the associate or else must be interpreted as spatially defined.

Also note that the interpretation of the predicate *sick* which is available in (36) is the sense that may be localized, as in *John is sick at home with the flu*. Its other interpretation, as in *\*John is sick in the head at home*, is not available. It is only the first interpretation that may be *localized* and is able to *locate* the feature denoted by the NP associate.

Finally, whether or not the particular formulation of location-sensitivity given above is accepted, the idea that there is a locative element to existential sentences has been advanced by authors starting at least with Lyons (1967), Kuno (1971), Clark (1978) and Freeze (1992). In this sense, an approach that defines the coda restriction in terms of an ability to be spatially localized also provides a way of characterizing this locative content (without recourse to the notion that the expletive subject itself is locational).

#### 4 Sentential semantics of feature-placing sentences

I have suggested so far that that assertion in a feature-placing sentence is accomplished by some combination of a set-denoting NP and a syntactically optional (but I argue semantically necessary) coordinate-denoting expression. Therefore, the logical form of these sentences would be something like:

- (38) [feature position]

This form is different in important respects from the usual form assumed for existential sentences in that it assumes neither existential quantification over an individual nor an

existential predicate (*there-be*). Furthermore, the logical form consists of a single clause, not three. This will become important in considering the scope facts for existential sentences.

However, if the associate NP in the existential construction does not introduce individuals into the discourse, and the logical form of existential sentences contains no existential quantification or no existential predicate how does their existential import arise? I would like to suggest that the existential import of these sentences arises from the content of their truth conditions rather than the content of their logical form. So, instead of the logical form containing an existential quantifier or existential predicate, the truth conditions that require that an item with a set of features at a location exists. These statements are made true or false, then, by virtue of the required set of features existing at the coordinates denoted by the coda. Below the two different proposals for the semantics of these sentences are compared:

#### **Feature-placing analysis**

(39) A sentence of the form [f p] is true iff there is an x that has f at p.

#### **“Standard”analysis**

(40) A sentence of the form [there exists an x], [x is a man] and [x is in the garden] is true iff there is an x, x is a man, and x is in the garden.

In the proposed semantics, then, there is an asymmetry between the logical form of the sentence and the truth conditional content of the statement. The existential import is located in the truth conditions and not the logical form (whereas in the traditional view, these two are symmetrical: both sides contain an existential clause). From the point of view of the interpretation of existential sentences, namely, that they assert existence and do not presuppose it, and in concert with the presupposition facts mentioned above, I would argue that moving the requirement for existence into the truth conditional content seems to better reflect the interpretation of these sentences, which do not imply existence as part of their meaning but assert it on the occasion of their use.

In fact, adopting the analysis outlined above for existential sentences enables us to account for some of their notable properties beyond those already discussed.

### **4.1 Copular sentence vs. existential sentences**

The similarities between copular and existential sentences have long been noted, with some arguing that the form of the existential is transformationally related to the copular sentence.

(41) A man is in the garden.

(42) There is a man in the garden.

Given what I have said about feature-placing sentences in opposition to subject-predicate sentences the analysis predicts, however, that these sentences are of a different logical form, even if they are truth-conditionally equivalent (and I agree that they are). The copular sentence is of the form subject-predicate while the existential sentence is not. What evidence is there in support of the position that their logical forms differ?

In order to bring out the differences between copular sentences with indefinite NP subjects and existential sentences, let us look at some well-known scope facts: The associate NP in existential sentences takes narrow scope with respect to operators such as negation. This is not the case in copular sentences. The copular sentence below, for example, when negated, can be interpreted as saying that a certain winged horse is not in the garden. This is not the case in the existential sentence and suggests that there is an existential quantifier present in the logical form of the one (the copular sentence) and not in the other (the existential sentence).

(43) There is a winged horse in the garden.

- (44) There isn't a winged horse in the garden.  
 (45) A winged horse is in the garden.  
 (46) A winged horse isn't in the garden.

These facts also provide support for the current analysis of the logical form of these sentences, which is mono-clausal, against their usual analysis, which takes them to be tripartite structures. Given a tripartite structure, it is not clear why only widest scope is possible for negation. Given a single clause, there is not another option.

- (47) There is not a winged horse in the garden.  
 (48)  $\neg$ [f winged horse p in the garden]  
 (49)  $\neg$  [there exists an x], ( $*\neg$ ) [x is a winged horse] and ( $*\neg$ ) [x is in the garden]

=It is not the case that there is a winged horse in the garden.

≠There is something such that it is not a winged horse in the garden.

≠There is a winged horse such that it is not in the garden.

## 4.2 More anaphora<sup>5</sup>

The above discussion of Heim (1987) regarding the unavailability of pronouns in existential sentences can also be extended to accommodate sentences like the following:

- (50) There is a man and his wife in the garden.

As in the case of *wh*-questions discussed above, an account of the pronominal anaphora in the sentence above does not demand an individual variable, but may be accomplished with a variable that ranges over sets of features, i.e., kinds<sup>6</sup>. After all, the sentence above does not refer to a specific man and his wife; the truth conditions merely require that a man and his wife be found in the garden.

For another case of anaphoric connection, consider the following examples from Partee:

- (51) I have lost ten marbles and found all but one. It might be under the couch.  
 (52) I have lost ten marbles and found nine of them. #It might be under the couch.

The sentence in (52) illustrates that conversational salience or logical inference is not enough to guarantee the possibility of pronominal reference. The expression the pronoun is anaphoric to must be available in the content of the discourse. Now, given the fact that the present approach claims no individuals are introduced into the discourse in the logical form of existential sentences, what can be said about the pronominal reference in the following sentences?

- (53) There is a man in the garden. He is wearing pajamas.

Whereas I am claiming that the logical form of existential sentences does not introduce individuals into the discourse, the truth conditions of an existential sentence like that in (54) require that a man exist at the coordinates expressed by the placer. It is to this man that the pronoun refers. This cannot technically, then, be considered a case of anaphora. Instead, we must assume that the pronoun above is *deictic* to the individual required by the truth conditions of the existential sentence.

There is some reason to believe that this approach to the pronominal reference above is correct. Take, for example the form of denials of existential statements:

<sup>5</sup> I would like to thank Harriet Taber for first bringing the facts in (50) to my attention as well as Daniel Rothschild, in the audience at SuB 10, for making me aware of the relevance of the Partee facts.

<sup>6</sup> It need not necessarily be assumed that anaphoric connection is accomplished via binding: cf. Fiengo and May 1994 for arguments against the binding approach to anaphora.

- (54) There is a man in the garden.  
(55) #No, he's not. (=No, there isn't a man in the garden)  
(56) No, he's not. (=No, he's in the *kitchen*, not the *garden*.)

As (54-57) show, although a statement of the form feature-placer may be felicitously followed by a statement containing a pronominal subject that takes as its referent the individual required to satisfy the truth conditions of a feature-placing statement, it is not felicitous to follow a feature-placing statement with a sentence that contains the same pronominal subject and an a denial of the original statement. This is because in order to deny the original statement you must take its truth conditions to be unfulfilled; the denial of the original statement, therefore, asserts that the pronoun has no referent (at that location). In (57), however, only a partial denial is stated: the existence of the referent of the pronoun is not in question, only his location. Thus, pronominal reference is felicitous in such a case.

## 5 Concluding remarks

In conclusion, let us return briefly to the debate about which constituent is the existential sentence constitutes the proper subject or predicate. By adopting an account of existential sentences in terms of feature-placing, it is possible to supercede such discussion while providing a principled (and straightforward) reason for these sentences' special surface form, that is, for why they appear with an expletive subject.

## References

- Abbott, B.: 1997, Definiteness and existentials. *Language* 73:1, 103-108.
- Carlson, G.: 1977, A Unified Analysis of the English Bare Plural. *Linguistics and Philosophy*. 1: 413-457.
- Diesing, M.: 1992, *Indefinites*. Cambridge: MIT Press.
- Diesing, M.: 1988, *The Syntactic Roots of Semantic Partition*. Dissertation, UMass Amherst.
- Dobrovie-Sorin, C.: 1998, Types of Predicates and the Representation of Existential Readings, *Proceedings of SALT (1997)*, Cornell University
- Fernald, T.: 1994, *On the Non-Uniformity of the Individual- and Stage-level Effects*. Dissertation, University of California, Santa Cruz.
- Fiengo, R. and R. May: 1994, *Indices and Identity*. MIT Press.
- Heim, I.: 1987, Where does the definiteness restriction apply? in Reuland, E. & ter Meulen, A.: 1987, (eds.), *The Representation of (In)definiteness*, Cambridge, Mass.: MIT Press, pp. 21-42.
- Higginbotham, J. & G. Ramchand.: 1997, The Stage-Level/Individual-Level Distinction and the Mapping Hypothesis, in *Oxford University Working Papers in Linguistics, Philology & Phonetics* 2: 53-83.
- Higginbotham, J.: 1987, Indefiniteness and Predication, in Reuland, E. & ter Meulen, A. 1987., (eds.), *The Representation of (In)definiteness*, Cambridge, Mass.: MIT Press, pp. 43-70.



- Keenan, E.: 1987, A Semantic Definition of “Indefinite NP”, in Reuland, E. & ter Meulen, A. 1987., (eds.), *The Representation of (In)definiteness*, Cambridge, Mass.: MIT Press, pp. 286–317.
- Ladusaw, W.: 1994, Thetic and Categorical, Stage and Individual, Weak and Strong, in *Proceedings of SALT IV*, eds. Mandy Harvey and Lynn Santelmann. CLC Publications.
- Kratzer, A.: 1995, Stage Level and Individual Level Predicates, in G. Carlson & F.J. Pelletier (eds.): *The Generic Book*. Chicago (The University of Chicago Press), 125–175.
- Landman, F.: 2004, *Indefinites and the Type of Sets*. London: Blackwell.
- Milsark, G.: 1974, *Existential Sentences in English*. Dissertation, MIT.
- McNally, L.: 1993, Adjunct Predicates and the Individual/Stage Distinction, in *Proceedings of WCCFL 12*.
- McNally, L.: 1998a, Stativity and Theticity, in S. Rothstein (ed.) *Events and Grammar*, Kluwer, Dordrecht, 293–307.
- McNally, L.: 1998b, Existential Sentences without Existential Quantification, *Linguistics and Philosophy* **21**, 353–392.
- Moore, G.E.: 1936, Is existence a predicate? in *G.E. Moore: Selected Writings*, ed. Thomas Baldwin. New York: Routledge, p. 134–146.
- Moro, A.: 1997, *The Raising of Predicates: Predicative Noun Phrases and the Theory of Clause Structure*, Cambridge UP, Cambridge New York Melbourne.
- Quine, W.V.: 1948, On what there is, in *From a Logical Point of View*. London: Oxford University Press, p. 1-19.
- Rando, E. and D. Napoli.: 1978, Definites in there-sentences, *Language* **54**: 300–13.
- Strawson, P.F.: 1971, *The Logico-Linguistic Papers*. London: Methuen and Co., Ltd.
- Strawson, P.F.: 1959, *Individuals*. London: Methuen and Co., Ltd.



# DEALING WITH ALTERNATIVES\*

Lucia M. Tovenà,  
Université Paris VII, UMR7110CNRS

tovena@linguist.jussieu.fr

## Abstract

Traditionally, pure additive particles and scalar additive particles are both characterised by an existential presupposition. They differ insofar as the set of alternatives that is built is unordered for the former, and ordered for the latter, which carry the so-called scalar presupposition. As a result, the two characterisations cannot be cumulated, an impossibility that is at odds with the fact that several languages exhibit this combination of readings for a single item. The discussion of Italian *neanche* '(n)either/(not) even', an item that can both be additive and scalar, allows us to expose the connection between the oppositions nonordered vs ordered set of alternatives and verified vs accommodated existential presupposition by adding content to the traditional view that the set of alternatives is made up of 'relevant' items in the context. The question of how to characterise this item is set against the backdrop of a more general discussion of the network of additive particles found in Italian.

## 1 Introduction

Adding PURE ADDITIVE and SCALAR-ADDITIVE particles to an utterance makes a clear difference to its interpretation, but exactly how to capture this difference is a matter still open to debate. It is customary to assign to pure additive and scalar-additive particles a pragmatic content which mainly takes the form of felicity constraints. Accordingly, these particles have in common an EXISTENTIAL PRESUPPOSITION (Karttunen and Peters 1979, König 1991), i.e. the associate (Krifka 1998) is understood as a member of a class of alternative individuals or actions containing at least another member.

They differ in at least two respects, both concerning the set constituted by the associate and its alternatives. First, pure additive particles such as *either* are assumed to have an unstructured set of alternatives. Mary's turning down the offer is neither more nor less unexpected than Jane's in example (1a). On the contrary, scalar-additive particles such as *even* are assumed to impose an order on the set of alternatives. This is called the SCALAR PRESUPPOSITION. Olga's not accepting in (1b) is understood as less probable/ likely/ expected/ informative than somebody else's.

- (1) a. Mary turned down the offer and Jane didn't accept either.  
b. Even Olga didn't accept.

A second traditional assumption is that only scalar-additive particles can accommodate their alternatives. Pure additive particles must verify their existential presupposition in the context (Zeevat 1992), see the contrast in (2).

---

\*Thanks to Francesca Tovenà, Jacques Jayez and Piermarco Cannarsa for valuable discussions. Results reported in the text are part of ongoing research.

- (2) a. ??Also Mary came.  
 b. Jane came. Also Mary came.  
 c. Even Mary came.

The discussion of Italian *neanche*, an item that can both be additive and scalar, allows us to expose the connection between the two oppositions nonordered vs ordered set and verified vs accommodated presupposition by adding content to the traditional view that the set of alternatives is made up of ‘relevant’ items which can be checked in the context.

A first factor that opens the way to the possibility of having both readings is the fact that an item does not impose a specific strategy for satisfying the existential presupposition shared by additive and scalar items, namely verification or accommodation. Another factor contributing to the same possibility is that, as far as the item itself is concerned, no specific structure is required to be detected on the class of alternatives.

It is important to notice that the type of accommodation that is relevant for the additive scalar particles under consideration is not the classic conversational case whereby a sentence like *I will be late because I have to drive my sister to the dentist* is interpreted under the precondition of admitting as backgrounded information my having a sister when such a piece of information had not been previously provided. In the case at hand, first, there is no flavour of having, at a given time, to update a previous belief state, and second, the sentence does not contain a description of what has to be accommodated, which is to say of the alternatives. Thus, it is somewhat different also from the classical lexical case of accommodation, whereby a verb such as *stop* in a sentence like *He stopped smoking* triggers the presupposition of a change of state and the *V-ing* expression constrains what has to be accommodated. In the present case, there is no similar direct constraint and what is available is information mainly on the associate, which is to say on the entity with respect to which something can get its status of alternative and thereby be accommodated. In (Tovenà 2005a) it has been proposed that imposing an order is a way of constraining the possible increase of information triggered by the additive nature of the item in the absence of overt antecedents. Thus, accommodated alternatives are not taken to be individually ‘as much contextually relevant as’ verified ones. Equal status in a discourse has to be gained, if ever, thanks to an explicit subsequent increase of information.

The paper is organised as follows. Aspects of the hypothesis of a connection between the strategy for satisfying the existential presupposition and the readings are presented in section 2 relatively to *neanche*. Section 3 aims at spelling out features of the picture that has emerged. Next, the hypothesis is tested on purely additive and purely scalar items, showing how different choices can be specified for different items and result in different combinations. Section 4 discusses some items that require the existential presupposition to be verified in the context. Section 5 deals with items that accommodate. Then, in section 6, we will show how the line of discussion taken in the paper allows us to integrate in the picture the case of an item that is evaluative in the sense of (König 1991), but that can work also as scalar. Section 7 summarises.

## 2 Underspecified strategy: *neanche*

### 2.1 The item

*Neanche* is an Italian adverb that exhibits additive (3) and scalar (4) interpretations.

- (3) Non ha mangiato la mela e neanche la pera  
 s/he didn’t eat the apple, neither the pear

- (4) Non ha mangiato neanche il caviale  
s/he didn't even eat caviar

The two interpretations do not correlate with distributive differences, a fact that provides evidence in favour of a unified analysis and goes against postulating some form of lexical split for *neanche*. More support for this line of analysis comes from the observation that such a combination of readings for a single lexical form is not unusual, cf. (König 1991).

Historically, *neanche* originates from the combination of a negative conjunction and the positive additive adverb *anche* 'also'. It occurs in negative clauses only, cf. (5)–(7).

- (5) \*Ha mangiato la mela e neanche la pera  
s/he ate the apple and NEANCHE the pear
- (6) \*Non ha mangiato la mela e ha assaggiato neanche la pera  
s/he didn't eat the apple and tried NEANCHE the pear
- (7) \*Ha mangiato neanche il caviale  
s/he ate NEANCHE caviar

Let us point out that in Italian, there are two more items besides *neanche* that, roughly speaking, have similar distributions and interpretations, at least for the purposes of this paper. One item is *neppure*, which also originates from the fusion of a negative component with a positive additive adverb (*pure* 'also'), and the other is *nemmeno*. We focus on *neanche* because its positive component is standardly not emotionally loaded.

Exploiting the proposal put forth in (Tovena 2005a) for *neppure*, we characterise *neanche* and its siblings as particles specialised in adding negative information. This function requires that parallel information of negative nature be conveyed by an antecedent/the context and by the clause that hosts the particle. Items performing this function can be found in various languages, see for instance the English item *either* and French *non plus*. The specific syntactico-semantic properties of such items, which is to say the issue of the lexicalisation of the function in a particular language, is an independent question, albeit closely connected. Tovena (2005b) has provided clear evidence in favour of an analysis of *neanche* and its siblings as negative concord (NC) words. For instance, they contribute sentential negation from preverbal position (8). As it is standard for the NC system of Italian, the verbal form following the NC-word must not be negated (9). This type of lexicalisation warrants that the clause in which it occurs is always negative since either *neanche* belongs to a negative concord chain or it expresses negation on its own.

- (8) Neanche il caviale era di suo gradimento  
not even caviar was fine for her/him
- (9) \*Neanche Daniele non ha fatto i compiti  
NEANCHE Daniele didn't do the homework

The fact that *neanche* is interpreted as negative in self-standing occurrences and fragment answers, cf. (10), provides evidence specifically against a characterisation as a negative polarity item (NPI). NPIs are never allowed in this context with their polarity sensitive reading, see *alcunché* 'anything' and *anybody* in (11).

- (10) a. Daniele non verrà, e Luisa? Neanche lei.  
Daniele will not come, and Luisa? Neither

- b. Ha mangiato almeno il caviale? Neanche quello.  
did s/he eat caviar at least? Not even that
- (11) a. Cosa fa? \*Alcunché.  
what does s/he do? ALCUNCHÉ
- b. Who will come? #Anybody. ( $\neq$  nobody)

Furthermore, *neanche* is not ‘licensed’ in traditional NPI licensing contexts such as under negative predicates (12a), in questions (12b), in conditionals (12c), in concessive contexts such as *troppo* Adj (too) as in (12d).

- (12) a. \*Dubito che abbia mangiato neanche la pera  
I doubt s/he ate NEANCHE the pear
- b. \*Ha mangiato neanche la pera?  
did s/he eat NEANCHE the pear?
- c. \*Se mangia neanche la pera, la situazione è grave  
if s/he eats NEANCHE the pear, it is a serious situation
- d. \*Sembra troppo stanco per fare neanche i compiti  
he seems too tired to do NEANCHE the homework

## 2.2 Two readings

Example (3) provides a clear case of additive reading, under the assumption that apples and pears are not ordered. The associate in (4) is traditionally viewed as more sophisticated/ exquisite/rare/ expensive than much other food, in short as ranking high in some classification. Hence it suites the intended scalar reading.

Consider now a situation where ranking is not lexically/culturally marked but information about a relevant order may be provided in the context. The background we are going to use all along is the following: Marzia, April, May, June and Julia are students who sat the same exam. Their names are listed giving the least gifted person first and the most gifted last.

Scenario 1: Marzia, April, May and June didn’t pass

Consider the sentences in (13) and (14). Agent *a* may use either of them to communicate information on the situation to agent *b*.

- (13) Non sono passate Marzia, June, April e non è passata neanche May.  
Marzia, June and April didn’t pass, neither did May
- (14) Non è passata neanche June.  
even June didn’t pass

Despite the difference in their asserted content, both (13) and (14) convey the information that Marzia, April, May and June failed the exam. How does *b* get it? Directly in (13), where all the alternatives are overtly provided and the set can be freely ‘scrambled’, see its equivalent in (15). Indirectly in (14), by exploiting the understanding that the girls are not equally gifted and their performances are going to reflect this situation. This leads to the interpretation whereby the girl who is mentioned is the cleverest among those who didn’t pass.

- (15) Non sono passate Marzia, April, May e non è passata neanche June.  
Marzia, April and May didn’t pass, neither did June

### 2.2.1 Computing the set of alternatives

Given the proposition  $\alpha(\beta)$  expressed by sentence  $S$  where *neanche* occurs with  $\beta$  as its associate, the existential presupposition that characterises additive items is traditionally given as in (16).

$$(16) \quad \exists y[\alpha(y) \wedge y \neq \beta]$$

This presupposition is meant to express the general understanding that the associate is viewed as a member of a class, that is the set of alternatives. On the one hand, the value for  $y$  must be comparable to the associate in some respect. For instance, in (3) one considers names of people, and food in (4). On the other hand,  $\alpha$  is thought of as something that takes an object of the same type as  $\beta$  as an argument and returns a proposition true in the context as it does with  $\beta$ .

There are at least two problematic issues to consider. First, proposing a general treatment for  $\beta$  is not an easy task, because *neanche*, as many other particles, can take associates of various types, e.g. NPs, VPs, PPs, etc. We won't pursue this side of the investigation in the paper. Second,  $\alpha$  may not be directly available, either because *neanche* and its associate occur in an elliptic structure so that the host clause does not provide enough content, cf. (17)<sup>1</sup>, or because there is no overt antecedent against which to check what gets into  $\alpha$ , cf. (18).

(17) La vittima non ha incontrato Luisa. E neanche Daniele.  
the victim did not meet Luisa. And she didn't meet Daniele either  
the victim did not meet Luisa. And neither did Daniele

(18) La festa è stata un disastro. Sembra che alle due non fosse ancora venuto neanche Daniele.  
the party was a complete failure. It seems that by 2 a.m. not even Daniele had showed up yet

Furthermore,  $\alpha(\beta)$  and  $\alpha(y)$  may be true although  $\alpha$  cannot be made to correspond to identical lexical material in the host clause and the antecedent clause, as noted for *either* by Rullmann (2003), cf. (19).

(19) Luisa ha respinto la nostra offerta. Neanche Daniele ha accettato.  
Luisa rejected our offer. Daniele didn't accept either

Traditionally, the set of alternatives triggered by an alternative inducing operator is defined following the treatment proposed by Rooth for focus operators. Rooth (1992) has claimed that the set of alternatives for the associate  $\beta$  of a focus operator, the focus semantic value of  $\beta$  in his terminology, is a set that contains both its ordinary semantic value, i.e. the denotation of the associate itself, and at least one element distinct from it, roughly speaking. More precisely, alternatives are considered with respect to the host clause, thus we are interested in the focus value of a clause, which is to say that we consider the set containing the proposition expressed by this clause as well as the propositions obtained by replacing focus marked material with alternatives of the same type. However, in the following we may, at times, sloppily talk of the set of alternatives as if made up of  $\beta$  and its alternates.

Rooth further claims that the focus semantic value considered in a specific case is a 'relevant' subset of the focus semantic value of the clause, constrained by contextual information. For instance, in our particular setting the property 'girl' or 'human being' can be derived from the

<sup>1</sup>It is true that in the general case discourse defuses this problem.

lexical content of the associate and be used to build its focus semantic value. Context can restrict the set of possible alternatives obtained in this way, so we can also consider properties like ‘student’ and ‘sitting the exam’ in our setting. Most importantly, the propositional function expressed by the host clause, here ‘did not pass’ is also used.

This is Rooth’s C set. We will call it  $ALT_{\beta}$  because we think that it is built getting all one can get from  $\beta$  but that the role of  $\alpha$  has not been fully appreciated and that the set may be further constrained by it. Indeed, the restriction effect of context is stronger when linked to overt information available in the co-text. We propose that  $ALT_{\beta}$  is what one can initially get with the associate and the host clause. It might contain contrasting alternatives. But verification of the existential presupposition in the context always results in double checking the set that is possibly reduced and gets (temporarily) closed. At this point,  $\alpha$  too will have given us all it can contribute. We will call  $ALT_{\beta}^{\alpha}$  the resulting set.

Therefore, two cases have to be distinguished. In the case of satisfaction by verification, the associate is argumentatively the upper bound of any subset of  $ALT_{\beta}$  whose members are entailed by the context and end up in  $ALT_{\beta}^{\alpha}$ . Thereby, the associate actually is the greatest element in  $ALT_{\beta}^{\alpha}$  from the vantage point of argumentation, we come back to this point at the end of the section. The definition of upper bound is recalled in (20). It is worth noticing that this notion requires X to have at least another member besides  $x$ .

- (20) Let X be a partially ordered set and  $\geq$  an order in it. Let  $x \in X$ . Let  $Y \subset X$ .  
 $x$  is an upper bound for Y iff  $\forall y, y \in Y, x \geq y$ .

On the other hand, if no verification takes place,  $ALT_{\beta}$ , or presumably a subset of it, would have to be accommodated. In such a situation, using an order is the best way of building an  $ALT_{\beta}^{\alpha}$  that is fit for potential future increases of information. This is because the associate is the only member which is provided, therefore it is the only one that can bear the burden of the construction of the set and is assigned the role of scalar endpoint. Thus, in the case of satisfaction by accommodation,  $ALT_{\beta}^{\alpha}$  has the associate as its sole member and the extra bit of information that has to be accommodated is the constraint that the associate is a maximal element. As a matter of fact, it is ‘the’ maximal element. No other alternatives have to be accommodated specifically. The definition of maximal element, recalled in (21), makes it clear that this notion does not require nor warrant the existence of one or more members in X besides the associate.

- (21) Let X be a partially ordered set,  $\geq$  an order, and  $x \in X$ .  
 $x$  is a maximal element in X iff  
 $\forall y, y \in X, y \geq x \rightarrow y = x$

The type of  $ALT_{\beta}^{\alpha}$  that we get in this second case works as a label for the class of equivalence of the subsets of  $ALT_{\beta}$  that are candidate for the role of actual set of alternatives in every situation as long as no more information is available. Speaker and hearer may even entertain different options. No specific subset of  $ALT_{\beta}$  is selected as information that is accommodated, i.e. when building  $ALT_{\beta}^{\alpha}$  an agent does not commit herself to a position stronger than what can be warranted and does not run the risk of having to retract. At the same time, information is incremented all the same.

Summing up,  $ALT_{\beta}$  is made of potential alternatives.  $ALT_{\beta}^{\alpha}$  is the actual set of alternatives. It seems plausible to treat  $ALT_{\beta}$  as the product of the focus component of a particle and  $ALT_{\beta}^{\alpha}$  as the product of the (pure and scalar) additive component. This hypothesis will not be tested in the following, but it may help to formulate a characterisation for the evaluative particle discussed



in section 6.

In a short aside, we note that extra complications come from the fact that ‘contradicting’ information may be subsequently added to what contributed by  $ALT_{\beta}$  and  $ALT_{\beta}^{\alpha}$  to a discourse, but a retraction indicator of some kind must be used, for instance *neanche* is repeated in (22). However, such a revision is more easily done when *neanche* is used as an additive particle than as a scalar one, see the marginal status of sequencing in the micro discourse proposed in (23).

- (22) Non c’era Luisa e neanche Daniele. E neanche Gianni, adesso che ci penso.  
Luisa was not there, neither was Daniele. Neither Gianni, I recall it now.
- (23) Figurati che fiasco, non c’era neanche Luisa. ? E neanche Daniele.  
Just think of the flop, not even Luisa was there. And not even Daniele.

We can make sense of this situation if we recall that  $ALT_{\beta}^{\alpha}$  is built extensionally, so that in (22) the revision amounts to reopening the set and adding one extra element without further consequences for the structure of the collection. In the case where alternatives are accommodated, on the contrary, revision involves computing the set afresh, because it is the new element that has to work as scalar endpoint and the scale must include the previous associate.

Finally, we should also cash in the effect that comes from the argumentative purpose of sentences containing additive and scalar particles. The argumentative goal provides a perspective on  $ALT_{\beta}^{\alpha}$  that translates in a relevance based (partial) ordering that is always imposed on  $ALT_{\beta}^{\alpha}$  at the discourse level. Extending to *neanche* the claim made in (Tovena 2005a) about *neppure*<sup>2</sup>, we say that in uttering a sentence containing *neanche*:

- The speaker signals that the piece of information added via the host clause is going to lead to modifications in the information state that would not occur without such an addition.
- The modification has a particular discursive function, therefore the presence of *neanche* triggers a search for a discourse goal by the hearer.
- The particle marks the piece of information as precisely the one that was missing to get the intended effect.

The piece of information provided via the associate is maximally useful/relevant for the argumentative goal in the scalar as well as in the additive cases.

### 2.2.2 The additive reading

Let us go back to our examples (13) and (14). In our setting,  $ALT_{\beta}^{\alpha} = \{\text{Marzia, April, May, June}\}$  or rather  $\langle \text{Marzia, April, May, June} \rangle$ .

We have assumed that to get the additive reading, the alternatives are identified using the associate and the content of the host clause in an anaphora-like way (van der Sandt 1992). The existential presupposition is satisfied only by verification, i.e. if and only if the proposition expressed by the host sentence with an alternative substituted for the associate follows from the context.

It is worth emphasising that in (3), where no order is perceived, as well as in (15), where a contextually given order was assumed, the associate is treated on a par with the alternatives. It is the context that provides overt information supporting the move from one member to the other required to build the set of alternatives  $ALT_{\beta}^{\alpha}$ .

The behaviour of additive *neanche* is captured by condition (24).

<sup>2</sup>Analogous considerations can be found in proposals put forth by (Merin 2003, Van Rooy 2003).

- (24) **constraints on *neanche***
- (i)  $ALT_{\beta}^{\alpha}$  can be a partially ordered set
  - (ii)  $ALT_{\beta}^{\alpha}$  is always argumentatively partially ordered
  - (iii) the associate of *neanche* is argumentatively the maximal element in  $ALT_{\beta}^{\alpha}$
  - (iv) if  $ALT_{\beta}^{\alpha}$  is ordered, the associate the maximal element in it, because this order must be compatible with the argumentative order.

Summing up, a first case is that of (3) where there are overt antecedents, no perceived order, and *neanche* gets an additive reading. A second case is exemplified by (15). Here we observe the presence of overt antecedents but this time *neanche* can get a scalar reading. This is so because  $ALT_{\beta}^{\alpha}$  happens to be a chain due to information provided in the setting. This possibility is allowed by (24iv). Analogously, in (25) we find overt antecedents and a scalar reading, since  $ALT_{\beta}^{\alpha}$  happens to be totally ordered because of lexical information. Cultural information may also be taken into consideration for establishing an order, see (26). Example (26) shows that for an order to be perceived it is not necessary that the antecedent clause is entailed by the host clause.<sup>3</sup>

- (25) Non ha studiato questo capitolo, e non l'ha neanche letto  
He didn't study this chapter and he did not even read it
- (26) Non ci ha ringraziato e non ci ha neanche salutato  
He didn't say 'thanks' and did not even say 'hello' to us

### 2.2.3 The scalar reading

Examples (15) and (25)–(26) show that the scalar reading can emerge in the presence of overt antecedent(s) if an order is perceived in the set of antecedents. Well formedness is not affected by (non-)perception.

The next case to consider is that of (14), where there are no overt antecedents and *neanche* gets a scalar reading. Given the information provided in the background, we know that in our setting  $ALT_{\beta}$  is a chain. The possibility for *neanche* of having a scalar reading in this case is also captured because condition (24iv) is sensitive to the structure of  $ALT_{\beta}$ .

Suppose now that the background is not overtly stated. If there are no antecedents, the class is still constrained via information on the discursive role of the associate, but  $\alpha$  and information coming from  $\beta$  cannot be used for verifying the existential presupposition. Here is where the change in the strategy for satisfying this presupposition is needed. The only way of bringing in relevant candidates for a set of alternatives, i.e. of controlling the move from the associate to some alternative(s), is by reasoning by abduction on (24iv) and the fact that no alternatives are provided in the context. The associate is required to be an upper bound for a potential subset  $ALT_{\beta}^{\alpha}$  but several such subsets can be envisaged. It is the greatest element of a partial order. For instance, example (14) per se is compatible also with a scenario where the names are ordered by luck, good shape, likelihood to succeed, etc. Several sets of alternatives might be entertained as the result of accommodating different ordering relations. Indeed, different agents may entertain different options in the same context, a situation that need not lead to a break down in communication because the crucial role of the associate is shared by them all. The possibility of conceiving different scales is covered by the current analysis, where the set of alternatives is defined only intensionally whenever the existential presupposition is not satisfied by verification.

<sup>3</sup>Thanks to Manfred Krifka for pointing this out.

### 2.3 Unconventional scales

The fact that the information contributed has to be maximally relevant for a specific goal, and not in absolute terms, makes it possible to account for scalar cases where the associate is not a standard scale endpoint, see (27). Given the physical or mental shape of the athlete, it was possible for her to win the semifinals and possibly the finals. When it comes to evaluating her performance, information that she did not make it to the final is more relevant than knowing that she didn't win it.

- (27) Non ha vinto neppure la semifinale!  
s/he did not win even the semifinals

The scale under consideration is not the one made up by the steps of a traditional tournament, but the one made by the levels the athlete could have reached.

### 3 Tacking stock on additive particles

In short, the key idea is that a particle that has an additive reading must verify the existential presupposition. Italian *anche*, English *either* and *also* are all well behaved members of this class.

As a first point, we record this aspect of the behaviour common to all additive particles as a constraint, in (28). This constraint is standardly met by verifying the existential presupposition and evaluating the impact of the particle at the discourse level.

- (28) Constraint 1 on additive particles  
The set of alternatives  $ALT_{\beta}^{\alpha}$  of an additive particle is not ordered directly by the particle, but argumentatively the associate is understood as the maximal element in it.

Next, we have noted that a lexical item may allow the possibility of taking into consideration the structure of the set of which the associate is maximal even if it does not impose specific requirements on it. This is to say that the presence of an order may be visible even when the order is not required. However, if there is an order, the associate is the greatest upper bound, and as such it could help in reconstructing the set when there are no overt antecedents. Hence, an ordering relation is taken into consideration to control the satisfaction of the existential presupposition by accommodation.

*Neanche* leaves unspecified the strategy for satisfying the existential presupposition. This can be satisfied by verification in context or by accommodation by working out the composition of the set of alternatives from the associate, which is the maximal element.

The possibility of accommodating correlates with the crucial role that the associate plays when the set of alternatives is constituted. We record this point as a constraint, in (29).

- (29) Constraint 2 on additive particles  
 $ALT_{\beta}^{\alpha}$  is an ordered set  $\Leftrightarrow$  the associate is the greatest upper bound for it.

The constraint in (29) is shared by *neanche* and all additive-scalar particles.

Finally, let us observe that  $ALT_{\beta}^{\alpha}$  can be totally ordered in two cases: (i) when  $ALT_{\beta}$  is totally ordered due to contingent facts, and (ii) when the associate is required to be the upper bound for  $ALT_{\beta}^{\alpha}$ , although the order is not always total. The latter is the scalar case. The former is discussed in the second half of the next section.

#### 4 Specific strategy–verification: *anche, also*

In the case of well behaved additive particles such as *also*, we have just said in the previous section that the associate is a maximal element in order to satisfy its argumentative/discursive function, but that the existence of antecedents, due to the existential presupposition, does not come with the requirement of an order. The existential presupposition is an independent requirement and its satisfaction does not involve imposing or even just appealing to any ordering relation. The same applies to Italian *anche*, with the only difference that this item is not equally ‘blindly’ well behaved, as we will see shortly.

It is then important to establish two points with certainty. First, we must know whether it is indeed the case that verification of the existential presupposition always takes place with additive particles. In order to test this, we can check if antecedents are always present in the preceding co-text, as usually claimed. A preliminary corpus-based study on *anche* confirms this claim and reveals that exceptions are rare and tolerated only when the context provides an unambiguous and usually unique alternative. Two possible cases are recorded.

1. The alternative is a widely known public figure particularly salient at the time the sentence is produced. Since the alternatives are identified in an anaphora-like way on extralinguistic material only, the success of the operation is uncertain and the felicity of the utterance decays fairly rapidly. At the time (30) was printed on a newspaper as the first sentence of an article, the antecedent, i.e. the death of the Pope, was in everybody’s mind. Just a few months later the sentence may already sound awkward.

(30) Anche il principe Ranieri di Monaco, 81 anni, è morto [...]. (IM7-4-2005)  
also Prince Ranieri of Monaco, aged 81, has died

2. The antecedent is the speaker, and this seems to apply to direct or reported speech. Example (31) is made of the title, the subtitle and the beginning of the first paragraph of an article from a newspaper. It contains an instance of this phenomenon with *neppure* (1), an instance with *anche* (2), and a regular additive use of *neppure* (3).

(31) (1) **Neppure la Fiat** vuole l’intervento dello Stato  
«L’azienda non è interessata», dice **Maroni** dopo l’incontro con Marchionne.  
(2) **Anche i vertici della Fiat** sarebbero contrari all’ingresso dello Stato nel capitale della multinazionale dell’auto. A riferirlo è stato ieri il **ministro Maroni**, dopo l’incontro con l’amministratore delegato del gruppo, Sergio Marchionne, a Palazzo Chigi: un intervento dello Stato nel capitale Fiat, ha detto il ministro, sarebbe «inutile, dannoso e, lo dico da stasera, non gradito. (3) Su questo intervento oltre a **non essere d’accordo il governo** non lo è infatti **neppure Fiat**». (IM10-2-2005)<sup>4</sup>

(1) Fiat does not want the intervention of the state either  
Maroni says [...]

(2) Fiat’s top management too would be against the State taking a stake in the capital of the multinational car manufacturer. It is the minister Maroni who said this yesterday, [...]

(3) Concerning this intervention, besides the unwillingness of the government, there is also that of Fiat.

<sup>4</sup>Numbers have been added to ease reference.

We conclude that it is indeed the case that plain additive particles require the verification of the existential presupposition in context.<sup>5</sup>

Second, it is important to have a way of telling apart items that leave the strategy underspecified, like *neanche*, from additive items that must always verify the existential presupposition but can still have emphatic scalar readings due to the contingent fact that  $ALT_{\beta}$  happens to be totally ordered, like *anche*. As discriminating test, we propose to use the case of a gap in an order. Only the latter type of particles are compatible with a scenario where the chain  $ALT_{\beta}^{\alpha}$  has a gap relatively to the chain in  $ALT_{\beta}$ , because the antecedent tells us where the gap is. On the contrary, scalar inferences used by scalar items to work out possible sets  $ALT_{\beta}^{\alpha}$  from the associate alone are built monotonically.

Consider the usual background.

Scenario 2: Suppose it has just been disclosed that May, June and Julia passed the exam. The exam was very difficult and not many people were expected to pass.

Surprise can be expressed with scalar *perfino* (positive *even*) and stressed *anche*, see (32)–(33). Mutatis mutandis, surprise can be expressed with *neanche*, see (34).

- (32) Perfino MAY è passata?  
did even May pass?
- (33) ANCHE MAY è passata?  
did even May pass?
- (34) Non è stata bocciata neanche MAY?  
did May not fail either?

Scenario 3: Suppose instead that June also failed. (Recall that we are dealing with pragmatic scales.)

In this scenario, *May* is the maximal element in  $ALT_{\beta}^{\alpha}$  and the structure of this set preserves the order of the chain in  $ALT_{\beta}$  of which *May* is an upper bound. The specificity of the case is that the new chain, i.e.  $ALT_{\beta}^{\alpha}$ , is a subset of that present in  $ALT_{\beta}$ . In this case, only *anche* can still be used, see (35)–(37).

- (35) #Perfino MAY è passata?  
did even May pass?
- (36) ANCHE MAY è passata?  
did even May pass?
- (37) #Non è stata bocciata neanche MAY?  
did May not fail NEANCHE?

The contrast can be explained as follows. *Anche* obtains  $ALT_{\beta}^{\alpha}$  by verification. It is sensitive to whether there is an order on  $ALT_{\beta}^{\alpha}$ , which is necessarily external to the operation of building the set. The comparison with the order on  $ALT_{\beta}$  can also be done independently. On the contrary, the composition of  $ALT_{\beta}^{\alpha}$  predicted with *perfino* (and *neanche* in the scalar reading) by using the associate as maximal is incompatible with information coming from the context in (35) and (37). Indeed, *perfino* works out candidate sets  $ALT_{\beta}^{\alpha}$  using the associate in this way because the existential presupposition it triggers has to be accommodated. Inferences drawn from the associate are monotone. The stumbling block is the gap represented by June's failure which

<sup>5</sup>The third possibility recorded is a case of cataphora.

cannot be predicted from the success of May.

Summing up, *anche* is subject to condition (38). The fact that the existence of overt antecedents must be verified is recorded in constraint (38iv). The option of viewing the associate as maximal in  $ALT_{\beta}^{\alpha}$ —other than on argumentative ground—is not overtly stated, which may be another reason why the existential presupposition cannot be accommodated.

(38) **constraints on *anche***

- (i)  $ALT_{\beta}^{\alpha}$  can be partially ordered
- (ii)  $ALT_{\beta}^{\alpha}$  is always argumentatively partially ordered
- (iii) the associate is argumentatively the maximal element in  $ALT_{\beta}^{\alpha}$
- (iv)  $|ALT_{\beta}^{\alpha}| > 1$  is verified in context
- (v) if  $ALT_{\beta}^{\alpha}$  is ordered, this order must be compatible with the argumentative order.

The difference between *also* and *anche* is then that a well behaved additive item like *also* works as if the status of greatest element of the associate must be ascribed only to the argumentative purpose it serves, and requires  $ALT_{\beta}^{\alpha}$  to be unordered in all other respects. Instead, *anche* can make do with a set  $ALT_{\beta}^{\alpha}$  that is ordered for independent reasons, as long as such an order is compatible with the argumentative ordering, as stated by condition (38v). Hence, a scalar reading is possible, but it is parasitic on an independently ordered domain. Apparently *also* is replaced by a specialised item when  $ALT_{\beta}^{\alpha}$  is ordered.

## 5 Specific strategy–accommodation: *perfino*, *even*

Well behaved scalar items such as *perfino* and *even* always allow one to accommodate the existential presupposition, hence the associate always has to be viewed as the greatest upper bound in  $ALT_{\beta}^{\alpha}$  as well as a maximal element.

*Perfino* is subject to condition (39).

(39) **constraints on *perfino***

- (i)  $ALT_{\beta}$  is partially ordered
- (ii)  $ALT_{\beta}^{\alpha}$  is always argumentatively ordered with the associate as its maximal element
- (iii) the associate is a maximal element in  $ALT_{\beta}$
- (iv) the associate is the greatest element in  $ALT_{\beta}^{\alpha}$
- (v)  $ALT_{\beta}^{\alpha}$  is accommodated in context

### 5.1 Accommodation and contextually available resources

Constraint (39v) says that the existential presupposition has to be accommodated. However, scalar items are compatible with the presence of overt antecedents.

- (40) Luisa ha incontrato il direttore e persino il presidente  
Luisa met the director and even the president

We propose that the two strategies for satisfying the existential presupposition may be independently triggered and are expected to converge when overt antecedents of scalar particles are available. This may seem an uneconomical choice that goes against the idea that accommodation is a rescue strategy. Evidence in favour of a double attempt, comes from the existence of ‘exceptional’ additive readings of well behaved scalar items, such as Fauconnier’s famous ex-

ample (41) concerning French *même* ‘even’. In (41), and in the Italian corresponding sentence (42), the set of overt candidates for the role of antecedent does not exhibit a salient order, as confirmed by the possibility of commuting the elements.

- (41) Georges a bu un peu de vin, un peu de cognac, un peu de rhum, un peu de calva et même un peu d’armagnac. (Fauconnier 1976, 17)  
Georges drank a little wine, a little cognac, a little rum, a little calvados, and even a little armagnac
- (42) Giorgio ha bevuto un po’ di vino, un po’ di cognac, un po’ di rum, un po’ di calvados e perfino un po’ di armagnac.

When there is an overt but apparently unordered set of antecedents, the double attempt results in a bleached form of the scalar reading. On the one hand, particles try to verify their presuppositions in the context and, as a result, an independent additive reading can emerge. On the other hand, if no salient order is perceived, a scalar reading can still be built by accommodating an order based on quantities, since the associate is the last element of a sequence.

## 6 Evaluative (scalar-like) items: *addirittura*

The last item we are going to discuss in this paper is the Italian positive particle *addirittura*, which can be rendered only partly by English *even*. This item would presumably fit in the class that (König 1991) has labelled as evaluative items, as it takes an associate that must be perceived as ranking high.

Consider (43). It can be used in contexts where several people pulled strings, in which case it is equivalent to *perfino*, see (44), and translates as *even*.

- (43) Per ottenere questo posto si è fatto raccomandare addirittura dal vescovo.  
to get this job he got even the bishop to pull strings for him
- (44) Per ottenere questo posto si è fatto raccomandare perfino dal vescovo.  
to get this job he got even the bishop to pull strings for him

However, (43) is compatible also with a situation where the bishop is the only person who pulled strings, in which case the sentence is not equivalent to (44) and the English rendering with *even* is no longer suitable. A better rendering is provided in (45), for which literal translations in Italian are given in (46).

- (45) The bishop himself pulled strings for him to get him this job
- (46) Per fargli ottenere questo posto, lo ha raccomandato il vescovo  $\left\{ \begin{array}{l} \text{in persona} \\ \text{medesimo} \end{array} \right.$

$ALT_{\beta}$  is viewed as the product of the focus component of a particle. The fact that a sentence containing *addirittura* can be used felicitously in a context where the proposition it expresses does not hold for a permutation of the associate, means that *addirittura* does not trigger a presupposition of existence.  $ALT_{\beta}^{\alpha}$  might not be computed. Hence the associate can be characterised as a maximal element in  $ALT_{\beta}$  but it is not necessarily the upper bound of one of its subsets. Further evidence supporting this characterisation comes from example (47), where the bishop is considered to rank high on the scale of influential people but the indefinite article requires him to be one among several, which is still compatible with a situation where only one person

pulled strings.

- (47) Per ottenere questo posto si è fatto raccomandare  $\left\{ \begin{array}{l} \text{addirittura da un vescovo} \\ \text{*da un vescovo in persona} \\ \text{*da un vescovo medesimo} \end{array} \right.$   
 to get this job he got nothing less than a bishop to pull strings for him

Constraints imposed by *addirittura* concern the associate, as recorded in (48). The conditional form of (48iii) paves the way to a scalar reading but does not have to be matched with an existential presupposition

- (48) **constraints on *addirittura***  
 (i)  $ALT_{\beta}$  is a partially ordered set  
 (ii) the associate is a maximal element in  $ALT_{\beta}$   
 (iii) if  $ALT_{\beta}^{\alpha}$  can be computed, i.e. if  $|ALT_{\beta}| > 1$  in context, then the associate is the upper bound of at least one of its subsets.

The need for constraint (48iii) is exposed by the contrast in (49). The presence of suitable antecedents triggers the computation of  $ALT_{\beta}^{\alpha}$ , but all overt alternatives must rank lower than the associate.

- (49) a. Per ottenere questo posto si è fatto raccomandare dal prete e addirittura dal vescovo  
 to get this job he got the priest and even the bishop to pull strings for him  
 b. \*Per ottenere questo posto si è fatto raccomandare dal vescovo e addirittura dal prete  
 he got the bishop and even the priest to pull strings for him

## 7 Summary

We have discussed how the scalar and additive readings of *neanche* result from different ways of satisfying the existential presupposition in the absence of specific constraints on two choice points which are the structure of the set of alternatives and the strategy to adopt to satisfy such a presupposition.

Next, the behaviour of several items has been characterised as corresponding to different combinations of choices. When verification of the existential presupposition is required, the additive reading emerges, but the scalar reading is possible as parasitic on a set of alternatives that is ordered for independent reasons. This is the case of *anche*. When accommodation is selected, scalar readings are always possible. This is the case of *perfino*.

In order to develop a network of items, we have also exploited the different consequences that the use of the two notions of maximal and of upper bound have on the minimal cardinality of the set of alternatives. In this way, the evaluative and at times scalar item *addirittura* can also find its place.

## References

- Fauconnier, G.: 1976, Remarque sur la théorie des phénomènes scalaires, *Semantikos* 1, 13–36.  
 Karttunen, L. and Peters, S.: 1979, Conventional implicature, in Oh and Dinneen (eds), *Presupposition, Volume 11 of Syntax and Semantics*, Academic Press, New York, pp. 1–56.



- 
- König, E.: 1991, *The Meaning of Focus Particles – A Comparative Perspective*, Routledge, London.
- Krifka, M.: 1998, Additive particles under stress, *Proceedings of Semantics and Linguistic Theory VIII*, pp. 111–129.
- Merin, A.: 2003, Replacing ‘Horn Scales’ by Act-Based Relevance Orderings to keep negation and numerals meaningful, *Forschungsberichte des DFG-Forschergruppe ‘Logik in der Philosophie’*.
- Rooth, M.: 1985, *Association with focus*, PhD thesis, University of Massachusetts at Amherst.
- Rooth, M.: 1992, A theory of focus interpretation, *Natural Language Semantics* **1**, 75–116.
- Rullmann, H.: 2003, Additive particles and polarity, *Journal of semantics* **20**, 329–401.
- Tovena, L. M.: 2005a, Discourse and addition, *Workshop Discourse Domains and Information Structure ESSLI 2005*, pp. 47–56. <http://www.linguist.jussieu.fr/~tovena/papers/essli05p-ref.pdf>.
- Tovena, L. M.: 2005b, Facets of a negative additive adverb, talk delivered at 3rd Workshop on Syntax and Semantics, Nantes.
- van der Sandt, R.: 1992, Presupposition projection and anaphora resolution, *Journal of Semantics* **9**, 333–377.
- van Rooy, R.: 2003, Negative polarity items in questions: strength as relevance, *Journal of Semantics* **20**, 239–274.
- Zeevat, H.: 1992, Presupposition and accommodation in update semantics, *Journal of Semantics* **9**, 379–412.



# RUSSIAN PREDICATE CLEFTS: TENSIONS BETWEEN SEMANTICS AND PRAGMATICS\*

Anna Verbuk,  
UMass, Amherst

averbuk@linguist.umass.edu

## Abstract

Russian predicate cleft constructions have the surprising property of being associated with adversative clauses of the opposite polarity. I argue that clefts are associated with adversative clauses because they have the semantics of S-Topics in Büring's (1997, 2000) sense of the term. It is shown that the polarity of the adversative clause is obligatorily opposed to that of the cleft because the use of a cleft gives rise to a relevance-based pragmatic scale. The ordering principle according to which these scales are organized is relevance to the question-under-discussion.

## 1 Introduction

VP-fronting constructions have been attested in a wide variety of languages, including Haitian Creole, Yiddish, Swedish, Norwegian, Catalan, Brazilian Portuguese, Hebrew and Russian. Russian predicate clefts are constructions where the infinitival verb is presposed and its tensed copy is pronounced in situ. The present paper is devoted to exploring the semantics, pragmatics and discourse function of Russian predicate clefts (RPCs). The main puzzle that this paper addresses is the association of RPCs with adversative clauses of the opposite polarity. It is argued that the association of clefts with adversative clauses is due to the fact that clefts are S-Topic constructions in Büring's (1997) sense of the term S-Topic<sup>1</sup>. S-Topics have a special discourse strategy associated with them; this strategy consists of implicating the relevance of a set of questions that are sisters to the question dominating the sentence containing the S-Topic. It is shown that clefts are associated with clauses of the opposite polarity because, by using a cleft, the speaker makes salient a relevance-based scale based on relevance to the question-under-discussion. In the concessive clause, the lower value on the scale is affirmed; in the adversative clause, it is denied that a higher value on the scale holds, hence the crossed polarity pattern.

The paper is organized as follows. Section 1 is the introduction. In section 2, contexts in which clefts are used and their association with adversative clauses are discussed. Section 3 is concerned with the intonational properties of clefts. In section 4, Büring's theory of S-Topics is introduced and a case is made for analyzing RPCs as S-Topic constructions. A compositional analysis of RPCs is provided. In section 5, it is argued that the association of clefts with adversative clauses of the opposite polarity is due to the fact that clefts have discourse function of implicating the relevance of a particular question that is sister to the question dominating the predicate cleft and the overt or implicit adversative clause provides an answer to this question. It is shown that the opposite polarity pattern is due to the fact that the use of a cleft gives rise to a pragmatic scale. In Section 6, it is argued that the use of an

---

\* I would like to thank Chris Potts and Barbara Partee for the insightful criticism of this work and John Kingston for his help with interpreting pitch tracks. I am also grateful for the helpful comments made by the audiences at FSIM, FASL 14 and SuB 10. All remaining errors are my own.

<sup>1</sup> It needs to be noted here that Büring (1997) uses the term S-Topics (or sentential topics) and Büring (2000) uses the term "contrastive topics" in reference to the same phenomenon.

RPC gives rise to a conventional implicature that some proposition Q that is stronger on the relevance-based scale than the proposition P given rise to by the cleft does not hold. It is also shown that when the adversative clause is not overt the speaker conveys its content through a particularized conversational implicature. In section 7, the analysis is summarized.

## 2 The Data

The concessive clause in (1b), ‘as far as reading it, he reads it’, is an example of an RPC.

- (1) a. Is he reading the book?  
 b. Čitat’ -to eë on čitaet, no ne ponimaet.  
 read<sub>INF</sub> TO it<sub>FEM.ACC</sub> he reads but not understands  
 ‘As far as reading it, he reads it, but he does not understand it.’

The speaker of (1b) uses the RPC construction in order to indicate that some other topic<sup>2</sup> than the one addressed by the predicate cleft is more relevant in the given context. The more relevant topic of whether or not the referent of ‘he’ understands what he is reading is addressed in the adversative clause.

- (2) a. Is she keeping in touch?  
 b. Ona pišet, no zvonit’ ne zvonit.  
 she writes but call<sub>INF</sub> not calls  
 ‘She writes but, as far as calling, she does not call.’

In (2b), the cleft occurs in the adversative clause; the more relevant topic is her not calling. The topic addressed by the RPC is always contrasted with some other topic; the speaker uses the RPC to indicate which topic is the most relevant one in the given discourse situation.

In the default case, the cleft is associated with an overt adversative clause. As will be argued below, in certain contexts, the content of the adversative clause may be conveyed through an implicature. Concerning the role of the topic particle *to*, it needs to be noted that its presence is never obligatory; *to* may encliticize to the preposed verb to mark it as discourse-old in the sense of having been evoked in the prior discourse, as in (1b).

### 2.1 Contexts of Use

RPCs, being instances of preposing constructions, cannot be uttered out of the blue. The predicate cleft in (3) below cannot be uttered in response to a question like, “what’s new?”

- (3) Begat’-to ona begala, a v magazin ne xodila.  
 run<sub>INF</sub> TO she ran but in store<sub>MASC.ACC</sub> not went  
 ‘As far as running, she ran, but she didn’t go to the store.’

(3) can be uttered in response to either of the following questions.

- (4) Did she go to the store ?  
 (5) Did she run?  
 (6) Has she done everything she planned to?

The verb that is preposed in the predicate cleft may but need not be given.

(3) is a felicitous answer to the question in (6) if both interlocutors know that running and going to the store are on her “to do” list. In Ward and Birner’s (2001) terms, (3) may be

<sup>2</sup> The term “topic” is not used in the technical sense in section 2.

feliculously uttered in response to either of the questions in (4-6) if ‘running’ and ‘going to the store’ are in poset relation as alternate members of the inferred poset “her ‘to do’ list .”

Next, consider the dialogue in (7) in a context where swimming is not something the referent of ‘she’ is wont to do.

- (7) a. What did she do today?  
 b. # Plavat’ ona plavala, no v magazin ne xodila.  
 swim<sub>INF</sub> she swam but in store<sub>MASC.ACC</sub> not went  
 ‘As far as swimming, she swam but she didn’t go to the store.’

Preposing the verb for “to swim” is infelicitous in this context because swimming is not a member of the inferred poset “activities she is likely to engage in.” If the predicate cleft construction is not used, the response is felicitous, as (7c) demonstrates.

- c. Ona plavala, no v magazin ne xodila.  
 she swam but in store<sub>MASC.ACC</sub> not went  
 ‘She went swimming but she did not go to the store.’

## 2.2 The association of RPCs with adversative clauses

The RPC is either associated with an overt adversative clause or the content of the adversative clause is conveyed through an implicature.

- (8) Speaker A:  
 a. What did she do today?  
 Speaker B:  
 b. # Guljat’ ona guljala.  
 walk<sub>INF</sub> she walked  
 ‘As far as going for a walk, she went for a walk.’

Even if A and B know that going for a walk is on the list of activities she is likely to engage in, B’s response is infelicitous. In contrast to VP-preposing constructions of the topicalization variety, the predicate cleft in (8b) can not be used to affirm an open proposition, “she did / did not go for a walk.”<sup>3</sup> The RPC has discourse function of indicating that some other topic is more relevant in the given context. An RPC may be used without an adversative clause *if the interlocutors share enough information for the hearer to be able to compute the speaker’s implicature that otherwise would have been overtly expressed in the adversative clause.*

Whenever a predicate cleft occurs on its own, there is a strong implicature to the effect that there is an issue that the speaker views as more relevant than the one addressed in the monoclausal predicate cleft construction.

- (9) a. Did they move to their new office?  
 b. Pereexat’-to oni pereexali.  
 move<sub>INF</sub> TO they moved  
 ‘As far as moving, they moved.’

Possible Implicature: but they haven’t renovated it.

The implicature that the predicate cleft gives rise to is a conversational implicature, as will be discussed in more detail below.

<sup>3</sup> One of the discourse functions of English VP-preposing constructions is affirming a speaker’s belief in an open proposition that is salient in the previous discourse (Ward, 1990).

(i) Mary said she would go to Boston, and go to Boston she did.

### 3 Intonation Facts

In this section, it will be demonstrated that a particular intonational contour is associated with RPCs, which will be instrumental in accounting for the association of RPCs with adversative clauses.

- (10) a. Who bought the tomatoes?  
 b. # Kupit' pomidory ona kupila, no salat ne sdelala.  
 buy<sub>INF</sub> tomatoes<sub>ACC</sub> she bought but salad not made<sub>PERF</sub>  
 'She bought the tomatoes but she hasn't made a salad.'

In (10b), the NP 'she' receives focus because of its status as new information. The only felicitous pronunciation of (10b) is the one where the main pitch accent falls on 'bought', as in (11b).

- (11) a. Did she buy tomatoes?  
 b. Kupit' pomidory ona kupila, no salat ne sdelala.  
 buy<sub>INF</sub> tomatoes<sub>ACC</sub> she bought but salad not make<sub>PERF</sub>  
 'She bought the tomatoes but she hasn't made a salad.'

Next, consider the intonation pattern associated with RPCs.

- (12) a. Does he know her address?  
 b. Znat' on ego ne znaet, no poiskat' mozet.  
 know<sub>INF</sub> he it<sub>MASC.ACC</sub> not knows but search<sub>PERF.INF</sub> can  
 'He doesn't know it but he can look for it.'

Figure 1 below shows that in (12b) the preposed verb 'know' receives a LH\* accent; the in-situ tensed verb 'know' also receives a LH\* accent, which is the main pitch accent of the sentence. The verb 'can' in the adversative clause receives a L\* accent.

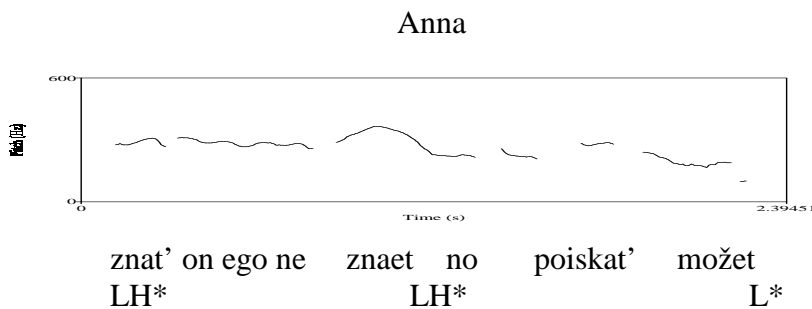


Figure 1. RPC

A variety of RPCs was recorded, and this particular intonation pattern obtained in all of them. It was found that there is a special tune associated with RPCs: a LH\* accent on the fronted infinitival verb, followed by a high plateau, followed by a LH\* accent on the in-situ tensed verb, followed by a high plateau, followed by a L\* accent on the focused phrase in the adversative clause.

It needs to be noted here that the LH\* accent on the preposed verb is due to the fact that a preposed phrase always receives a LH\* accent in Russian. A variety of constructions where a phrase was preposed were recorded and the preposed phrase was invariably marked by a LH\* accent. However, the LH\* accent on the in situ tensed verb is unexpected. Incidentally, contrastive topics, or S-topics in Büring's terms, are marked by a LH\* accent in Russian as well. In (13b) below, the NP *Anja* functions as an S-topic, as will become clear from the discussion of S-topics in the next section. The NP *Anja* is marked by a LH\* accent.

- (13) a: What did the women wear ?  
 b: Anja byla v dublënke.  
 Anja was in coat  
 ‘Anja wore a coat.’

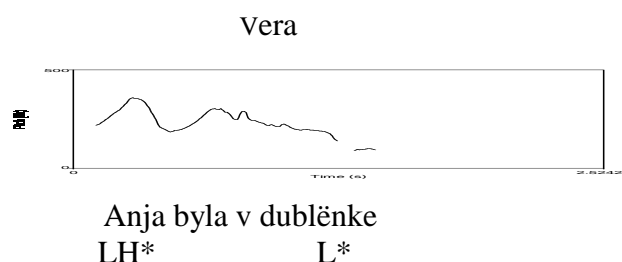


Figure 2. S-topic

The intonation contour associated with the RPC and the association of RPCs with adversative clauses will be accounted for by demonstrating that these properties follow from the fact that RPCs are S-Topic constructions in Büring’s (1997) sense of the term.

#### 4 Büring’s Theory of S-Topics and the S-Topic Discourse Strategy

Büring (1997) introduces the notion of S-Topics to account for the coherence of discourses where one of the interlocutors provides a partial or even a seemingly unrelated answer to his addressee’s question.

- (14) Speaker A:  
 a. What book would Fritz buy?  
 Speaker B:  
 b. Well, I would buy *The Hotel New Hampshire*. (Büring 1997:66).  
 L\*H

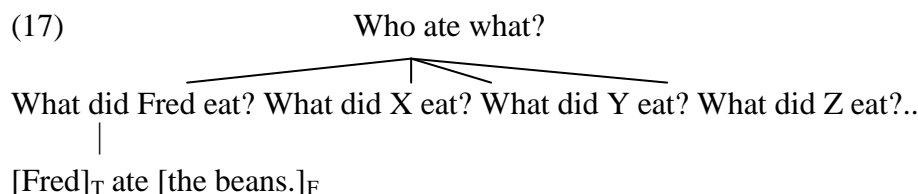
The L\*H accent on the “I” in B’s response is obligatory in order for it to be a felicitous response to A’s question. On the face of it, the Focus value of the answer does not match the meaning of the question. While the question in (14) denotes a set of propositions of the type, “Fritz would buy Y,” the focus value of the answer is, “I would buy Y.” The dialogue in (14) is coherent because B’s response is appropriate with respect to the Discourse-topic that is defined as a set of propositions that are informative with respect to the Common Ground. Propositions of the type, “X would buy Y,” are informative with respect to the Common Ground. In, “X would buy Y,” the topic as well as the focus introduces a set of alternatives. The Topic value of (14b) can be represented as a set of questions that obligatorily includes the original question, “What book would Fritz buy?” Questions in the topic value are formed by replacing the S-Topic with an alternative and questioning the focus of the original sentence containing the S-Topic, as in (15).

- (15) {What book would I buy?, What book would Fritz buy?, What book would Mary buy?...} (Büring 1997:66-67).

In order for the utterance of a sentence containing an S-Topic to be felicitous, one of the answers to one of the questions in the topic value needs to be under discussion. In (14), the question, “What book would Fritz buy?” is under discussion prior to the utterance of the sentence containing the S-topic. This ensures that the sentence containing the S-Topic is informative with respect to the Common Ground. The use of an S-Topic is felicitous only if at least one of the alternatives to it is under discussion.

The use of an S-Topic indicates the following discourse strategy. In the discourse tree (d-tree) framework used in Büring (2000), the use of a sentence containing an S-Topic implicates the existence of a set of questions that are sisters to the question immediately dominating the sentence containing the S-topic.

- (16) a. What did Fred eat?  
 b. [Fred]<sub>T</sub> ate the [beans.]<sub>F</sub>  
 L\*H



The use of the sentence in (16b) indicates a discourse strategy in the sense of implicating the relevance of questions that are sisters to the question immediately dominating the sentence, “Fred ate the beans.” The generalized conversational implicature associated with the use of (16b) is that other people ate other foods (Büring 2000:4-7).

#### 4.1 RPCs as S-Topic constructions

In this section, it will be argued that RPCs are S-Topic constructions in Büring’s (1997, 2000) sense of the term. The following conditions need to be fulfilled in order for a construction to be classified as an S-Topic construction.

1) Phonologically, an S-Topic is obligatorily marked by a topic accent, and this accent must be different from the focus accent. As discussed in section 2, in the RPC, the in-situ tensed verb is obligatorily marked by a LH\* accent that is distinct from the focus accent.

2) The use of a sentence containing an S-Topic is associated with a strategy of implicating that questions in the topic value of the S-Topic sentence are relevant. This is precisely the strategy that the use of an RPC indicates.

- (18) Emu xotelos’ blesnut’ i obratitsja k dame na eë rodnom jazyke. Čitat’-to po-bolgarski on čital – kirillica ! – i daže pri ètom koe-čto ponimal, no ustnaja živaja reč’ nikak ne poddavalas’ ponimaniu: taratorjat.

‘He wanted to impress the lady by speaking to her in her native language. As far as reading Bulgarian, he could read it – they used the Cyrillic alphabet! -- and he even understood some of what he was reading, but the spoken language he couldn’t understand – they were speaking too fast’. (Mamedov, Milkin, *The Sea Stories*. 2003).

In (18), the underlined predicate cleft cannot occur without being followed by an adversative clause, as (19) illustrates.

- (19) Emu xotelos’ blesnut’ i obratitsja k dame na eë rodnom jazyke. # Čitat’-to po-bolgarski on čital – kirillica ! – i daže pri ètom koe-čto ponimal.

The use of the RPC in (18) implicates that a question different from the one addressed by the RPC is the most relevant one in the given discourse, namely, the protagonist’s command of spoken Bulgarian. As the discourse tree in (20) illustrates, this question is addressed in the adversative clause and is sister to the question immediately dominating the predicate cleft.



- (20)                   How good was his Bulgarian?  
                           /                          |                          \  
 Could he speak it? Could he read it? Could he understand it?

as far as reading Bulgarian, he could read it... but the spoken language he couldn't understand...

3) In order for the use of a sentence containing an S-Topic to be felicitous, one of the questions in the topic value of the S-Topic sentence needs to be under discussion. The use of an S-Topic is possible only if at least one of the alternatives to it is under discussion. In (18), the question, "Could he speak Bulgarian?" is under discussion prior to the utterance of the cleft because in the discourse preceding the cleft it is mentioned that the protagonist wanted to speak to the lady in Bulgarian.

#### 4.2 RPCs as S-Topic constructions: a formal account

First, it needs to be determined what phrase in the RPC can be analyzed as an S-topic. Both the preposed infinitival verb and its in situ tensed copy are marked by the LH\* topic accent. As demonstrated, topicalized phrases are marked by LH\* in Russian. If the preposed verb alone were construed as an S-topic, it would be puzzling why its in situ tensed copy obligatorily bears the LH\* topic accent as well. The in situ tensed verb has the status of being given, thus its being marked with the LH\* topic accent must convey some additional meaning. This meaning is that of being an S-topic; the tensed verb in situ will be analyzed as an S-topic in Büring's sense of the term.

In Büring's framework, the S-topic introduces a set of alternatives. In the case of RPCs, the verb in situ is an S-Topic that introduces a set of alternatives. Crucially, the adversative clause associated with the cleft is a member of this set. This is due to the fact that the use of a predicate cleft is associated with a strategy of implicating that a set of questions that are sisters to the question immediately dominating the cleft is relevant; the adversative clause is an answer to one of these questions.

Consider how this would work on the following constructed example.

- (21) Čitat' Maša čitaet, no ne ponimaet.  
 read<sub>INF</sub> Masha read but not understand  
 'As far as reading, Masha reads but she does not understand what she is reading.'

- (22) As far as reading, Masha [reads]<sub>T</sub> but she does not [understand]<sub>F</sub>

The focus on the verb "understand" introduces a set of alternatives. The focus value of (22) is given in (23).

- (23) {read Masha read but not understand, read Masha read but not write...}

The Topic value of (22) is a set of such sets with alternatives to the S-Topic. Consider Büring's interpretation rule (50) in the Appendix for deriving the topic value of a sentence in which one phrase is topic-marked and another one is focus-marked. By rule (50), the topic value of (22) is as in (24):

- (24) {{read Masha read but not understand, read Masha read but not write...}, {sing Masha sing but not understand, sing Masha sing but not write...}}

Consider Büring's (1997) interpretation rule for deriving the topic value of a sentence given in (51) in the Appendix. By the rule in (51), the topic value of (22) is as follows.

[[22]]<sup>t</sup> =  $\lambda P. \exists H [H \in \text{ALT}(\text{read}') \ \& \ H(\text{Masha}) \ \& \ P = \lambda p. \exists Q [Q \in \text{ALT}(\text{understand}') \ \& \ H \in \text{ALT}(\text{understand}') \ \& \ p = \neg Q(\text{Masha})]]$

### 4.3 The compositional analysis of RPCs

Abels' (2001) syntactic analysis of RPCs will be adopted here. Abels (2001) argues for the movement analyses of RPCs, with both copies of the verb being phonetically realized.

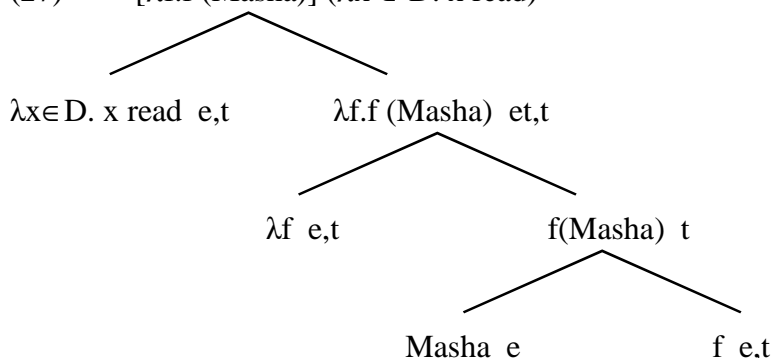
(25) [CP... [XP [VP... V<sub>inf</sub>...]]...[-to...[IP... V<sub>fin</sub>...]]] (Abels, 2001, p. 10).

Next, consider a constructed RPC in (26) and its semantic derivation in (27) below.

(26) Čitat' Maša čitaet.  
 read<sub>INF</sub> Masha reads  
 'As far as reading, Masha reads.'

In my semantic analysis, I am ignoring the difference between the infinitival verb and the tensed verb. In (27) below, first, the function *f* that is a trace of the moved VP combines with the NP "Masha." Then lambda abstraction over *f* takes place. After that, the infinitival verb is combined with the product of the lambda abstraction, which results in the RPC meaning on top of the tree.

(27) [ $\lambda f.f(\text{Masha})$ ] ( $\lambda x \in D. x \text{ read}$ )



The truth conditions of the sentence in (26) are as in (28).

(28) [ $\lambda f.f(\text{Masha})$ ] ( $\lambda x \in D. x \text{ read}$ ) = 1 iff Masha reads.

In the tree in (27), I provided a compositional analysis of the RPC in which the verb "read" is used intransitively. It needs to be noted here that my analysis would have to be elaborated to account for RPCs with transitive verbs in which the direct object may either be preposed as part of the preposed VP or, alternatively, is scrambled out of the VP, with the VP being subsequently preposed.

## 5 Why RPCs are Associated with Adversative Clauses

As demonstrated, RPCs have discourse function of S-Topics -- the use of an RPC indicates a strategy that consists of implicating the relevance of questions in the topic value of the cleft. In addition, the speaker of a cleft indicates the sub-strategy that consists of indicating which specific question among the questions in the topic value of the cleft is relevant in the given discourse. As previously argued, the adversative clause can be implicated rather than overt if the following condition holds.

(29) *The interlocutors share enough information for the hearer to be able to compute the speaker's implicature that otherwise would have been overtly expressed in the adversative clause.*

When contextual information is not sufficient for the addressee to infer from the context the question whose relevance is implicated by the use of an RPC, the speaker uses an overt adversative clause that provides an answer to this question. When the addressee is able to infer the question and the answer to it from the context, the content of the adversative clause providing the answer may be expressed through a conversational implicature.

### 5.1 The crossed polarity pattern and pragmatic scales

Whenever an RPC is followed by an overt adversative clause, the polarity of the adversative clause is the opposite of that of the cleft (e.g., (1), (2), (18)).

The following constructed examples demonstrate that violating the crossed polarity pattern requirement leads to deviance.

- (30) a. Did she buy tomatoes?  
 b. \* Kupit' pomidory ona kupila, a ogurtsy u neë byli.  
 buy<sub>INF</sub> tomatoes<sub>ACC</sub> she bought but cucumbers<sub>ACC</sub> at her were  
 'She bought the tomatoes but the cucumbers she already had.'  
 c. Kupit' pomidory ona kupila, a ogurtsy ne kupila.  
 buy<sub>INF</sub> tomatoes<sub>ACC</sub> she bought but cucumbers<sub>ACC</sub> not bought  
 'She bought the tomatoes but the cucumbers she didn't buy.'

The contrast between (30b) and (30c) demonstrates that the reason why the RPC in (30b) is deviant is that the crossed polarity pattern requirement is violated.

Next, consider an RPC where both the clause containing the cleft and the adversative clause have negative polarity.

- (31) a. Has she answered the email?  
 b. \* Otvetit' ona ne otvetila, no u neë ne bylo vremeni.  
 answer<sub>INF</sub> she not answered but at her not was time  
 'She didn't answer the email but she didn't have time.'

If a predicate cleft is not followed by an overt adversative clause, it gives rise to an implicature of the opposite polarity, as (32) illustrates.

- (32) Context: A and B know that Mary is not sure if she should write to John or not.  
 Speaker A:  
 a. Did Mary write John a letter?  
 Speaker B:  
 b. Napisat'-to pis'mo ona napisala.  
 write<sub>INF</sub> TO letter she wrote  
 'As far as writing the letter, she wrote it.'

Implicature: the speaker does not know if Mary sent the letter.

In accounting for the crossed polarity pattern, I would like to adopt Lee's (2002) insight that the use of CT (or S-topic, in Büring's terms) gives rise to a scale. According to Lee (2002), the use of a CT predicate gives rise to a Horn scale; event descriptions are ordered on the scale based on degree of accessibility to the ultimate goal in the relevant series of events.

However, the notion of accessibility to the ultimate goal in the relevant series of events is too narrow to account for the types of scales RPCs may give rise to. While in Korean predicate clefts, only stage-level predicates may be used, in RPCs, individual-level predicates may be used as well. Moreover, RPCs give rise to scales that are not entailment-based. A constructed example in (33) illustrates that the use of an RPC gives rise to a pragmatic scale.

(33) Context: A and B are trying to decide if Miss Clark or Mary would be a better French tutor for their son. A knows nothing about either of the two candidates, and B knows that Miss Clark has a degree in French but doesn't like French and that Mary loves French but is incompetent.

Speaker A:

a. Would Miss Clark be a good tutor?

Speaker B:

b. Znat' francuskij ona znaet, no ne lubit.

know<sub>INF</sub> French she know but not love

'As far as knowing French, she knows it, but she doesn't like it.'

The pragmatic scale relevant for (33) is as in (34).

(34) <love French, know French>

The question under discussion (QUD)<sup>4</sup> that the RPC in (33b) addresses is, "Would Miss Clark be a good tutor?" If speaker B were to follow up his utterance with, "I think that she would make a good tutor," he would sound contradictory. A natural continuation of (33b) is, "So I don't think she would make a good tutor." This is evidence to the effect that B's response conveys a negative answer to the QUD – "no, Miss Clark wouldn't be a good tutor." The concessive and adversative clauses of B's reply in (33) constitute two parts of his answer to the QUD. The concessive clause containing the cleft provides an inconclusive answer to the QUD. It is the adversative clause that implicates the negative answer to the QUD that speaker B wishes to convey. These intuitions about the exchange in (33) are reflected in the scale in (34). "Love French" is stronger than "know French" on the pragmatic scale based on *relevance to the QUD*.

Next, consider the dialogue in (35) that takes place in the same context as the one in (33).

(35) Speaker A:

a. Would Mary be a good tutor?

Speaker B:

b. Lubit' francuskij ona lubit, no počti ne znaet.

love<sub>INF</sub> French she love but almost not knows

'As far as liking French, she likes it, but she hardly knows it.'

As in (33), in (35), B's response may not be felicitously followed up with, "I think that she would make a good tutor." B's response conveys a negative answer to the QUD, "Would Mary be a good tutor?" The exchange in (35) gives rise to the following scale.

(36) <know French, love French>

"Know French" is ranked higher than "love French" because the concessive clause in which "love French" is affirmed does not answer the QUD conclusively. In other words, "know French" is ranked higher because its denial provides a conclusive answer to the QUD that speaker B wishes to convey.

The following dialogue illustrates that pragmatic scales that RPCs give rise to are based on relevance as it is perceived by the speaker of the cleft, not necessarily as perceived by both interlocutors.

Assume that the dialogue below takes place in the same context as the one in (33).

---

<sup>4</sup> In the pragmatic literature, the term QUD is often used in reference to different phenomena. In the present paper, I am using the term QUD in reference to the either explicit or implicit question that is the most salient one during a given stage in the conversational exchange. Büring (2000) uses the term "question-under-discussion" in reference to the same phenomenon.

- (37) Speaker A:  
 a. Does Mary like French ?  
 Speaker B:  
 b. # Znat' francuskij ona ne znaet, no lubit.  
 know<sub>INF</sub> French she not know but love  
 'As far as knowing French, she doesn't know it, but she loves it.'

(37b') shows that if an RPC construction is not used, this response is fine.

- b': Ona francuskij ne znaet, no lubit.  
 she French not know but love  
 'She doesn't know French but she loves it.'

The dialogue in (37) illustrates that the adversative clause in the RPC cannot contain an answer to an overt immediate QUD; only the clause containing the cleft can answer an immediate QUD. Thus B's response in (37) would have been felicitous as an answer to a question, "Does Mary know French?" As it stands, the exchange in (37) is infelicitous because, as it was previously argued, discourse function of RPCs is indicating that a different question (or topic) than the one addressed in the concessive clause is the more relevant one. The more relevant topic is addressed in the overt or implicated adversative clause. In (37), speaker B's use of the cleft in response to A's question suggests that he considers some topic other than Mary's liking French more relevant in the given context. Speaker B appears to contradict himself when he ends up addressing the subject of Mary's loving French in the adversative clause, hence the infelicity of (37b). In a nutshell, (37) illustrates that the speaker of the RPC is the one indicating to the addressee which topic he considers more relevant. Thus the pragmatic scale that the use of an RPC gives rise to is based on relevance to the QUD *as perceived by the speaker of the cleft*.

As far as the crossed polarity pattern between the cleft and the adversative clause is concerned, it needs to be noted that this requirement is pragmatic rather than semantic, as will be illustrated below. Consider the RPC in (38), where both clauses have positive polarity.

- (38) Prijti ona prišla, no pozdno.  
 come<sub>INF</sub> she came but late  
 'She came over, but she came over late.'

In (38), both the cleft and the adversative clause have positive polarity. The adversative clause contains an elided VP "came"; "came late" is an alternative to "came," which is the S-topic. The overt adversative clause "but late" introduces a new question in the topic value, namely, "Was she on time?" and provides a negative answer to this question. The relevant pragmatic scale is given in (39):

- (39) <come over on time, come over>

The adversative clause gives rise to the implicature, "she did not come over on time." Thus it is implicated that the higher value on the scale does not hold. In (38), the polarity of the relevant scalar implicature is opposed to that of the concessive clause; the scalar implicature rather than the overt adversative clause satisfies the crossed polarity pattern.

To summarize, RPCs are associated with clauses of the opposite polarity for the following reason. The use of an RPC introduces a pragmatic scale, and the concessive clause affirms a lower value on the scale, while the adversative clause denies that a higher value holds. This observation is formalized in (40).

- (40) *The proposition given rise to by the RPC containing an S-topic predicate P is contrasted with an either overt or implicit adversative proposition "but'  $\neg$  Q" for*

*positive clefts and “‘but’ Q” for negative clefts, with predicate Q being stronger than P on the relevance-based pragmatic scale that the speaker’s use of the RPC gives rise to.*

It needs to be noted here that an RPC may either be followed by an adversative clause or, in some cases, it may be preceded by a concessive clause and may occur in the adversative clause, as in (41).

- (41) Ona francuskij znaet, no lubit’ ne lubit.  
 she French know but love<sub>INF</sub> not loves  
 ‘She knows French but, as far as loving it, she doesn’t love it.’

If an RPC occurs in the adversative clause, it has the same discourse function as an RPC occurring in the concessive clause. An RPC occurring in the adversative clause indicates the sub-strategy associated with RPCs, i.e., it indicates which specific question in the topic value of the RPC is the most relevant one in the given discourse. By using the predicate cleft in the adversative clause, the speaker indicates that the question dominating the cleft is the most relevant one in the given discourse. The answer to this question is contrasted with the answer to the question dominating the concessive clause preceding the cleft. The use of (41) gives rise to the scale where “loving French” is ranked higher than “knowing French.” In light of the fact that an RPC can occur in the adversative clause, the condition in (40) needs to be modified to the one in (42).

- (42) *The RPC containing an S-topic predicate may occur either in the concessive or adversative clause. The concessive proposition given rise to by the clause containing predicate P or  $\neg P$  is contrasted with the adversative propositions “‘but’  $\neg Q$ ” or “‘but’ Q,” respectively, with predicate Q being stronger than P on the relevance-based pragmatic scale that the speaker’s use of the RPC gives rise to.*

## 6 Conventional and Conversational Implicatures Generated by the RPC

By the condition in (42), the utterance of the RPC gives rise to the implicature that some predicate Q that is stronger than predicate P employed in the cleft does not hold. This is the *conventional* implicature associated with RPCs. From this it follows that the predicate whose truth is affirmed or denied in the RPC cannot be the maximal value on the scale the RPC gives rise to. Consider a case where using in the cleft the strongest item on the relevant scale leads to infelicity.

- (43) Speaker A:  
 a. How good is his Bulgarian ?  
 Speaker B:  
 b. # Znat’ on ego v soveršenstve znaet.  
 know<sub>INF</sub> he it in perfection know  
 ‘As far as knowing Bulgarian, he knows it perfectly.’  
 Speaker C  
 c. Znat’ on ego znaet.  
 know<sub>INF</sub> he it know  
 ‘As far as knowing Bulgarian, he knows it.’

A’s question and B’s infelicitous response in (43b) give rise to the following scale that the two interlocutors share.

- (44) < know Bulgarian perfectly, know Bulgarian moderately well, know Bulgarian badly >

B's response in (43) would have been felicitous without the modifier "perfectly." The modifier "perfectly" cannot be used because the RPC in (43b) ends up affirming the highest value on the scale in (44) -- "know Bulgarian perfectly."

In contrast, C's response in (43c) is felicitous and may implicate that the referent of 'he' knows Bulgarian but does not like it, in which case C's utterance of the cleft would give rise to the scale in (45).

(45) <like Bulgarian, know Bulgarian>

When an RPC is associated with an overt adversative clause, the clause containing the RPC affirms proposition P and gives rise to the conventional implicature that some proposition Q that is higher on the relevant scale does not hold. This implicature is non-cancelable.

(46) Given that P is the content of the RPC, the RPC generates the following *conventional implicature*:

“¬ Q' for some Q that is stronger than P on the relevance-based pragmatic scale.”

When the speaker utters the adversative clause, the hearer learns the exact content of Q. Thus the utterance of (43c) generates the conventional implicature that some higher value than "know Bulgarian" does not hold and the conversational implicature, "he does not like Bulgarian." If the speaker of (43c) were not sure that his addressee would be able to compute this implicature, he would have followed up the cleft with an overt adversative clause, "but he does not like Bulgarian." Because the speaker of the cleft is often unsure that the hearer can infer the content of the scale that his use of a given RPC generates, the speaker often utters rather than merely implicates the adversative clause.

The speaker of a cleft may convey the content of the adversative clause through a *particularized conversational implicature* (PCI), given that his addressee has sufficient information to compute its content. (47) illustrates how this implicature is computed.

(47) Context: A and B know that Mary is thinking about sending John a letter but is unsure if she should send it.

Speaker A:

a. Did Mary write John a letter?

Speaker B:

b. Napisat'-to pis'mo ona napisala.

write<sub>INF</sub> TO letter she write

'As far as writing the letter, she wrote it.'

Implicature: the speaker does not know if Mary sent the letter.

(48) Computing the Implicature:

While providing a direct answer to A's question, B employed a marked construction. By Levinson's (2000) M Heuristic, "what is said in an abnormal way isn't normal" (Levinson, p. 38). B would not have used a marked construction unless he intended to convey some additional meaning, this meaning being that, apart from the writing of the letter, some of Mary's actions are relevant in the given discourse. By Levinson's (2000) Q-principle, if B were in a position to make a more informative statement about actions that Mary performed, he would have done so. By Grice's (1975) maxim of Relevance, since B did not make such a statement, yet implicated the relevance of Mary's actions, he must have intended to convey the meaning that he is unsure if Mary performed some other relevant action(s). The interlocutors share the knowledge that sending the letter is a relevant action. B's utterance of (47b) gives rise to the ignorance implicature that B is unsure if Mary sent the letter.

In (47), initially, the QUD is, “Did Mary write John a letter?” By using an RPC, speaker B shifts the QUD to a broader QUD, “Did Mary contact John?” B’s use of the RPC in (47) and the implicature it generates give rise to the following pragmatic scale.

(49) <send the letter, write the letter>

The cleft asserts the weaker value on this scale; however, it does not provide a satisfactory answer to the broader QUD. Whether or not the stronger value on the scale -- “send the letter” -- actually holds is more relevant to the broader QUD. If it does not hold, a negative answer to the broader QUD would be conveyed and vice versa. If speaker A believed that B knew for a fact whether or not Mary sent the letter, he would have taken B’s utterance to convey the PCI, “Mary did not send the letter.”

The conversational implicature the cleft gives rise to is particularized rather than generalized because it is entirely context-dependent. Thus, if (47b) were uttered in a context where A and B shared the knowledge that the postal service is unreliable, the utterance of (47b) would have generated the implicature, “the speaker does not know if the letter will be delivered.”

## 7 Conclusion

The main puzzle that was addressed here was the association of clefts with adversative clauses of the opposite polarity. It was argued that the association of clefts with adversative clauses is due to the fact that clefts are S-Topic constructions. The speaker of the cleft implicates the relevance of a set questions in the topic value of the cleft and indicates which specific question in this set is relevant in the given discourse. Typically, a cleft is associated with an overt adversative clause that addresses the more relevant question. Alternatively, the content of the adversative clause may be implicated if the interlocutors share enough information for the hearer to be able to compute the speaker’s conversational implicature that otherwise would have been overtly expressed in the adversative clause.

As far as the opposed polarity pattern is concerned, it was argued that it arises because the use of an RPC gives rise to a relevance-based scale. The concessive clause affirms a lower value on this scale and the higher value is denied in the adversative clause. The use of an RPC conventionally implicates that some proposition that is stronger on the relevance-based scale than the one given rise to by the cleft does not hold.

While a substantial amount of work has been done in neo-Gricean pragmatics on exploring the maxims of Quantity and Quality, the maxim of Relevance is the least studied and the least understood of Grice’s maxims. (Relevance theory is based on the notion of relevance that is radically different from the maxim that was originally proposed by Grice). In the light of some observations concerning the generation of implicatures that were made in this paper, I would like to briefly suggest a way of formalizing the maxim of Relevance within the question under discussion framework (Roberts, 1996)<sup>5</sup>. The maxim of Relevance may be conceived of as demanding relevance to the QUD. The mechanism behind generating a Relevance implicature is that a speaker flouts the maxim of Relevance because his utterance does not address the QUD, or addresses it indirectly or partially. However, the implicature that the speaker conveys through producing this utterance does address the QUD directly; thus the speaker obeys the maxim of Relevance at the level of the implicature that the utterance gives rise to.

---

<sup>5</sup> It needs to be noted here that the idea to make a connection between Relevance and the question under discussion is implicit in van Rooj (2003), who proposes to rank answers to a salient question in terms of informativity and relevance to the question.



**Appendix**

Topic semantic value:

(50)  $[[\text{HANS}_T \text{ IS COMING}_F]]^t = \{ \{Ch, Lh\}, \{Cf, Lf\}, \{Cm, Lm\} \}$

(L = is leaving)

The topic value of (50) may be represented as follows using  $\lambda$ -notation:

(51)  $[[50]]^t = \lambda P. \exists x [x \in \text{ALT}(\text{hans}) \ \& \ P = \lambda p. \exists Q [Q \in \text{ALT}(\text{is-coming}) \ \& \ p = Q(x)]]$

(based on Büring 1997, pp. 78-79).

**References**

- Abels, Klaus. 2001. The Predicate Cleft Construction in Russian. In *FASL 9*, 1-19. Bloomington, IN, Michigan Slavic Publications.
- Büring, Daniel. 1997. *The Meaning of Topic and Focus – The 59<sup>th</sup> Street Bridge Accent*. London: Routledge.
- Büring, Daniel. 2000. On D-Trees, Beans, and B-Accents. Ms., UCLA.
- Grice, Paul. 1975. Logic and Conversation. In *Speech Acts*, ed. by Peter Cole and Jerry L. Morgan, 41-58. Syntax and Semantics 3. New York: Academic Press.
- Lee, Chungmin. 2002. Contrastive Topic and Proposition Structure. In *Asymmetry in Grammar*. Di Sciullo, Anne-Marie eds. John Benjamins.
- Levinson, Stephen. 2000. *Presumptive Meanings*. Cambridge, MA.: MIT Press.
- Ward, Gregory and Betty Birner. 2001. Discourse and Information Structure. In: *Handbook of Discourse Analysis*, ed. by Deborah Schiffrin, Deborah Tannen, and Heidi Hamilton, 119-137. Oxford: Basil Blackwell.



# DECOMPOSING PATH SHAPES: ABOUT AN INTERPLAY OF MANNER OF MOTION AND ‘THE PATH’\*

Matthias Weisgerber,  
Universität Konstanz

matthias.weisgerber@uni-konstanz.de

## Abstract

In this paper we will develop a formal conceptual model of how the path in a motion situation interacts with the semantic analysis of so called ‘motion shape verbs’ like ‘wackeln’ (‘wobble’), a subclass of the so called ‘manner of motion verbs’. Central to this model will be the distinction between two concepts of motion: *translational* motion and *non-translational motion*, which has no inherent translational component but puts emphasis on describing specific *Motion Shape Patterns*. We will define and algorithmically describe a theory of *Path Shape Decomposition* that aims at algorithmically deriving the translational vs. nontranslational distinction from the shape of the path. To account for object internal motion, we additionally introduce Bounding Box encapsulation, which yields a topological division of inner and outer movement. Finally we demonstrate how the outcome of such a technical decomposition can be used in modelling a Path Superimposition scenario like ‘Peter wackelt über die Straße’.

## 1 Introduction

Compared to path, not much research has been done concerning a formalization of manner of motion. Research in manner of motion has not yet reached a status of formal modelling. It is even unclear what the role of manner information in semantic modelling should be: decompositional semantic approaches do not assign manner an important role in word meaning modelling: formal abbreviations like ‘... & MOD<sub>MOVE</sub> & ...’ have not cared about further details. In formal semantic representations (e. g. (1), from Kaufmann (1995, p. 225f)), however, the *only* visible difference in meaning lies hidden in the manner information, which has not been formally elaborated:

- (1) a.  $\lambda P\lambda x\lambda s[\text{GEH}_P(x)\&\text{MOVE}_P(x)\&P(x)](s)$   
b.  $\lambda P\lambda x\lambda s[\text{SPRING}_P(x)\&\text{MOVE}_P(x)\&P(x)](s)$

The division between the two motion concepts of GO and MOVE, however, is widely accepted; Talmy (1983, 1985) and Jackendoff (1991) elaborate this division. Habel (1999) summarizes this unsymmetry in the state of the art as follows: “Während räumliche Konzepte – etwa durch das PATH-Konzept (Jackendoff 1990) – in systematischer Weise in die semantische Beschreibung von Verben der Fortbewegung eingehen, *fehlt eine entsprechende systematische Einbeziehung räumlicher Konzepte in der lexikalisch-semantischen Analyse der anderen Bewegungsverben bisher weitgehend.* (p. 106) [While spatial concepts like the PATH concepts enter into semantic modelling of motion verbs in a systematical way, there is no systematic theory of

---

\*This research has been supported from the SFB 471 “Variation and Evolution in the Lexicon”, funded by the Deutsche Forschungsgemeinschaft. I want to thank Peter Pause, Wilhelm Geuder, Mila Dimitrova-Vulchanova, Liljana Martinez, Joost Zwarts, Matthias Auer and Anja Rüsing for very useful comments and discussions.

*other motion verbs* including spatial concepts so far. Translation by author, emphasis added.]”. With his analysis of German ‘drehen’ (‘turn’), Habel (1999) presents one first step towards an analysis of the sub-class ‘manner of motion verbs’.

Levin (1993, p. 264ff) lists *manner of motion verbs* in her ‘verb classes’ collection; and Levin and Rappaport Hovav (1995) further investigate the distinction between GO and MOVE as concepts. They define MOVE as motion without necessary change of location. Yet what – besides syntactic behaviour, which is a central criterion in Levin (1993) – acts as central feature for this category, what is common to all these verbs? In other words, what makes a verb a ‘manner of motion’ verb? And, finally, what is the semantic impact of manner of motion?

Maienborn (1994) presents a regularity that explains why sentences like (2-a) are much better than sentences like (2-b): Verbs are able to temporally behave like a translational motion verb and thus subcategorize a path argument.

- (2) a. Peter wackelt über die Straße. (Peter is wobbling over the road)  
 b.???Anja liest in die Küche. (Anja is reading into the kitchen)

A selectional restriction for this effect lies in the connection to contextual and world knowledge: “Das in Frage stehende Prädikat muss auf eine essentielle Eigenschaft der Fortbewegung Bezug nehmen” [The predicate in question has to refer to an essential characteristic of translational motion.] (Maienborn (1994), p. 240). However, Maienborn does not offer a formal model. We will come back to this with a sketch how to apply our model in section 4.

## 1.1 Path Shape Verbs

Modelling manner of movement can be grouped into at least three components, all containing several conceptual dimensions:<sup>1</sup> (A) path shape (in which way does the motion relate to the space it is living in); (B) physical parameters of space and time (contact with surfaces, the influence and omnipresence of gravity, speed of motion); (C) an agentive-intensional component, attitudes, and many other parameters (like ‘psychological state of figure in motion’ – cf. ‘gubagguba’ in the Language Luganda (‘trudge for a long distance with a sad event ahead’), example from Dimitrova-Vulchanova and Martinez (2005)). Consider Dimitrova-Vulchanova and Martinez (2005) for a recent empirical elaboration of dimensions of manner modelling. Based on their classification, one might sketch a Modular Conceptual Space as in (3):

- (3)  $\langle \langle \text{PATH path shape, grain level of specification}^2, \dots \rangle, \langle \text{OBJECT } \pm \text{ANIMATE, } \pm \text{USEOFLIMBS, orientation, intension, attitudes, } \dots \rangle, \pm \text{TRANSLATIONAL, } \pm \text{ROTATIONAL, } \pm \text{DEFORMATIONAL, speed, } \dots \rangle$

In the current paper we will approach the question how manner of motion information can be described. How can it be anchored to semantics, to conceptual knowledge, to situation representation, and, finally, to the lexicon? And what is the role of the path in this game? We will narrow down the problem onto one of the dimensions: We suggest, while restricting ourselves to an elaboration of Path Shape, that manner of motion verbs express significant micro-variation

<sup>1</sup>These dimensions can be modelled as a Modular Conceptual Space, as Geuder and Weisgerber (2006) define it. This offers the advantage that for each module (‘domain’) the most suitable architecture can be chosen locally. Modules together with intermodule communication establish a Modular Conceptual Space.

<sup>2</sup>As van der Zee and Nikanne (2005) define it: There are three grain levels of Path Shape specification, grain 0: no focus on path shape like in ‘go’, grain 1: focus on global path shape as in ‘curve’, grain 2: focus on local path shape as in ‘zigzag’.

on the path involved. We define, in a pretheoretical fashion:

**Definition 1 (motion shape verbs)** *motion shape verbs (class MOM) are those verbs of motion which give more information about details of the motion going on than just starting point, via points and ending point of a path. They need not be specified for a change of place.*

Note that this class is orthogonal to what is often called *verbs of locomotion* (see, for example, Eschenbach et al (2000)); and in our case it is definitely not meant to be a basis for categorization – since we assume scales of increasing informativeness of manner representations, as in ⟨‘go’ <\* ‘fahren’ (‘drive’), ‘fliegen’ (‘fly’) <\* ‘wackeln’ (‘wobble’)⟩, where <\* is a suitable measure. Examples for motion shape verbs are: ‘crawl’, ‘creep’, ‘wobble’, ‘shiver’, and many others. A subclass is the class of pure *Path Shape Verbs* like ‘spiral’, ‘curve’, ‘zigzag’.

Consider, as an example, (4):<sup>3</sup>

- (4) 30 Tonnen Waren wackeln auf den Köpfen von rund 650 Lastenträgern auf  
30 tons of goods are wobbling on the heads of about 650 carriers on  
Bergpfaden in Richtung Marktplatz.  
mountain paths towards market place.

(<http://www.spiegel.de/wissenschaft/mensch/0,1518,360820,00.html>, 17.6.2005)

The theme of the motion situation given in (1) (‘30 Tonnen Waren’) is being transported along an atelic (unbounded) path with specified Via (‘auf Bergpfaden’) and Direction (‘in Richtung Marktplatz’). The verb ‘wackeln’, however, does not basically express translational movement but a *movement shape*: while fixed at a position, the theme moves in a defined cyclic pattern with a defined speed.

Finally, how should meanings of verbs like ‘wackeln’ and the combination with a path-PP be lexicalized? In the course of this paper, we will argue that a path can be divided into cyclic patterns and a translational component and that linguistically, the translational components refer to (intended) motion from a source *a* to a goal *b* as expressed in PPs, while the cyclic patterns refer to manner-of-movement information as expressed in path shape verbs and -adverbs. In the following sections we will first see which hints and answers current research is offering, we will then analyse the connection between motion and path shape. In a next step we will formally introduce *Path Shape Decomposition*, starting from a discussion of technical requirements. We will demonstrate that the *shape of a path* is the result of merging a translational source-goal component (e. g. as expressed in the path-PP) and a number of what we call *movement shape patterns* (normally implicitly expressed in manner-verbs or -adverbs). Finally we will discuss some case studies and provide examples for lexical entries.<sup>4</sup>

## 1.2 Decomposing Motion

Engelberg (2000) argues in favour of an analysis assuming two parallel subevents, and presents linguistic as well as psychological evidence. He calls manner of motion verbs *Zweibewe-*

<sup>3</sup>We have tried to give English translations for all German examples. These glosses, however, do not in all cases provide a 1:1 mapping of sense. Also, judgements of examples cannot be directly transferred here.

<sup>4</sup>Note, additionally, that our notion of Path Shape is different from, but not contradictory to, what Zwarts (2006) calls ‘event Shape’: his proposal is to include a Path notion into the lexical meaning of verbs like ‘enter’ and prepositions like ‘into’ such that the pairwise similarity between both in spatial terms is reflected in a parallel construction of the lexical entry. Doing so, however, he remains on a grain level which does not affect what we call ‘motion shape’.

*gungsverben* ( $\approx$  *dual movement verbs*)<sup>5</sup>: he assumes two movements taking place simultaneously in the same event: a *translational movement* and, relative to that, an *eigenmovement of the participant*. He assumes these two subevents as central components of the semantic structure. Put in Path Shape analytical terms: there is a relation between translational motion along a path on the one hand and cyclic motion patterns performed by the object on the other. Path Shape Decomposition can here be taken as a formal account to more formally describe this interplay by linking the path shape patterns to subevent descriptions in order to see which is the influence of both subevents onto the resulting Path Shape.

Shaw, Flascher and Mace (1994, p. 485f) report the observation that subjects decompose observed motion. The motion of a rolling wheel is recognized as a decomposition of a *translation* of the middle point and a *rotation* of another point round the middle point. Therefore the authors claim that decomposition of the event leads to a more basic way of describing a complex motion event. This finding backs our approach, since we believe that path decomposition enables us not only to describe and represent motion events as a whole, but also that most basic patterns of a complex motion are conceptually linked to the meaning of manner of motion verbs.

Musto et al (2000) report the empirical finding that when subjects observe moving dots on a screen and after it draw the path how they remember it, performance increases (or even overgeneralizes) when subjects recognize certain patterns in the path. This, again, supports our argument that decomposing the Path is an efficient way of analysing the informational content of Path motion situations.

To conclude: A translational and a cyclic nontranslational motion component can be present within the same verb. This results in a complex path shape: Whenever in a motion event the path is significantly not neutral (grain 0), the path shape can be decomposed into a sum of more simple Path Shape Patterns which are linked to the meaning of manner verbs and -adverbs. In the following we will finally present the Path Shape Decomposition framework. We will see how a Path Shape decomposition is used to form the link to lexical modelling of motion shape verbs.

## 2 Path Shape Decomposition

In this chapter we will develop a formal conceptual model of how the path in a motion situation interacts with the semantic analysis of motion shape verbs. Central to this model will be the distinction between two concepts of motion. – The first is a concept of *translational* motion. This component can be modelled by a suitable path theory, as has been proposed in various approaches in literature, and as we are also modelling in other current work (Weisgerber forthcoming). The second motion concept has no inherent translational component but puts emphasis on describing specific *motion patterns*. The latter cannot be described by current path theories: semantic path theories are not designed to represent path in a granularity that is both fine enough to represent a motion in all its details, and technically equipped to account for cyclic path shapes that emerge from this motion.

In order to account for this problem we will decide on a pointwise path definition that allows for a fine grained focus. We will define and algorithmically describe a theory of *Path Shape Decomposition* that aims at algorithmically deriving the translational vs. nontranslational distinction from the shape of the path.

---

<sup>5</sup>all terms originally German, English terms suggested by the author of this paper

## 2.1 Introducing the model

To start with we define the distinction between *translational* and *nontranslational movement*:

**Definition 2 (translational vs. nontranslational movement)** *Let, preformally, a **place** be a ‘possible location for an object in space’. We call a movement a **translational movement** if it is a movement of an object on a path starting at a source and ending at a goal ( $\rightarrow$  ‘change of location’) and no place is visited more than once. We call a movement a **nontranslational movement** if it is a movement pattern with no source and goal defined, where the object repeatedly returns to a place or a position after a short finite time.*<sup>6</sup>

Take, for example, ‘go’ as a translational movement: an object moves on a path from a source *a* to a goal *b*; and take ‘wobble’ as an example for a nontranslational movement: an object starts moving at a position *a* and passes by this position regularly after some finite time. Many verbs, however, express both components (e. g. ‘jump’, ‘walk’), and some verbs are able to change between expressing translational or nontranslational movement depending on the context and the reference system (e. g. ‘turn’ is, by the definition given, undecided between being translational or nontranslational). Therefore, this distinction of translational vs. nontranslational is no basis for different verb categories. Consider, as an example, sentence (5):

(5) Der Käse rollte zum Bahnhof. (The cheese rolled to the station)

This ‘roll’-situation includes two kinds of movement: first, there is a circular rotation pattern – an object rotates with contact to the ground (the core meaning of ‘rollen’) –, and second, there is a translational movement, which is introduced by the goal-PP. Since both motions are linear within time, they can be added up, yielding a sine shaped path for every point of the moving object.

Central for our analysis is the following fact, that obviously follows from both geometry and functional analysis:

**Fact 1 (Path Shape Decomposability)** *Every sequence of subsequent positions can be decomposed into a finite number of cyclic patterns and an optional translational component.*<sup>7</sup>

Linguistically, the translational components refer to (intended) motion from a source *a* to a goal *b* and the cyclic patterns refer to manner of movement information. In Satellite-framed languages<sup>8</sup> the first is ‘normally’ expressed in PPs, while the second is ‘normally’ expressed in manner of motion verbs and -adverbs – however, this linking can be realized in various variants.

<sup>6</sup>The expression ‘after a short finite time’ reminds of the unavoidable pragmatical influence of the notion of space and time in the reference system, which can be seen in the unprototypicality of the use of ‘wobble’ in ‘imagine a planet that wobbles between two suns with a frequency of some 100.000 years’.

<sup>7</sup>The mapping between rotations as circles and their representation as sinus functions is a common mathematical notion. That means, a complex motion shape (in rotation interpretation) can be converted into a complex sine function. Using Fourier Analysis, this can be decomposed into basic sine functions with amplitude and frequency, which corresponds to radius and rotation speed of a circle

Note in this context that ‘cyclic patterns’ is not specified for another aspect of shape yet: both the abrupt change of direction in ‘zigzag’ and the more rotational shape in ‘swing’ or ‘circle’ is subsumed here. Fourier analysis, on the other hand, can extract a sine in one single step, whereas a zigzag yields infinite combination of sine functions. This may be taken seriously as a hint that from a physical point of view zigzagging is not a natural basic object motion pattern. Indeed, zigzagging in real world tends to be either round-edged or an alternating sequence of straight-line motions intervals and turn-on-position motions, hence it is, physically, not one basic motion pattern. However, consider Zee (2000) for an investigation of the sharp edge feature in zigzagging.

<sup>8</sup>following the Talmy-classification, although this classification raises some unanswered questions.

Path Shape Decomposability and the fact that motion pattern information is expressed by words, i. e. is part of their lexical meaning, implies that there are two possible directions of mapping to be modelled: they can be subsumed as *linguistic analysis* and *linguistic generation* (cf. fig. 1). The *linguistic analysis* direction is a mapping of linguistic motion situation descriptions to a

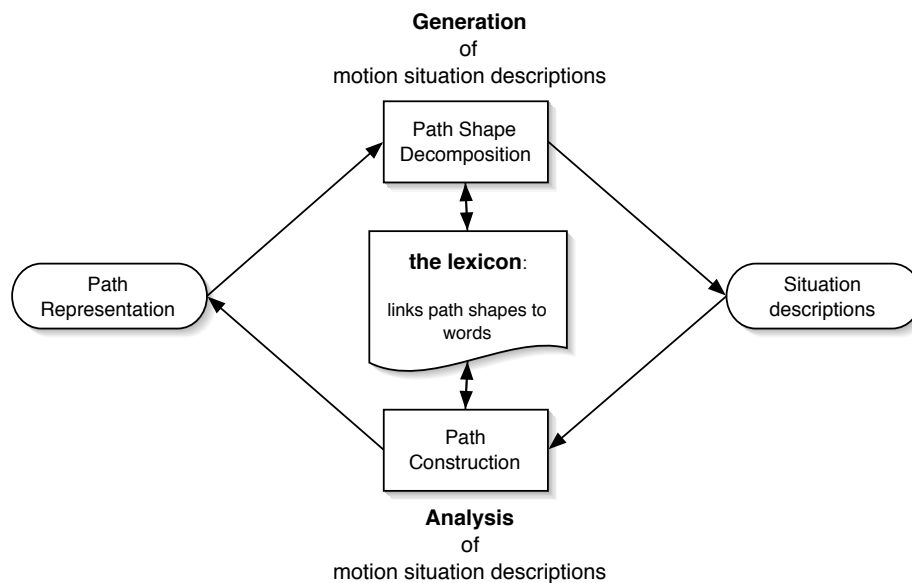


Figure 1: Two directions of PSD

model representation of the path and manner patterns involved. This direction requires a lexicon which links path shape building blocks to words and a theory that allows mounting these parts together to yield a path shape representing the situation. For a given sentence like ‘Peter wobbles from *a* to *b*’, an algorithm will produce a path-geometric analysis of the situation described. The *linguistic generation* direction, on the other hand, describes the reverse process: it is a mapping of a physically given path representation to language. Given a formal graphical description of the path shape, the algorithm generates a sentence that describes the situation as linguistic output, using both path and manner expressions. The latter direction is both algorithmically and linguistically of high complexity: the algorithmical part consists of decomposing the path in parts which are each linked to words in the lexicon, and the linguistic part generates natural language output. Due to finiteness of space in the current paper we will not discuss the latter part here.

## 2.2 Defining the toolkit

Technically, the model we suggest operates on a *simulation level* of situation representation, called  $\sigma$  level, whose task it is to build physical models of the situation, according to the knowledge provided by semantic and conceptual levels, and to judge the physical (im)possibility of a situation described in the actual world settings. This level can be seen as the interface between conceptual and world knowledge about physical space.

Similar to Zwarts (2004b), who suggests a path algebra defining path as “a starting point, an end point, and points inbetween on which the path imposes an ordering [...] defined as continuous functions from the real unit interval  $[0, 1]$  to positions in some model of space”, we define the *path* as a sequence of location-relations between a moving theme and a background object.<sup>9</sup>

<sup>9</sup> This definition offers the advantage that inserting and deleting path points – as is done when increasing and



**Definition 3 ( $\sigma$ -Path)** A *Path* in the  $\sigma$ -world is a chain of points, two of which are designated as starting point and end point:

$$\text{PATH} = \left\{ x_i \in \text{POS}, i \in [0..1] \subset \mathcal{Q} : \right. \\ \left. \text{NEIGHBOUR}(x_i, x_j) \ \& \ \text{NEIGHBOUR}(x_j, x_k) \ \text{iff} \right. \\ \left. i < j < k \wedge \neg \exists x, y : i < x < j < y < k \wedge x_0 = \text{'starting point'} \wedge x_1 = \text{'end point'} \right\}.$$

### 2.3 The Lexical Entries

In the path generation algorithm, which starts out from linguistic input and ends with printing out a path shape, this connection is algorithmically represented as a step ‘link word meaning to path representation  $\leftarrow$ use $\leftarrow$  lexicon’; and in the Path Shape Decomposition algorithm it would be the step ‘linguistic generation [from path shape snippets]  $\leftarrow$ use $\leftarrow$  lexicon’. That assigns a key role to lexical entries: they are the central data structure that bidirectionally links path shape to language. Let us shortly give two examples: German ‘wackeln’ (‘wobble’) and ‘to spiral’.

$$(6) \quad \text{a.} \quad \left[ \begin{array}{l} \text{'wackeln'} \\ \vdots \\ \text{PATH SHAPE} \\ \left[ \begin{array}{l} +\text{ROTATIONAL} \\ \text{AmplitudeRange} = \dots \\ \text{FrequencyRange} = \dots \end{array} \right] \\ \vdots \end{array} \right], \quad \text{b.} \quad \left[ \begin{array}{l} \text{'spiral'} \\ \vdots \\ \text{PATH SHAPE} \\ \left[ \begin{array}{l} +\text{ROTATIONAL} \\ \text{AmplitudeRange} = \dots \\ \text{FrequencyRange} = \dots \end{array} \right] \\ \left[ \begin{array}{l} +\text{TRANSLATIONAL} \end{array} \right] \\ \vdots \end{array} \right]$$

The excerpt from a lexical entry for the item ‘wackeln’ shows the link between Path Shape Snippet and Lexicon. The Path Shape that belongs to the (spatial) meaning of ‘wackeln’ can be defined in terms of a range of possible Amplitude values and a range of possible frequency values, which together yields a sine shaped Path snippet. Furthermore ‘wackeln’ is purely +ROTATIONAL, that means it is not translational and hence does not offer a slot for a PP as an argument. This yields path superimposition.

The verb ‘to spiral’, a Path Shape verb, is an interesting case, since it is the ‘prototype’ for a combination of a translational and a rotational component. Note that there are many ways to compose the translational with the rotational component: it depends on the angle between the plane of the rotation and the direction of the translation – hence, the verb is underspecified for this distinction: all constellations are good evidences of ‘spiral’. If the translation is orthogonal to the plane of the circular component, we get a ‘cylindrical’ spiral (as in ‘spiralling up around the pilar’), and if they are in the same plane, we either get a standard spiral (as in ‘spiralling towards the sun’) or a translation where the object is performing circles. Consider Zee (2000) and Zwarts (2004a) for an in-depth analysis of ‘to spiral’.

---

decreasing granularity, respectively – only means rewriting two neighbour pairs, which is of little algorithmic complexity. Additionally, one can assume replacement functions ‘starting point  $\rightarrow$  source’ and ‘end point  $\rightarrow$  goal’ dependent on the decision if the path is telic (as in ‘arrive’) or atelic (as in ‘approach’). We do not elaborate on that – see, for instance, Zwarts (2004b), Verkuyl (1993) and Verkuyl and Zwarts (1992) for an elaboration of aspect and (a)telic path.

## 2.4 The Algorithm

Having defined a toolbox and having defined the structure of the lexical entries that we assume, we are finally ready to dive into the center of the path shape decomposition approach: the algorithm.

The *Path Generation Algorithm* is given in figure 2. The input is a linguistic representation of a motion scenario. This representation is linguistically decomposed by standard syntactic and semantic tools. In this process all word meanings are looked up in the lexicon, which contains path representation patterns for motion vocabulary. Words are linked to path representation patterns. These patterns to path are linked to the path, which is gradually built up stepwise. The whole process is called recursively, along the recursive structure of the linguistic decomposition tree. The recursion ends when the whole sentence is analysed and at the same time the whole path is built. The output is the path shape that belongs to the sentence which has been put in.

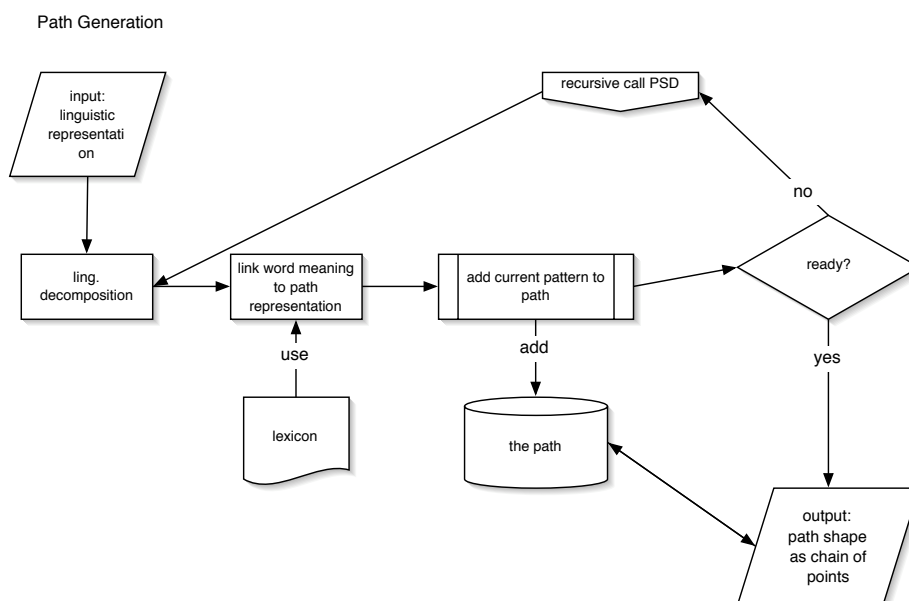


Figure 2: Path Generation Algorithm

## 2.5 Conclusion

This section has been the ‘inventive’ part of the paper. We have argued that in motion situations the path can always be decomposed in a number of rotation patterns and one optional translation (Path Shape Decomposability). We have defined, as a toolkit, the  $\sigma$ -world and a notion of path as chain of points. Finally, we have proposed the Path Generation Algorithm, which models the Linguistic Analysis direction. The duty of the Applications section 4 will then be to make clear how this information is dealt with in concrete by the algorithms. Before, however, we have to address a class of cases that has not been addressed so long: motion situations including rotation and deformation, as well as other cases of object internal motion.

### 3 Higher dimensional object representation: the Bounding Box.

While in a majority of situations involving path the relevant positions of the whole object can be modelled as points (which directly fits into the pointwise definition of path, as in ‘Peter went to Trondheim’), things are different in cases where deformation or rotation are involved (as in ‘Maria bent forward’, ‘Peter turned round’). In these cases, the object does not only move as a whole along a path, but subject to its physical architecture, it undergoes shape changes and orientation changes. Furthermore, a ‘translational’ and a manner component can be present within the same verb. It need not be the case that both components are fully lexically specified – consider ‘springen’, ‘hüpfen’ (‘jump’), cf. discussion on *pairs* in Dimitrova-Vulchanova and Weisgerber (in process).

#### 3.1 Rotation.

- (7) a. The record is turning.  
 b. ??The record is turning towards the door.  
 c. ??Peter is turning.  
 d. Peter is turning towards the door.

Although each point of the object moves on a path in the course of the rotation, the object as a whole does not change position. Even if we consider a real translational movement of the single points of the record, the reading as change of position remains semantically bad (as in (7-b)) – this is due to the fact that there is no outstanding point which gives the record an implicit main axis.

Another problem mentioned above becomes visible in (7-d): ‘turn’ either is purely rotational or it is both translational and rotational, i.e. there is an optional translation involved in the meaning of turn. We will come back to this case (and for an in-depth elaboration of rotation consider Habel (1999).)

#### 3.2 Deformation.

- (8) a. Maria bent out of the window.  
 b. Maria bent to front.

In (8-a) two aspects interfere: one part of Maria changes its position moving on a path from inside through the window to outside; another part of Maria, however, does not change position: even if most parts of Maria are outside, we still recognize Maria as inside the window. We claim this effect is both a matter of the focus we put on the different body parts – as long as Maria's feet are inside and Maria is standing on her feet, the position ‘inside’ is assigned to the whole of Maria – and a matter of which chain of changes of positions lead to the actual position – all of Maria was inside before the movement, and she will end up inside again after the bending process. The same effect remains more implicit in (8-b), where a part of Maria moves to a front position while Maria's overall position in space remains unchanged. Finally, there is additional semantic evidence for an analysis where (8-a) does not describe a change of place: The bending situations behave like states, and changes of state can be added separately – consider (9).

- (9) a. Maria bent out of the window for three hours / \* in three hours.  
 b. \*Maria bent out of the window and back again.  
 c. Maria bent out of the window, and then she fell out of the window.

This fact will strengthen our analysis that the location of the motion event is, with no change, inside the room – although parts of the object (Mary) are located outside the window.

### 3.3 Internal vs. External: Encapsulation in the Bounding Box

These cases of ‘object internal’ motion lead to a granularity where we have to treat the dimensionality of the object as greater than zero (i. e. ‘point’). In the case of deformation, single points of the object are able to perform motion relative to the whole – this object-internal motion depends on the physical character of the object. The increase in the dimensionality of the object influences the modelling of the interplay of object and path: A topological division of movement inside the object and movement outside the object arises. This division is a key to ambiguity effects arising from the fact that it is not always clear where, relative to the object, a movement is located: it is, therefore, not obvious which is the reference frame of a movement.

All of this implies that the model has to account for such cases – in other words, the model needs an object representation tool. Can this be formalized without the cost of unbearably high complexity? Let us answer this question in two steps: At first, we show that an additional modelling of object internal movement is possible with finite effort. This is due to the following:

**Fact 2** *If an object changes its shape (internal deformation) without infinitely increasing its volume, then the process of extension is a finite process in all dimensions: in the extreme case, all available volume extends along one single dimension – the object has changed into approximately a line of finite length, and cannot extend any more. Hence, if the possible deformation is finite on all dimensions, all possible deformations can be described as **patterns**, i. e. the process stops after some time or returns to a known former state.*

The second step is that we distinguish between ‘inside’ and ‘outside’ of objects: We assume a *Bounding Box* as a model of the object in the  $\sigma$ -world. The Bounding Box ‘wraps’ (encapsulates) the entire object and thus clearly defines a border between inside and outside:

**Definition 4 (Object Encapsulation: Bounding Box)** *A **Bounding Box**  $BB$  of an object  $O$  in the  $\sigma$ -world is a cohesive cover of points, which encloses the object  $O$ :*

$BB(O) := \{x_{i,j} \in \text{PoS}, i, j \in [0..1] :$

(i)  $x_{i,j}$  represents a point of the object and has a neighbour that does not belong to the object or (ii) there is a plane through  $x_{i,j}$  such that more than 2 neighbours of  $x_{i,j}$  lying on that plane represent object points.  $\}$

*This set is constructed recursively. A model of an object  $O$  in the  $\sigma$ -world involves exactly one active **Bounding Box**  $BB(O)$  in each context and point of time. This Bounding Box divides the **inside** from the **outside**.<sup>10</sup>*

<sup>10</sup>Encapsulating the object in a Bounding Box is our model’s way to deal with cases that involve *vagueness*. Vagueness can appear in several cases – we would like to mention only the cases of object shape vagueness (in a class of objects it is difficult to define which is the exact extension of the object, e. g., where exactly does a cloud end?) and region vagueness (e. g., ‘flowers *in* the vase’ or ‘apples *in* the bowl’, cf. the seminal work about language and cognition of spatial prepositions by Herskovits (1986)). It is central to our notion of Bounding Box that we will put vagueness into bounds rather than analyse it away or eliminate it: At a given point of time, the Bounding Box does not equal but approximate the size of the object, and thus stands for the object to allow further reasoning with the situation. That means that vagueness is shifted to the process of assigning the Bounding Box: the more vague the object shape, the more context, pragmatics and reasoning enters into the process of Bounding Box assignment.<sup>11</sup>

We now apply the topological division of inside and outside to the relation between object and movement:

**Definition 5 (Object Internal vs. -External Movement)** *The division of movement into translational and nontranslational movement is applicable in a recursive way: the Bounding Box representing the object makes up a reference system, in which translational and nontranslational movement can take place again. Movement inside the Bounding Box is called **object internal movement**, while the movement of the Bounding Box relative to a larger reference system is called **external movement**.*

Note that due to the recursivity the notion of Bounding Box induces a reference system with inside and outside in all cases. Take, for example ‘The stain on the record moves to the left’. The Bounding Box of ‘the stain’ is now in focus, it is moving on a path that itself is located inside the Bounding Box of the record. That means that, relative to the record, there is no movement of the stain (it is fixed to the surface), relative to the outside world, the movement of the record is internal (the record remains fixed at its place as whole) and the motion of the stain is external (it is being transported along a path). Since this division is triggered by the Bounding Box, which is set dynamically due to both the verb’s lexical entry and influences of the context, it becomes clear once more that this division cannot be a basis for a stable verb categorization (as we have discussed above).

It is common to all physical objects in real world that they are located at one place due to environment forces. Gravity, which creates contact between an object and the ground, can be argued to be the instantiation of ‘support’. This physical fact directly enters into our Bounding Box framework: There is a subset of Bounding Box points that are involved in contact to another supporting object due to environmental forces. We call this set of points the *fixation plane* of the Bounding Box. The fixation plane anchors the Bounding Box to the space it is “living” in. Note that the fixation plane needs not be flat – its shape is influenced by the shape of the supporting ground.

Let us now go back to two examples of situations, repeated here as (10-a) and (10-b), and see what effects can occur within the Bounding Box framework.

- (10) a. Maria bent out of the window.  
b. Peter turned to the left.

As we have argued above, (10-a) does not describe a change of place but an internal movement. No external movement of an object on a path is taking place here. This is modelled with the help of the Bounding Box of the object ‘Maria’: While Maria is moving parts of her body out of the window, the Bounding Box representing a model of the object Maria has to extend to cover the whole object. The place of the Bounding Box, its position in space, remains unchanged, since the *fixation plane* is stable: Maria is standing on her feet. The fact that bending is object internal, finally, is a feature of the verb ‘bend’: in the lexical entry of ‘bend’ the feature +INTERNAL must be present, and no path slot. Example (10-b) concerns change of orientation. The shape of the object Peter evokes an internal orientation axis: Peter has a ‘front’ and a ‘back’. The verb ‘turn’ has the meaning of a change of the absolute direction of this orientation. This makes the example ambiguous in that without context we cannot infer if the turning is internal (turn on a point) or external (move on a circled path). This ambiguity is a regular one – it has to be fixed in the verb entry as ±EXTERNAL. In the external case the *fixation plane* of the Bounding Box of the object ‘Peter’ moves on a circled path, whereas in the internal case, the *fixation plane* remains at a fixed position and the movement takes place inside the Bounding Box. What about the PP? In both cases, external and internal, a path PP can be present (‘turn into Tägermoos

road' vs. 'turn to the left'). Syntactically that means that the verb allows for a PP in each case, and the lexical entry of the verb has to decide on the meaning of the PP: in the external case, the PP is linked to a (circled) path, whereas in the internal case, the PP is linked to the direction of the orientation vector.

Finally, of what help can a bounding box be in the path superimposition case? Consider

(11) Peter zittert über die Straße (Peter is shivering over the road).

Again, the Bounding Box defines a reference system. When talking about situations, one cannot switch reference system, therefore it is impossible to mention inside- and outside-information together in the same clause.<sup>12</sup> So, how does inner information get to outside? An enfocus-strategy makes the Bounding Box more narrow (i. e. change the referency system) as to make inner motion visible to the outside as motion of the whole Bounding Box. Consider 'zittert über die Straße' (to be discussed later): If the shivering affects outer path shape, then it has become a shivering of the whole Bounding Box. The motion of the Bounding Box is what is superimposed in the end.<sup>13</sup>

#### 4 Degree of influence, Maienborn's 'temporary motion verbs', and $\lambda P$

Maienborn (1994) deals with cases where verbs that lexically do not provide a path slot are combined with path-PPs. Consider the following examples (taken from Maienborn) – all of these verbs are no change of location verbs; and only some of them are (manner of) motion verbs.

- (12) a. Ein Motorrad *knattert* über die Landstraße. (A motorbike *crackles* over the road)  
 b. Der Hochgeschwindigkeitszug *dröhnt* durch den Tunnel. (The high speed train *booms/drones* through the tunnel)  
 c. Das Motorrad *jault* durch die Stadt. (The motorbike *whines* through the city)  
 d. Gunda *turnt* über den Sessel. (Gunda *does-gymnastics* over the armchair)  
 e. Gunda *hampelt* in die Küche. (Gunda (*actively wobble around*) into the kitchen)  
 f. Das Kleinkind *wackelt* in die Sandkuhle. (The small child *wobbles* into the sand-box)

(13) \*Gunda liest in die Küche. (Gunda is reading into the kitchen)

How does, semantically, the path anchor to the meaning of the verb? Maienborn (1994) argues against a notion of pure modification and proposes instead a mechanism where the verb becomes a *temporary motion verb*. This mechanism is triggered by the path-PP.

As can be seen in (13), however, this mechanism needs to be restricted: "Das in Frage stehende Prädikat muss auf eine essentielle Eigenschaft der Fortbewegung Bezug nehmen" [The predicate in question has to refer to an essential characteristic of translational motion.] (Maienborn (1994), p. 240).

In the case of manner of motion verbs, path shape analysis can be of some help: If a verb encodes information about any kind of motion and if this motion is not purely internal but has a visible effect onto the resulting path, it is possible to semantically superimpose this motion

<sup>12</sup>cf. Bohnemeyer (2003) for an empirical crosslinguistic investigation how many motion path information can be encoded in one clause

<sup>13</sup>However, this is not completely trivial (see also discussion on 'wackeln'). Which point of the object defines the path that I recognise as 'zigzag'? Imagine the object is fixed to the carrier and therefore only wobbles with its upper end. We define: the greatest existent amplitude is taken as the amplitude of the pattern motion.

on a path introduced by a PP, and reversely, to treat the PP temporarily as an argument of the situation representation. Compare:

- (14) a. Peter wackelte über die Straße. (Peter was wobbling over the road)  
 b. ?Peter zitterte über die Straße. (Peter was shaking over the road)  
 c. ???Peter fror über die Straße. (Peter be-cold- $V_{fin}$  over the road)

Interpretation: The movement induced by the manner pattern must have an influence on the translation movement: ‘wobbling’ and ‘over the road’ must interact.<sup>14</sup> (14-b) is another evidence for that: There is one possible reading of (14-b) where the effect of shaking is visible in Peters movement. The more of the pattern motion effect is visible, the better the sentence. Hence, the amplitude of the pattern-motion is significant for meaning distinction: ⟨‘wackeln’ > ‘schwingen’ > ‘zittern’ > ‘vibrieren’⟩.

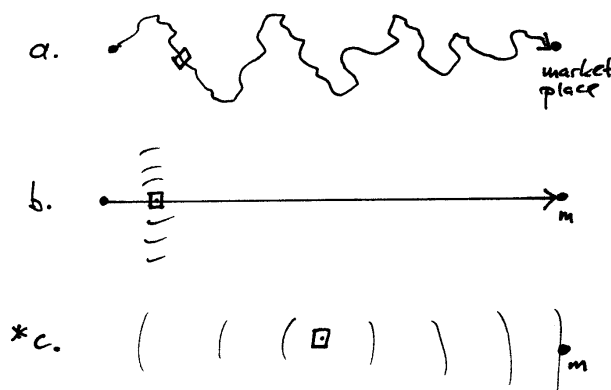
In the case of sound emission verbs, one has to ‘dive deeper into context’ – but, in the end, the same claim holds, when we assume the causation relation: the motion on the path produces the sound emission, a ‘trace of sound’ can be recognized for a while. But this has to be elaborated in depth at another place.

Finally, consider once more (4) repeated as (15) – which seems to contradict Maienborns thesis that a verb can provide a  $\lambda P$  slot whenever it wants to:

- (15) 30 Tonnen Waren wackeln auf den Köpfen von rund 650 Lastenträgern auf  
 30 tons of goods are wobbling on the heads of about 650 carriers on  
 Bergpfaden in Richtung Marktplatz.  
 mountain paths towards market place.

Here, the combination of the rotational pattern part and a Path-PP cannot yield translational reading ((16).c is out as an interpretation of (15)). That should be taken as a sign for the non-existence of a  $\lambda P$  slot in the verb. Path Shape Superimposition is the only remaining possible interpretation: the pattern motion is superimposed on a path, hence it is not itself the path.

(16)



<sup>14</sup>This effect has been called *Path Superimposition*. “Superimposition is a graphics term meaning the placement of an image on top of an already-existing image, usually to add to the overall image effect, but also sometimes to conceal something (such as when a different face is superimposed over the original face in a photograph). [en.wikipedia.org/wiki/Superimposition]”.

## 5 Conclusion: Path Shape Decomposition and Manner Modelling

(Modified) manner of motion verbs yield one single complex path of motion. With the help of the Path Shape Decomposition framework we presented, this path can be seen as consisting of two kinds of components: iterated rotational patterns and one translational part. These are linked to the lexical meaning of manner verbs and -adverbs: Motion Shape Patterns are in most cases linked to ‘manner’ information, while the translational component is often expressed by the Path-PP or direction adverbs. In order to account for object internal motion, we additionally introduced Bounding Box Encapsulation, which yields a topological division of inside and outside-movement. As an application, we discussed the ‘wobble over the road’-case and related cases and presented an explanation for Maienborns path-superimposition effect .

We are aware of the fact that many details have to be added to the framework. Many facets are in preparation, and others are considered to be projects of ‘further work’.

## References

- Bohnenmeyer, J.: 2003, The unique vector constraint: The impact of direction changes on the linguistic segmentation of motion events, in E. van der Zee and J. Slack (eds), *Representing Direction in Language and Space*, Oxford University Press, Oxford, pp. 86–110.
- Dimitrova-Vulchanova, M. and Martinez, L.: 2005, Motion naming in three satellite-framed languages: A pilot study. Paper given at Scandinavian Conference on Linguistics (SCL) 21, Trondheim, 2.6.2005, unpublished.
- Dimitrova-Vulchanova, M. and Weisgerber, M.: in process, Pairs, *unpublished*, NTNU Trondheim & Universität Konstanz.
- Engelberg, S.: 2000, *Verben, Ereignisse und das Lexikon*, Niemeyer, Tübingen.
- Eschenbach, C., Tschander, L., Habel, C. and Kulik, L.: 2000, Lexical specifications of paths, in Freksa, Brauer, Habel and Wender (2000), pp. 127–144.
- Freksa, C., Brauer, W., Habel, C. and Wender, K. F. (eds): 2000, *Spatial Cognition II, Integrating Abstract Theories, Empirical Studies, Formal Methods, and Practical Applications*, Vol. 1849 of *Lecture Notes in Computer Science*, Springer, Berlin.
- Geuder, W. and Weisgerber, M.: 2006, On the Geometrical Representation of Concepts. Reflections on Peter Gärdenfors (2000): Conceptual Spaces, *under revision for: Linguistics and Philosophy* pp. ??–??
- Habel, C.: 1999, Drehsinn und Reorientierung – Modus und Richtung beim Bewegungsverb drehen, in G. Rickheit (ed.), *Richtungen im Raum*, Westdeutscher Verlag, Opladen, pp. 101–128.
- Herskovits, A.: 1986, *Language and spatial cognition. An interdisciplinary study of the prepositions in English*, Cambridge University Press, Cambridge, Mass.
- Jackendoff, R.: 1991, *Semantic structures*, number 18 in *Current studies in linguistics series*, MIT Press, Cambridge, Mass.
- Kaufmann, I.: 1995, *Konzeptuelle Grundlagen semantischer Dekompositionsstrukturen. Die Kombinatorik lokaler Verben und prädikativer Komplemente*, Niemeyer, Tübingen.



- Levin, B.: 1993, *English Verb Classes and Alternations. A Preliminary Investigation*, The University of Chicago Press, Chicago / London.
- Levin, B. and Rappaport Hovav, M.: 1995, *Unaccusativity. At the Syntax-Lexical Semantics Interface*, MIT Press, Cambridge, MA.
- Maienborn, C.: 1994, Kompakte Strukturen – Direktionale PPn und nicht-lokale Verben, in S. W. Felix, C. Habel and G. Rickheit (eds), *Kognitive Linguistik. Repräsentation und Prozesse*, Westdeutscher Verlag, Opladen, pp. 229–249.
- Musto, A., Stein, K., Eisenkolb, A., Röfer, T., Brauer, W. and Schill, K.: 2000, From motion observation to qualitative motion representation, in Freksa et al. (2000), pp. 115–126.
- Shaw, R. E., Flascher, O. M. and Mace, W. M.: 1994, Dimensionen der Ereigniswahrnehmung, in H. Feger and J. Bredenkamp (eds), *Wahrnehmung (Enzyklopädie der Psychologie. Themenbereich C: Theorie und Forschung. Serie II: Kognition. Bd. 1)*, Verlag für Psychologie Dr. C. J. Hogrefe, Göttingen, pp. 457–528.
- Talmy, L.: 1983, How language structures space, *Spatial Orientation: Theory, Research and Application*, Plenum, New York, pp. 225–282.
- Talmy, L.: 1985, Lexicalization patterns: semantic structure in lexical forms, in T. Shopen (ed.), *Language typology and syntactic description, Vol. 3: Grammatical categories and the lexicon*, Cambridge University Press, Cambridge, MA.
- van der Zee, E. and Nikanne, U.: 2005, The grain levels in the linguistic expressions of motion. Talk given at Scandinavian Conference on Linguistics (SCL) 21, Trondheim, 2.6.2005.
- Verkuyl, H.: 1993, *A Theory of Aspectuality*, Cambridge University Press, Cambridge / Mass.
- Verkuyl, H. and Zwarts, J.: 1992, Time and space in conceptual and logical semantics: The notion of path, *Linguistics* **30**, 483–511.
- Weisgerber, M.: forthcoming, Where lexical semantics meets physics: Towards a three-level framework for modelling path, in M. Dimitrova-Vulchanov and E. van der Zee (eds), – *to appear, title to be announced* –, Oxford University Press, Oxford, p. ?
- Zee, E. v. d.: 2000, Why we can talk about bulging barrels and spinning spirals: Curvature representation in the lexical interface, in E. van der Zee and U. Nikanne (eds), *Cognitive Interfaces: Constraints on Linking Cognitive Information*, Oxford University Press, Oxford, pp. 143–182.
- Zwarts, J.: 2004a, Competition between word meanings: The polysemy of (a)round, in C. Meier and M. Weisgerber (eds), *Sinn und Bedeutung, sub8, Proceedings of the eighth meeting of the Gesellschaft für Semantik, Frankfurt, October, 2003*, Vol. 114 of *University of Konstanz Linguistics Working Papers*, Universität Konstanz, Konstanz, pp. 349–360.
- Zwarts, J.: 2004b, Prepositional aspect and the algebra of paths. To appear in: *Linguistics and Philosophy*.
- Zwarts, J.: 2006, Event shape: Paths in the semantics of verbs, *unpublished manuscript* .



# DON'T NEGATE IMPERATIVES!

## IMPERATIVES AND THE SEMANTICS OF NEGATIVE MARKERS

Hedde Zeijlstra  
University of Tübingen

hedde.zeijlstra@uni-tuebingen.de

### Abstract

Languages cross-linguistically differ with respect to whether they accept or ban True Negative Imperatives (TNIs). In this paper I show that this ban follows from three generally accepted assumptions: (i) the fact that the operator that encodes the illocutionary force of an imperative universally takes scope from C°; (ii) the fact that this operator may not be operated on by a negative operator and (iii) the Head Movement Constraint (an instance of Relativized Minimality). In my paper I argue that languages differ too with respect to both the syntactic status (head/phrasal) and the semantic value (negative/non-negative) of their negative markers. Given these difference across languages and the analysis of TNIs based on the three above mentioned assumptions, two typological generalisations can be predicted: (i) every language with an overt negative marker X° that is semantically negative bans TNIs; and (ii) every language that bans TNIs exhibits an overt negative marker X°. I demonstrate in my paper that both typological predictions are born out.

## 1 Introduction

This paper is about the fact that not every language accepts so-called True Negative Imperatives (TNIs).<sup>1</sup> TNIs are exemplified in (1) and (2) for Dutch and Polish respectively. In Dutch, in main clauses the finite verb precedes the negative marker *niet*. In imperative clauses the negation can also follow the finite imperative verb without yielding ungrammaticality. Polish also accepts TNIs: both in regular negative indicative clauses and in imperative clauses, the negative marker *nie* immediately precedes the finite verb.

- |     |    |  |        |
|-----|----|--|--------|
| (1) | a. | Jij slaapt <i>niet</i><br>You sleep NEG<br>'You don't sleep'       | Dutch  |
|     | b. | Slaap!<br>Sleep!<br>'Sleep'  |        |
|     | b. | Slaap <i>niet</i> !<br>Sleep NEG!<br>'Don't sleep!'                | (TNI)  |
| (2) | a. | (Ty) <i>nie</i> pracujesz<br>You NEG work.2SG<br>'You don't work!' | Polish |
|     | b. | Pracuj!<br>Work.2SG.IMP<br>'Work!'                                 |        |

---

<sup>1</sup> Terminology due to Zanuttini (1994)

- c. *Nie pracuj!* (TNI)  
 NEG work.2SG.IMP  
 'Don't work!'

Things are different however in a language like Spanish, as illustrated in (3). In Spanish the negative marker *no* always occurs in preverbal position. However, if the verb has an imperative form, it may not be combined with this negative marker. Spanish does not allow TNIs. In order to express the illocutionary force of an imperative<sup>2</sup>, the imperative verb must be replaced by a subjunctive. Such constructions are called Surrogate Negative Imperatives (SNIs).

- (3) a. Tu *no* lees Spanish  
 NEG read.2SG  
 'You don't read'
- b. ¡Lee!  
 Read.2SG.IMP  
 'Read!'
- c. \*¡No lee! (\*TNI)  
 NEG read.2SG.IMP  
 'Don't read'
- d. ¡No leas! (SNI)  
 NEG read.2SG.SUBJ  
 'Don't read'

In this paper I address two questions: (i) how can this ban on TNIs in languages such as Spanish be explained? And (ii) how does the observed cross-linguistic variation follow?

The outline of the paper is as follows: in section 2 I discuss three previous analyses of the ban on TNIs. In section 3 I discuss some relevant semantic and syntactic properties of negative markers and in section 4 I demonstrate by means of a survey of different languages that the properties described in section 3 are related to the acceptance of TNIs. In section 5, I present my analysis for all language groups that have been discussed. In section 6, I show that the analysis presented in section 5 makes some correct predictions regarding the development of Negative Concord and the acceptance of TNIs in Romance languages. Finally, Section 7 concludes.

## 2 Previous analyses

### 2.1 Rivero (1994), Rivero & Terzi (1995)

Rivero (1994) and Rivero & Terzi (1995) assume that the clausal structure always has the structural relations in (4).

- (4) CP > NegP > IP > VP

Then the difference between Slavic languages (which generally allow TNIs) and Romance languages (that generally disallow them) concerns the position where imperative force is induced in the sentence. This is either IP (expressed by movement of  $V_{imp}$  to  $I^{\circ}$ ) or CP (expressed by verbal movement to  $C^{\circ}$ ). Now the difference between Slavic and Romance languages falls out immediately: if the  $Neg^{\circ}$  position is filled by an overt element, i.e. by a

<sup>2</sup> Negative sentences with the illocutionary force of an imperative are often referred to as prohibitives.

negative marker, then verbal movement from  $I^\circ$  to  $C^\circ$  is no longer allowed, given the Head Movement Constraint (Travis (1984)). Hence Slavic languages, such as Polish allow TNIs, whereas Romance languages, such as Spanish, where the verb moves to  $C^\circ$ , do not (see (5)).

- (5) a.  $[\text{NegP} [\text{Neg}^\circ \text{Nie}] [\text{IP} [\text{I}^\circ \text{pracuj}_{[\text{IMP}i]}] [\text{VP } t_i]]]$  Polish  
 NEG work.2SG.IMP  
 'Don't work!'
- b.  $*[\text{CP} [\text{C}^\circ \text{Lee}_{[\text{IMP}i]}] [\text{NegP} [\text{Neg}^\circ \text{no}] [\text{IP} [\text{I}^\circ t_i] [\text{VP } t_i]]]]$  Spanish  
 NEG read.2SG.IMP  
 'Don't read!'

Rivero's and Rivero & Terzi's analysis faces two serious problems. The first problem is that it is unclear why in Romance languages the negative marker is not allowed to cliticize onto  $V_{\text{imp}}$  so that they move together to  $C^\circ$  as a unit, a point already addressed by Han (2001). Rizzi (1982) argues that in constructions such as (6), consisting of a participle or an infinitive, the subject occupies a Spec,IP position and the auxiliary moves to  $C^\circ$ . In case of negation, the negation then joins the verb to move to  $C^\circ$ . Rizzi refers to these structures as Aux-to-Comp constructions.

- (6) a.  $[[\text{C}^\circ \text{avendo}] \text{Gianni fatto questio}]^3$  Italian  
 having Gianni done this  
 'Gianni having done this, ...'
- b.  $[[\text{C}^\circ \text{non avendo}] \text{Gianni fatto questio}]$   
 NEG having Gianni done this  
 'Gianni having not done this, ...'

If in the cases above *non* is allowed to attach to  $V_{\text{part}}/V_{\text{inf}}$ , it is unclear why this movement would not be allowed in the case of  $V_{\text{imp}}$ .<sup>4</sup>

The second problem is that in the structure in (5)a the operator that encodes the illocutionary force of an imperative is c-commanded by the negation. It has already been noted by Frege (1892) and Lee (1988) that negation cannot operate on the illocutionary force of the sentence, but only on its propositional content (a negative assertion remains an assertion, a negative question remains a question, and a negative command has to remain a command). Hence, in Rivero and Terzi's analyses for Slavic languages either negation takes scope from too a high position, or the imperative operator takes scope from too a low position.

## 2.2 Zanuttini (1997)

Zanuttini (1997) distinguishes different kinds of negative markers basing herself on a number of Romance dialects (mostly from Northern Italy). She argues that negative head markers ( $X^\circ$ ) that can negate a clause by themselves are actually lexically ambiguous between two different lexical items, which are often phonologically identical. For instances she claims that in Italian the negative marker *non* is lexically ambiguous between *non-1*, which may occur only in clauses with the illocutionary force of an imperative, and *non-2*, which may appear in

<sup>3</sup> Example taken from Rizzi (1982)

<sup>4</sup> Rivero and Terzi argue that in these cases the  $V_{\text{part/inf}}$  does not raise to  $C^\circ$ , but to a position lower than  $\text{Neg}^\circ$  and that the subject is in a position even below. This analysis seems to be contradicted by the fact that (*non*) *avendo* may even precede speaker-oriented adverbs such as *evidamente* ('evidently'), which occupy a position higher than  $\text{NegP}$  (as pointed out by Cinque (1999) and repeated in Han (2001)).

all other clauses. Furthermore, Zanuttini proposes that *non-1* subcategorizes a MoodP, whereas *non-2* does not:

- (7) a. [NegP *non-1* [MoodP ... [VP ]]] imperative clauses  
 b. [NegP *non-2* ... [VP ]] other clauses

The ban on TNIs can now be accounted for as follows. Imperative verbs are often morphologically defective, indicating that they lack a particular [MOOD] feature. As a result, the [MOOD] feature on Mood° cannot be checked and the sentence becomes ungrammatical. In other clauses, e.g. indicatives, there is no MoodP selected, and thus the sentence is grammatical, as shown in (8).

- (8) a. \*[NegP *Non-1* [MoodP [Mood°[MOOD] telefona<sub>[IMP]i</sub>] a Gianni [VP t<sub>i</sub>]]] Italian  
 └─ x ─┘  
 NEG call.2SG.IMP to Gianni  
 ‘Don’t call Gianni!’  
 b. [Io [NegP *non-2* telefono<sub>i</sub> a Gianni [VP t<sub>i</sub>]]]  
 I NEG call.1SG to Gianni  
 ‘I don’t call Gianni’

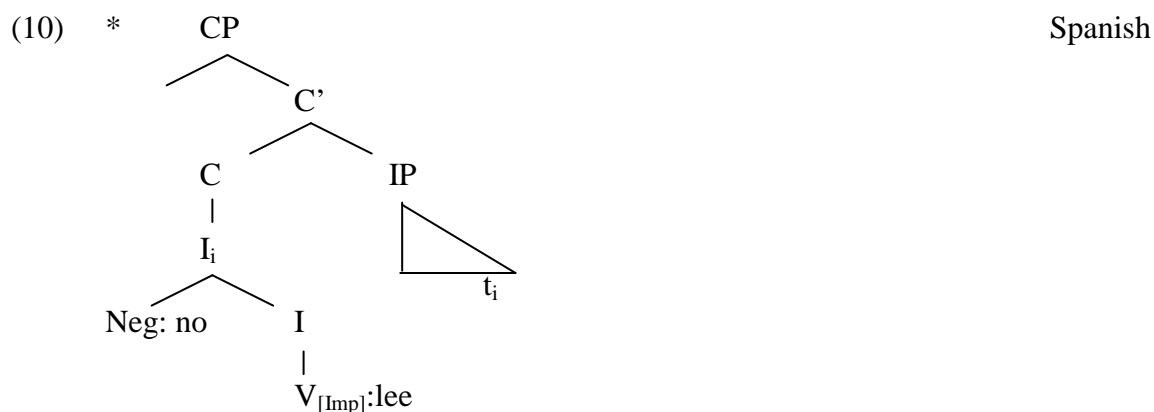
Still, this analysis suffers from two problems. First, the lexical distinction between *non-1* and *non-2* seems not well motivated. Although Zanuttini motivates this claim by arguing that languages that have two distinct negative markers are often sensitive to mood distinctions in the verbal paradigm (cf. Sadock & Zwicky (1985)), it is not clear why languages universally have to exhibit two negative markers. It could even be the case that the motivation for a second negative marker (found in languages such as Hungarian, Albanian and Greek) is because the regular negative marker could not be combined with an imperative. Such a motivation would lead to circularity.

Second, the prediction that this analysis makes is too strong. It is unclear why the analysis does not hold for Slavic languages, such as Polish, which has a negative head marker *nie* that negates a clause by itself and allows TNIs. Moreover, one may even find Romance varieties, which allow TNIs. Old Italian (9) is an example.

- (9) *Ni ti tormenta di questo!* Old Italian  
 NEG yourself torment.2SG.IMP of this  
 ‘Don’t torment yourself with this!’

### 2.3 Han (2001)

Han (2001) argues that the ban on TNIs does not follow from syntactic requirements that have been violated, but from a semantic violation: the imperative operator (i.e. the operator that encodes the illocutionary force of an imperative,  $Op_{IMP}$  hereafter) may not be in the scope of negation.  $Op_{IMP}$  is realised by moving a feature [IMP] on  $V_{imp}$  to  $C^\circ$ . Han takes negation in Romance languages to head a projection somewhere high in the IP domain. Hence, negation head-adjoins first to  $V_{imp}$ , and then as a unit they move further to  $C^\circ$ . As a result  $Op_{IMP}$  remains in the c-command domain of negation, which violates the constraint that negation may only operate on the propositional content of the clause. The structure (10) is thus ill formed.



Under this analysis, it becomes immediately clear why in languages like Dutch TNIs are allowed. In those languages negation does not form a unit with  $V_{imp}$  and  $V_{imp}$  raises across negation to  $C^\circ$ , as shown in (11).

(11) [<sub>CP</sub> slaap<sub>[Imp]<sub>i</sub></sub> [<sub>NegP/VP</sub> niet t<sub>i</sub>]] Dutch

For Slavic languages Han assumes that  $V_{imp}$  does not move to  $C^\circ$ . Consequently, this would mean that  $V_{imp}$  remains under the scope of negation (as the negative marker is a syntactic head in those languages,  $V_{imp}$  cannot move across it). However, Han argues that in those cases the feature [IMP] moves out of  $V_{imp}$  and moves to  $C^\circ$ . Thus,  $Op_{IMP}$  outscopes negation, as demonstrated in (12) for Polish.

(12) [<sub>CP</sub> [IMP]<sub>i</sub> [<sub>NegP</sub> nie [<sub>IP</sub> pracuj<sub>i</sub> ]]] Polish

The fact that Han allows feature movement for the Slavic languages seems to contradict the analysis for Romance languages, since it remains unclear why this feature movement would not be possible in Romance languages. Apart from this problem, Han assumes that the negative marker (in the languages discussed) is always the carrier of semantic negation. In the following section I demonstrate that this is not always the case.

### 3 Semantic and syntactic properties of negative markers

In this section I discuss some semantic properties of negative markers. I present arguments that show that negative markers differ cross-linguistically with respect to their semantic contents. In some languages, such as Spanish and Italian, I argue the negative marker is the phonological realisation of a negative operator. In other languages, such as Polish and Czech, I argue that the negative marker is semantically vacuous, but has a syntactic requirement that it needs to stand in an Agree relation with a negative operator, which may be left phonologically abstract. The section concludes with a few remarks about the syntactic status of negative markers.

#### 3.1 Strict vs. Non-strict NC languages

The term *Negative Concord (NC)* refers to the phenomenon in which two negative elements yield only one semantic negation. The set of NC languages falls apart in two classes: Strict NC languages and Non-strict NC languages. In Strict NC languages the negative marker may both follow or precede n-words<sup>5</sup> as is demonstrated for Czech in (13). In Non-strict NC languages the negative marker may only precede n-words. An example of a Non-strict NC language is Italian (14).

<sup>5</sup> Terminology due to Laka (1990), Giannakidou (2002).

- (13) Strict NC:
- a. Milan *\*(ne)vidi nikoho* Czech  
 Milan NEG.saw n-body  
 ‘Milan didn’t see anybody’
- b. Dnes *\*(ne)volá nikdo*  
 Today NEG.calls n-body  
 ‘Today nobody calls’
- c. Dnes *nikdo \*(ne)volá*  
 Today n-body NEG.calls  
 ‘Today nobody calls’
- (14) Non-strict NC:
- a. Gianni *\*(non) ha telefonato a nessuno* Italian  
 Gianni NEG has called to n-body  
 ‘Gianni didn’t call anybody’
- b. Ieri *\*(non) ha telefonato nessuno*  
 Yesterday NEG has called n-body  
 ‘Yesterday nobody called’
- c. Ieri *nessuno (\*non) ha telefonato (a nessuno)*  
 Yesterday n-body NEG has called to n-body  
 ‘Yesterday nobody called anybody’

In Zeijlstra (2004) I argue that NC is a form of multiple Agree (cf. Ura (1996), Hiraiwa (2001, 2005)) between a negative operator that carries an interpretable negative feature [iNEG] and elements that carry an uninterpretable negative feature [uNEG]. Sentence (14)a can thus be analysed as (15), where *nessuno*’s [uNEG] feature is checked against *non*’s [iNEG] feature.<sup>6</sup>

- (15) [TP Gianni [<sub>NegP</sub> *non*<sub>[iNEG]</sub> ha telefonato a *nessuno*<sub>[uNEG]</sub> ]]

Given the assumption that n-words are analysed as semantically non-negative indefinites that carry a feature [uNEG] (cf. Ladusaw (1992), Brown (1999), Zeijlstra (2004)), it follows that the negative operator must c-command them in order to yield the correct readings. Consequently, it means that if the negative marker carries a feature [iNEG] no n-word is allowed to precede it (and still yield an NC reading).

However, in Strict NC languages such as Czech, the negative marker may be preceded by an n-word. Consequently, this negative marker cannot be the phonological realisation of the negative operator. It then follows that the negative marker itself carries [uNEG] and that it has its [uNEG] feature checked by an abstract negative operator *Op*<sub>-</sub>, as shown in (16).<sup>7</sup>

- (16) Dnes *Op*<sub>-[iNEG]</sub> *nikdo*<sub>[uNEG]</sub> *nevolá*<sub>[uNEG]</sub> Czech  
 Today n-body NEG.calls  
 ‘Today nobody calls’.

The [uNEG]/[iNEG] distinction exactly explains the Strict NC vs. Non-strict NC pattern that one finds amongst NC languages. Thus I argue that negative markers in Non-strict NC

<sup>6</sup> Note that here a feature checking mechanism is adopted in which checking may take place between a higher interpretable and a lower uninterpretable feature (cf. Adger (2003))

<sup>7</sup> Note that this analysis requires that an abstract *Op*<sub>-</sub> is also available in Non-strict NC languages, for instance in constructions such as (14)a.



languages, like Italian *non* and Spanish *no*, carry a feature [iNEG], whereas negative markers in Strict NC languages, such as Czech *ne* and Polish *nie*, carry a feature [uNEG].

### 3.2 Further evidence

I now present some further evidence for the assumption that the difference between Strict and Non-strict NC languages reduces to the semantic value of their negative markers. First it can be shown that negation behaves differently in Strict and Non-strict NC languages with respect to the scope of quantifying DPs. This is shown in (17). Although Czech *moc* ('much') dominates the negative marker, it is outscoped by negation. This reading is however not obtained in a similar construction in Italian, where *molto* ('much') remains in the scope of negation. This is a further indication that Italian *non*, contrary to Czech *ne*, is a phonological realisation of  $Op_{-}$ .

- (17) a. Milan *moc* *nejedl* Czech  
 Milan much NEG.eat.PERF  
 $\neg$  > much: 'Milan hasn't eaten much'  
 \*much >  $\neg$ : 'There is much that Milan didn't eat'
- b. Molto *non* ha mangiato Gianni Italian  
 Much NEG has eaten Gianni  
 \* $\neg$  > much: 'Gianni hasn't eaten much'  
 much >  $\neg$ : 'There is much that Gianni didn't eat'

Second, in some Strict NC languages the negative marker may be left out if it is preceded by an n-word, something to be expected on functional grounds if the negative marker carries [uNEG] (if an n-word precedes it, the negative marker is no longer needed as a scope marker). This is for instance the case in Greek (a Strict NC language) with *oute kan* ('NPI-even'). If *oute kan* precedes the negative marker *dhen*, the latter may be left out. If it follows *dhen*, *dhen* may not be removed (cf. Giannakidou (2005)). This forms an argument that Greek *dhen* is in fact not semantically negative. As Greek is a Strict NC language, this confirms the assumption that in Strict NC languages the negative marker carries [uNEG].

- (18) a. O Jannis \*(*dhen*) *dhiavase oute kan tis Sindaktikes Dhomes* Greek  
 The Jannis neg reads even the Syntactic Structures  
 'Jannis doesn't read even Syntactic Structures'
- b. *Oute kan ti Maria (dhen) proskalese o pritanis*  
 Even Maria NEG invite the dean  
 'Not even Maria did the dean invite'

Finally, the semantic emptiness of negative markers may solve a problem put forward by Watanabe (2005) against Giannakidou's (2000) analysis of fragmentary answers. Giannakidou (2000, 2002) argues that n-words in Greek are semantically non-negative. Hence, she has to account for the fact that n-words in fragmentary answers like in (19)a yield a reading that includes a negation. She argues that this negation, expressed by *dhen*, is deleted under ellipsis. Hence the assumption that n-words are semantically non-negative can be maintained. Watanabe (2005) argues that this analysis violates the condition that ellipsis may only take place under semantic identity (cf. Merchant's (2001a) notion of e-GIVENness). However, as the question does not contain a negation, it may not license ellipsis of the negative marker *dhen*. If on the other hand, *dhen* is semantically non-negative, the identity condition is met again. The abstract negative operator then induces the negation in the answer. Note that in Non-strict NC languages the negative marker never follows an n-word, and therefore no negative marker can be deleted under ellipsis in the first place.

- (19) a. Q: Ti ides?  
What saw.2SG?  
'What did you see?'  
A: [*Op*-, [*TIPOTA* [*dhen-ida*]]] Greek  
N-thing [NEG saw.1SG]  
'Nothing!'
- b. Q: ¿A quién viste?  
What saw.2SG?  
'What did you see?'  
A: [*Op*-, [*A nadie* [*vió*]]]  
N-thing [saw.1SG]  
'Nothing!'

### 3.3 A few words on syntax

Finally, a few words on the syntactic status of negative markers need to be said. All three analyses that have been discussed in section 2, as well as my own analysis that I present in section 5, rely crucially on the distinction between negative markers that are syntactic heads ( $X^\circ$ ) and those that have phrasal status (XP). I follow the standard analysis (Haegeman (1995), Zanuttini (1997, 2001), Merchant (2001b), Zeijlstra (2004) amongst many others) that negative adverbs (such as Dutch *niet*, German *nicht*, French *pas*) are XPs, whereas weak or strong preverbal negative markers as well as affixal negative markers have  $X^\circ$  status (Italian *non*, Spanish *no*, Polish *nie*, Czech *ne*, Greek *dhen*, French *ne*). Hence negative markers can be distinguished in two respects, each with two possible values: they have either  $X^\circ$  or XP status and they have either a value [iNEG] or [uNEG].<sup>8</sup>

## 4 Typological generalisations

Based on the notions discussed above, a number of languages have been investigated for the syntactic status of their negative markers, and their semantic value. Moreover it has been investigated whether these languages allow TNIs or not. The results are shown in (20) below.

### (20) Language sample

Class:	Language:	Neg. marker: $X^\circ$	Neg. marker: [iNEG]	TNIs allowed
I	Spanish	√	√	*
	Italian	√	√	*
	Portuguese	√	√	*
II	Czech	√	*	√
	Polish	√	*	√
	Bulgarian	√	*	√
	Serbo-Croatian	√	*	√
III	Greek	√	*	*
	Romanian	√	*	*
	Hebrew	√	*	*
	Hungarian	√	*	*
IV	Dutch	*	√	√
	German	*	√	√
	Norwegian	*	√	√
	Swedish	*	√	√
V	Bavarian	*	*	√
	Yiddish	*	*	√
	Quebecois	*	*	√

<sup>8</sup> In Zeijlstra (2006), it is argued that in Non-strict NC languages negative markers do not have a formal feature [iNEG], but a semantic feature [NEG]. However, as the interpretation of an element carrying [iNEG] is identical to the interpretation of an element carrying [NEG], I disregard this distinction in this paper, as nothing crucial in this analysis hinges on it.

Based on (20) the two following typological generalisations can be drawn:

- (21) **G1:** Every language with an overt negative marker  $X^\circ$  that carries [iNEG] bans TNIs.  
**G2:** Every language that bans TNIs exhibits an overt negative marker  $X^\circ$ .

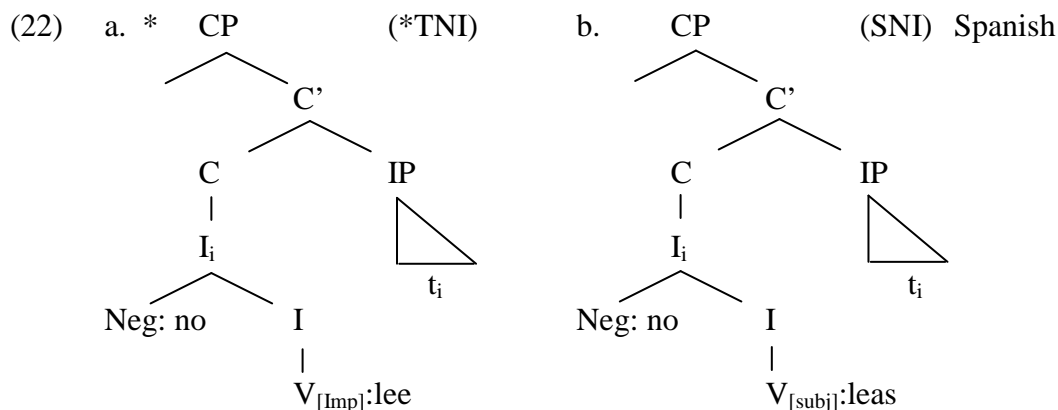
These typological generalisations indicate that both the semantic value of the negative marker and its syntactic status play a role in determining whether and why a language bans TNIs. **G2** has already been observed by Zanuttini (1997), **G1** is to my knowledge a novel observation. In the next section I present an analysis that is based on these notions.

## 5 Analysis

I argue that both the ban on TNIs and its cross-linguistic distribution can be explained on the basis of the following three well-motivated assumptions. First, I assume that  $Op_{IMP}$  must take scope from  $C^\circ$ , a standard analysis in the syntax of imperatives (cf. Zanuttini (1997)). Second, I adopt the classical observation that operators that encode illocutionary force may not be operated on by a (semantic) negation. In this respect, the analysis presented here reflects Han's analysis. Third, I adopt the HMC (Travis' (1984)), an instance of relativized minimality (cf. Rizzi (1989)). Now I demonstrate how for each combination of  $\pm X^\circ$ ,  $\pm[iNEG]$  the correct results are predicted.

### 5.1 Class I languages

The first class of languages consists of languages that exhibit a negative marker  $X^\circ$ , which carries an [iNEG] feature. To these languages Han's analysis applies and  $V_{imp}$  must raise to  $C^\circ$ . As the negative marker  $Neg^\circ$  must be attached to  $V^\circ$ , this negative marker c-commands [IMP], and given the syntactic head status of the negative marker,  $V_{imp}$  cannot escape out of this unit. This is illustrated for Spanish in (22)a. If, however, the imperative verb is replaced by a subjunctive, nothing leads to ungrammaticality, since the subjunctive does not carry along a feature that encodes illocutionary force, and thus it may be c-commanded by the negation (see (22)b). Obviously, this does not yield the semantics of a prohibitive. However, I assume, following Han, that the prohibitive reading is enforced through pragmatic inference. The language needs to fill the functional gap and uses the non-imperative construction with the subjunctive as a replacement. The SNI does not yield the reading of a prohibitive, but is then used as one.<sup>9</sup>



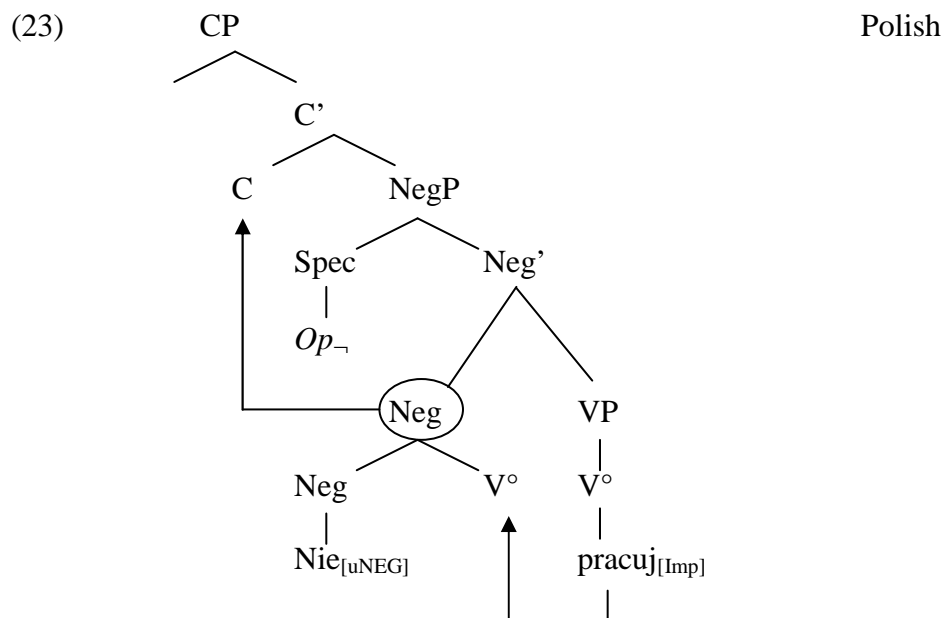
<sup>9</sup> Han (2001) suggests that the fact that the subjunctive encodes an irrealis, plays a role in the imperative interpretation. This is however contradicted by the fact that (for instance) an indicative can adopt this function as well (Italian plural SNIs exhibit an indicative).

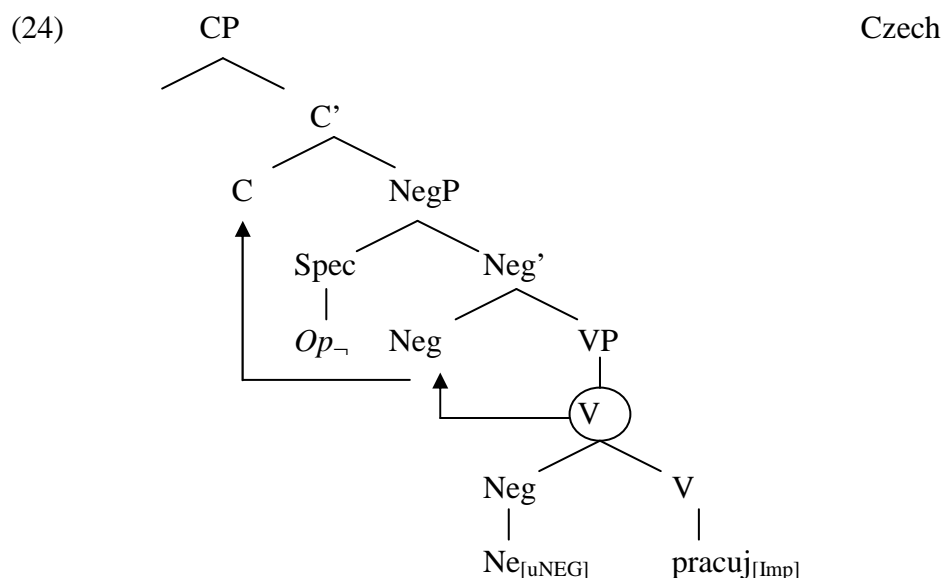
Note that the first typological generalisation (**G1**) immediately follows: since the negative head adjoins to  $V_{imp}$  and  $V_{imp}$  must raise to  $C^\circ$ ,  $Op_{IMP}$  cannot avoid being outscoped by negation. Thus every language with an overt negative marker  $X^\circ$  that carries [iNEG] bans TNIs.

## 5.2 Class II languages

Languages that have negative markers  $X^\circ$  which carry [uNEG] at their disposal differ with respect to the ban on TNIs. Czech, Polish, Bulgarian and Serbo-Croatian for instance accept TNIs, whereas Romanian, Hungarian, Greek and Hebrew disallow them. In this subsection I discuss the first kind of languages.

In Slavic languages, such as Czech, Polish, Bulgarian and Serbo-Croatian, the negative marker is always in preverbal position. Slavic languages however differ with respect to the phonological strength of the negative marker. Polish *nie* is phonologically strong and can be said to be base-generated in its own position  $Neg^\circ$  that c-commands VP. Czech *ne* is weaker than Polish *nie* and it is thus unclear whether *ne* originated in  $Neg^\circ$  or has been base-generated as a head adjunction onto V. In both cases, these negative markers are semantically non-negative and negation is thus induced from  $Op_{-}$ . I assume as Zeijlstra (2004) that this  $Op_{-}$  occupies a Spec,NegP position. The clausal structure therefore does not block TNIs. In Polish  $V_{imp}$  moves to  $Neg^\circ$ , attaches to *nie* and as a unit [ $_{Neg}$  *nie-V\_{imp}*] moves along to  $C^\circ$ .  $Op_{-}$  remains in situ in Spec,NegP and  $Op_{IMP}$  takes scope from  $C^\circ$ . In Czech the complex verbal unit [ $_V$  *ne-V\_{imp}*] moves through  $Neg^\circ$  (and all other intermediate head positions) to  $C^\circ$ , from where  $Op_{IMP}$  takes scope.  $Op_{-}$  is located in Spec,NegP. Thus, both in Polish and Czech the scopal condition  $Op_{IMP} > Op_{-}$  is met. This is illustrated below in for Polish in (23) and for Czech in (24).





### 5.3 Class III languages

The third class of languages under discussion consists of (amongst others) Romanian, Hungarian, Greek and Hebrew. These languages also exhibit  $X^\circ$  negative markers carrying [uNEG] features, but contrary to Class II languages they ban TNIs. As has been discussed in the beginning of this section, movement of  $V_{imp}$  to  $C^\circ$  obeys the HMC. Consequently, if a negative marker is base-generated in  $Neg^\circ$ ,  $V_{imp}$  must attach to it, otherwise the derivation crashes. However, it depends on the phonological properties of a negative marker whether it allows this kind of clitisation. It could very well be that this negative marker cannot be attached to  $V_{imp}$ . In that case the language also bans TNIs and the language requires an SNI. This possibility is born out by the typology presented in (20).

A result of the fact that some languages generally block verbal movement to a higher position than  $Neg^\circ$  is that alternative suppletive strategies have to be followed (subjunctives for instance generally have to raise to  $C^\circ$ , too). One strategy can be to use a different negative marker for negative imperatives.<sup>10</sup> This is the case for instance in Hungarian, where TNIs (using the regular negative marker *nem*) are ruled out, but where the (phonologically weaker) negative marker *ne* is used as a suppletive marker. This negative marker allows for attachment to  $V_{imp}$  (either in  $Neg^\circ$  or  $V^\circ$ ) and, carrying [uNEG], it can yield negative imperatives. This is illustrated below.

- (25) a. \**Nem* olvass! Hungarian  
 Neg read.IMP  
 'Don't read!'
   
 b. *Ne* olvass!  
 Neg read.IMP  
 'Don't read!'

If *ne* is base-generated in V, the derivation is equivalent to the one for Czech in (24), if *ne* is base-generated in  $Neg^\circ$  a structure equivalent to (23) represents the correct structure.

Note that, if a second negative marker is used for negative imperatives, this distinction will be grammaticalised. It becomes part of the featural equipment of these negative markers in which contexts they are allowed to occur (mostly along the lines of mood ([±irrealis] for instance), as illustrated by Saddock and Zwicky (1985)). A phonologically distinct negative

<sup>10</sup> Van den Auwera (2005) shows that this is one of the strategies attested most often.

marker has such a feature bundle that it only occurs in those contexts where it is allowed, and the default negative marker will then be reanalysed such that it is assigned a feature bundle that ensures that it is mutually exclusive with respect to the other negative marker. As a result of this grammaticalisation both negative markers can be phonologically weakened in due course without changing the language with respect to the status of TNIs, although the original motivation for the second negative marker was the fact that the phonological strength of the default negative marker was too strong to allow head adjunction to  $V_{imp}$ . This explains why a large number of Strict NC languages (with negative head markers) still ban TNIs.

#### 5.4 Class IV languages

It follows too that if a negative marker has phrasal rather than head status, TNIs are accepted. Regardless of the position of the negative marker, it cannot block movement of  $V_{imp}$  to  $C^\circ$ . Hence  $Op_{IMP}$  can always take scope from  $C^\circ$  and all scopal requirements are met. In Zeijlstra (2004) it has been argued that the position of the negative marker in Dutch is a vP adjunct position. The structure of a TNI in Dutch would then be like (26).

(26)  $[_{CP}$  slaap $_{[Imp]i}$   $[_{vP}$  niet  $t_i$ ]] Dutch

Note that from this analysis typological generalisation **G2** follows immediately. If in a particular language there is no negative marker  $X^\circ$  available, movement of  $V_{imp}$  to  $C^\circ$  can never be blocked. Consequently, all languages that ban TNIs exhibit an overt negative marker  $X^\circ$ .

#### 5.5 Class V languages

Class V languages finally are NC languages without a negative head marker, such as Bavarian Quebécois and Yiddish. Given the explanation for **G2**, it is not expected that TNIs are banned in these languages. The only difference between these languages and Class IV languages is that the negative marker in these languages does not carry an [iNEG] feature.<sup>11</sup> Hence, an abstract negative operator  $Op_-$  needs to be included. This could either be (depending on one's syntactic views) in a (higher) VP adjunct position or in Spec,NegP. Whatever structure is adopted (the representation in (27) is just an example of the two possible structures), verbal movement to  $C^\circ$  cannot be blocked and therefore TNIs are allowed.

(27) Kuk nit! Yiddish  
 Look NEG  
 'Don't look!  
 $[_{CP}$  Kuk $_{[Imp]i}$   $[_{NegP/VP}$   $Op_-$   $[_{NegP/VP}$  nit  $[_{VP}$   $t_i$ ]]]

#### 5.6 Concluding remarks

It follows that the three assumptions that I presented in the beginning of this section ( $Op_{IMP}$  takes scope from  $C^\circ$ ,  $Op_{IMP}$  may not be c-commanded by a negative operator and the HMC) predict that in some languages TNIs are excluded. Moreover the analysis based on these assumptions predicts the typological generalisations **G1** and **G2**.

<sup>11</sup> This follows from the observation that in languages such as Yiddish a negative marker may occur both the left and to the right of an n-word, and exhibit NC.

## 6 Further evidence: diachronic change

In Non-strict NC languages with a negative marker  $X^\circ$  (that must carry [iNEG]) TNIs must be banned. This holds for instance for Italian. However, it is known that Old Italian allowed TNIs (as pointed out by Zanuttini (1997) and shown in (28)). The analysis presented above predicts that is impossible that the negative marker *non* in Italian, which is a syntactic head, carries a feature [iNEG] but constitutes TNIs. It could however be that Old Italian *non* carried [uNEG] and thus the prediction is that Old Italian cannot have been a Non-strict NC language. This prediction is born out. Old Italian was a Strict NC language, with a negative marker *non* that carried a feature [uNEG], as shown in (29).

- |      |    |  |               |
|------|----|--|---------------|
| (28) | a. | <i>Ni</i> ti tormenta di questo! <sup>12</sup><br>NEG yourself torment.2SG.IMP of this<br>'Don't torment yourself with this'                         | Old Italian   |
|      | b. | * <i>Non</i> telefona a Gianni!<br>NEG call.2SG.IMP to Gianni<br>'Don't call Gianni'   | Cont. Italian |
| (29) | a. | <i>Mai nessuno</i> oma <i>non</i> si può guarare <sup>13</sup><br>N-ever n-even-one man NEG himself can protect<br>'Nobody can ever protect himself' | Old Italian   |
|      | b. | <i>Nessuno</i> (* <i>non</i> ) ha detto <i>niente</i><br>N-body neg has said n-thing<br>'Nobody said anything'                                       | Cont. Italian |

Apparently Italian developed from a Strict NC language into a Non-strict NC language. Since in Old Italian TNIs were allowed, the change from Strict NC into Non-strict NC must have caused the ban on TNIs. Similar observations can be made for the development of Portuguese that used to be a Strict NC language that allowed TNIs and transformed into a Non-strict NC language that bans TNIs. See Zeijlstra (2006) for a more detailed analysis of the development of Romance languages with respect to NC. The analysis presented above predicts that the diachronic developments with respect to the acceptance of TNIs and the kind of NC that a language exhibits are related. The fact that this prediction is born out further supports this analysis.

## 7 Conclusions

In this paper I analyse the ban on TNIs as a result of three principles: (i) the fact that  $Op_{IMP}$  universally takes scope from  $C^\circ$ ; (ii) the fact that  $Op_{IMP}$  may not be c-commanded by a negative operator and (iii) the HMC (an instance of Relativized Minimality). It follows that if a negative marker is a syntactic head and carries an [iNEG] feature,  $V_{imp}$  may not move across  $Neg^\circ$ , but must attach to it. Hence, the [IMP] feature remains under the scope of negation and the TNi is ruled out.

From this analysis the typological generalisations **G1** and **G2** can also be derived. **G1** follows, since (as explained above) every Non-strict NC language with a negative marker  $X^\circ$  this negative marker must carry [iNEG] and thus TNIs are ruled out. **G2** follows because of the HMC. If a language does not exhibit a negative marker  $Neg^\circ$ , this marker can never block verbal movement to  $C^\circ$  and TNIs must be allowed.

<sup>12</sup> Zanuttini (1997).

<sup>13</sup> Martins (2000): 194

Finally, it follows that diachronic developments with respect to the kind of NC (Strict/Non-strict) that a language exhibits may influence a language's ban on TNIs. It is shown for Italian that this prediction is indeed correct.

## References

- Adger, D.: 2003, *Core Syntax: a minimalist approach*, Oxford: Oxford University Press.
- Brown, S.: 1999, *The Syntax of Negation in Russian*, Stanford: CSLI Publications.
- Chomsky, N.: 2001, Derivation by Phase, in M. Kenstowicz (ed.), *Ken Hale: a Life in Language*, MIT Press, pp. 1-52.
- Frege, G.: 1892, Über Sinn und Bedeutung, *Zeitschrift für Philosophie und philosophische Kritik* **100**: 25-50. Translated as: On Sinn and Bedeutung, in M. Beaney (ed): 1997, *The Frege Reader*, Blackwell Publishers, pp. 151-171.
- Giannakidou, A.: 2000, Negative ... Concord?, *Natural Language and Linguistic Theory* **18**, 457-523.
- Giannakidou, A.: 2002, N-words and Negative Concord, Ms. University of Chicago.
- Giannakidou, A.: 2005: The landscape of EVEN items, Ms. University of Chicago.
- Haegeman, L.: 1995, *The syntax of negation*, Cambridge Studies in Linguistics 75, Cambridge: Cambridge University Press.
- Han, C.: 2001, Force, negation and imperatives, *The Linguistic Review* **18**, 289-325.
- Haraiwa, K.: 2001, Multiple Agreement and the Defective Intervention Effect, Ms MIT.
- Haraiwa, K.: 2005, Dimensions in Syntax, Ms. University of Tokyo.
- Herburger, E.: 2001, The negative concord puzzle revisited, *Natural Language Semantics* **9**, 289-333.
- Jespersen, O.: 1917, *Negation in English and other Languages*, Copenhagen: A.F. Høst.
- Ladusaw, W. A.: 1992, Expressing negation. In C. Barker and D. Dowty (eds), *SALT II*, Cornell Linguistic Circle.
- Laka, I.: 1990, *Negation in Syntax: on the Nature of Functional Categories and Projections*. PhD dissertation, MIT.
- Lee, C.: 1988, Speech act terms and mood indicators (in Korean), *Acta Linguistica Hungarica* **38**, 127-41.
- Martins, A.M.: 2000, Polarity Items in Romance: Underspecification and Lexical Change, in S. Pintzuk, G. Tsoulas, and A. Warner (eds), *Diachronic Syntax: Models and Mechanisms*, Oxford University Press.
- Merchant, J.: 2001a, *The syntax of silence*, Oxford: Oxford University Press.
- Merchant, J.: 2001b, Why no(t), Ms. University of Chicago.



- 
- Rivero, M.L.: 1994, Negation, imperatives and Wackernagel effects, *Rivista di Linguistica* **6**.
- Rivero, M.L. & Terzi, A.: 1995, Imperatives, V-movement, and Logical Mood, *Journal of linguistics* **31**, 301-332.
- Rizzi, L. :1982. *Issues in Italian Syntax*, Dordrecht /Cinnaminson, NJ: Foris Publications.
- Rizzi, L.: 1989, *Relativised Minimality*, Cambridge, MA: The MIT Press.
- Rowlett, P.: 1998, *Sentential Negation in French*, New York/Oxford: Oxford University Press.
- Sadock, J. and Zwicky, A.: 1985, Speech act distinctions in syntax, in T. Shopen (ed), *Language typologie and syntactic description*, Cambridge University Press, pp. 155-96.
- Travis, L.: 1984, *Parameters and Effects of Word Order Variation*, PhD Dissertation, MIT.
- Ura, H.: 1996, *Multiple Feature-Checking: A Theory of Grammatical Function Splitting*, PhD Dissertation, MIT.
- Van den Auwera, J.: 2005, *Why languages prefer prohibitives*, Valencia: Studea Linguistica Europea.
- Van der Wouden, T.: 1994, *Negative Contexts*, PhD Dissertation, University of Groningen.
- Watanabe, A.: 2004, The Genesis of Negative Concord, *Linguistic Inquiry* **35**, 559-612.
- Zanuttini, R.: 1994. Speculations on negative imperatives, *Rivista di linguistica* **6**, 119-142.
- Zanuttini, R.: 1997, *Negation and clausal structure. A Comparative Study of Romance languages*. Oxford studies in comparative syntax, New York, Oxford: Oxford University Press.
- Zanuttini, R.: 2001, Sentential Negation, in M. Baltin and C. Collins (eds), *The Handbook of Contemporary Syntactic Theory*, Blackwell, pp. 511-535.
- Zeijlstra, H.: 2004, *Sentential negation and Negative Concord*. PhD Dissertation, University of Amsterdam.
- Zeijlstra, H.: 2006, How semantic dictates the syntactic vocabulary, in C. Ebert and C. Endriss (eds), *Proceedings of Sinn & Bedeutung 10*, ZAS.



# HOW SEMANTICS DICTATES THE SYNTACTIC VOCABULARY

Hedde Zeijlstra  
University of Tübingen

hedde.zeijlstra@uni-tuebingen.de

## Abstract

In this paper I argue that the set of formal features that can head a functional projection is not given by UG but derived through L1 acquisition. I formulate a hypothesis that says that initially every functional category  $F$  is realised as a semantic feature  $[F]$ ; whenever there is an overt doubling effect in the L1 input with respect to  $F$ , this semantic feature  $[F]$  is reanalysed as a formal feature  $[i/uF]$ . In the first part of the paper I provide a theoretical motivation for this hypothesis, in the second part I test this proposal for a case-study, namely the cross-linguistic distribution of Negative Concord (NC). I demonstrate that in NC languages negation has been reanalysed as a formal feature  $[i/uNEG]$ , whereas in Double Negation languages this feature remains a semantic feature  $[NEG]$  (always interpreted as a negative operator), thus paving the way for an explanation of NC in terms of syntactic agreement. In the third part I discuss that the application of the hypothesis to the phenomenon of negation yields two predictions that can be tested empirically. First I demonstrate that negative markers  $X^\circ$  can be available only in NC languages; second, independent change of the syntactic status of negative markers, can invoke a change with respect to the exhibition of NC in a particular language. Both predictions are proven to be correct. I finally argue what the consequences of the proposal presented in this paper are for both the syntactic structure of the clause and second for the way parameters are associated to lexical items.

## 1 Introduction

A central topic in the study to the syntax-semantics interface concerns the question what exactly constitutes the set of functional projections, or more precisely, what constitutes the set of formal features that are able to project. Since Pollock's (1989) work on the split-IP hypothesis many analyses have assumed a rich functional structure, consisting of a UG-based set of functional heads that are present in each clausal domain (Beghelli & Stowell (1997) for quantifier positions, Rizzi (1997) for the CP domain, Zanuttini (1997) for negation or Cinque (1999) for the IP domain). This approach has become known as the *cartographic* approach (cf. Cinque (2002), Rizzi (2004), Belletti (2004) for an overview of recent papers). Under this approach the set of functional projections is not taken to result from other grammatical properties, but is rather taken as a starting point for grammatical analyses.

An alternative view on grammar, standardly referred to as *building block grammars* (cf. Iatridou (1990), Bobaljik & Thrainsson (1998), Koenenman (2000), Neeleman (2002)), takes syntactic trees to be as small as possible. Obviously, in many cases there is empirical evidence for the presence of a functional projection in a particular clause, e.g. due to the presence of an overt functional head. The main difference between the building block grammar approach and the cartographic approach (in its most radical sense) is that in the first approach the presence of a particular functional projection in a particular sentence in a particular language does not imply its presence in all clauses, or all languages, whereas this is the basic line of reasoning under the latter approach (cf. Cinque (1999), Starke (2004)). However the question what exactly determines the amount and distribution of functional projections however remains open.

The question what constitutes functional projections and thus the set of formal features that are able to project is not only important for a better understanding of the syntax-semantic

interface, but is also of acute interest to the study of parameters. Given Borer's (1984) assumption that parametric values are associated to properties of lexical elements, a view adopted in the Minimalist Program (cf. Chomsky 1995, 2000). For instance, the *Wh* (*fronting / in situ*) parameter follows from the presence of a [WH] feature on  $C^\circ$  that either triggers movement of *Wh* terms to a sentence-initial position or allows them to remain in situ.

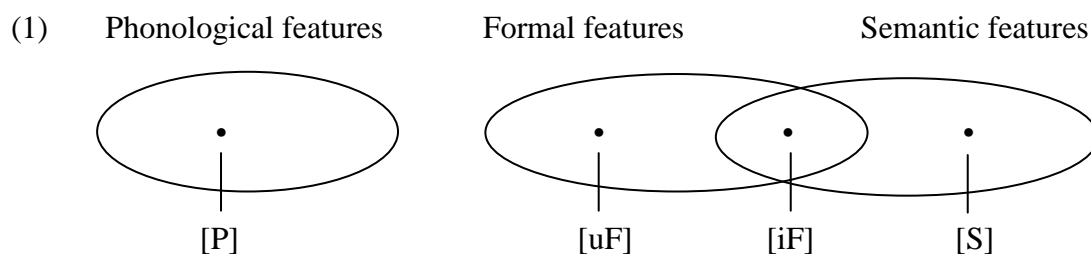
In the following section I provide some theoretical backgrounds and present my proposal in terms of syntactically flexible functional categories, arguing that a particular feature [F] can only be analysed as a formal feature able to create a functional projection FP if and only if there are (substantial) instances of doubling effects with respect to F present in language input during first language acquisition. After that, in section 3, I illustrate how the mechanism presented in section 2, works by discussing a case-study: negation and Negative Concord. In this section I demonstrate that negation is a syntactically flexible functional category: in Negative Concord languages negation is realised as a formal feature, in Double Negation languages it is not. Moreover I argue that Negative Concord should be analysed as a form of syntactic agreement and that the range of parametric variation can be derived from the different ways that negation can be formalised (or not) in a grammatical system. In section 4 two more consequences of the proposal of section 2 are discussed: (i) the syntax of (negative) markers and (ii) patterns of diachronic change. Here I show that the hypothesis formulated in section 2 makes correct predictions, thus providing empirical evidence for it. Section 5 concludes.

## 2 Formal features result from doubling effects

In the Minimalist Program (Chomsky 1995, Chomsky 2000, Chomsky 2001) Lexical Items (LIs) are assumed to be bundles of three kinds of features: phonological features, semantic features and formal features. In this paper the distinction between formal features and semantic features is of particular interest. First, I focus on the question as to what exactly are the differences between formal and semantic features. Second, the question rises how these differences can be acquired during L1 acquisition.

### 2.1 Formal features

As LIs consist of three different kinds of features, three different sets of features can be distinguished: the set of phonological features, the set of formal features and the set of semantic features. Following standard minimalist assumptions on the architecture of grammar, the set of formal features and the set of semantic features intersect, whereas the set of phonological features does not. This is illustrated in (1).



In the figure, the relations between the sets are illustrated. As the sets of formal and semantic features intersect, it follows that only some formal features carry semantic content. Therefore formal features have a value  $\pm$ interpretable: interpretable formal features can be interpreted at LF, the interface between grammar and the (semantic) Conceptual-Intentional system; uninterpretable features do not carry any semantic content and should therefore be deleted in the derivation before reaching LF in order not to violate the Principle of Full Interpretation

(Chomsky 1995). Uninterpretable features ([uF]'s) can be deleted by means of establishing a checking relation with a corresponding interpretable feature [iF].

A good example of a formal feature is the person feature (a so-called  $\phi$ -feature). It is interpretable on pronouns, but uninterpretable on verbs. This is the reason why finite verbs enter a relation with a subject, so that the uninterpretable person feature on the verb is checked against the interpretable feature on the subject and is deleted. A proper example of a semantic feature is genus (as opposed to gender), which does not trigger any syntactic operation. No feature has to be deleted, as genus can always be interpreted. The difference between formal features and semantic features thus reduces to their ability to participate in syntactic operations.

Now the following question arises: how can one know whether a particular feature is an interpretable formal feature [iF] or a semantic feature [F]? The final observation enables us to distinguish the two. From a semantic perspective the two are undistinguishable, as they have identical semantic content:

$$(2) \quad \|X_{[iF]}\| = \|X_{[F]}\|$$

However, if one detects the presence of an uninterpretable formal feature [uF] in a sentence, there must be present an element carrying an interpretable formal feature [iF]. Hence an element Y carries an interpretable feature [iF] if (in the same local domain) an element carries an uninterpretable feature [uF] without yielding ungrammaticality (with Y being the only possible candidate to delete [uF]). In those cases Y must carry [iF] instead of [F], otherwise feature checking cannot have taken place. This question is of course not only relevant for the curious linguist, but plays also a major role in first language acquisition, as the language learner also needs to find out of which features a particular LI consists of.

## 2.2 Uninterpretable features and doubling effects

So, the question how to determine whether an LI carries a formal feature [iF] or a semantic feature [F] reduces to the question how to determine whether an LI carries a feature [uF]. If in a grammatical sentence an LI X carries a feature [uF] there must be an LI Y carrying [iF]. Hence, the question arises how uninterpretable features can be detected. This question is much easier to address: LIs carrying [uF]'s exhibit (at least) two properties that can easily be recognised (which already have been mentioned above) and are repeated in (3).

- (3) a. A feature [uF] is semantically vacuous.  
 b. A feature [uF] triggers syntactic operations Move and Agree in order to be deleted.

At first sight there are three properties that form a test to recognise a feature [uF]: its semantic uninterpretability, the triggering of an operation Move and the triggering of an operation Agree. Below I argue that all of these three properties reduce to one single property: doubling.

First, although a feature [uF] is meaningless, it must establish a syntactic relationship with an element that carries [iF] and that therefore must have semantic content. This is illustrated in the following example with the person feature [i/u2SG]:

- (4) a. Du kommst German  
 You come  
 b.  $[_{TP} \text{Du}_{[i2SG]} \text{kommst}_{[u2SG]} ]$   
└──────────┘

In (4) it is shown that the information that the subject is a 2<sup>nd</sup> person singular pronoun is encoded twice in the morphosyntax: first by the choice of the subject *Du*, second by the person marker *-st* on the verbal stem.

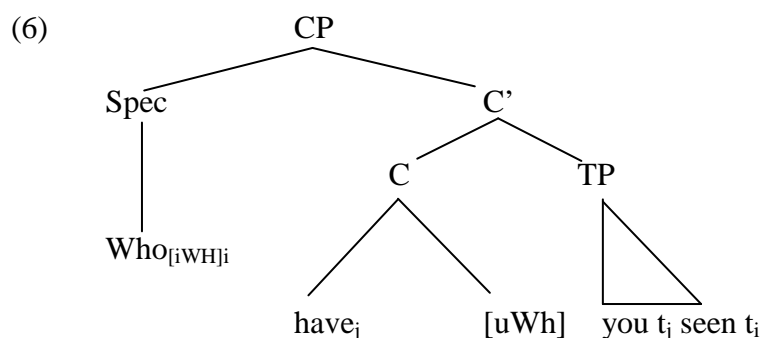
The example in (4) is already an example of the syntactic operation Agree as at some point in the derivation the verb's [u2SG] feature is checked against a corresponding [i2SG] feature. Without an Agree relation between *Du* and *kommst*, the sentence would be ungrammatical; if *kommst* did not have any uninterpretable person features at all, there could not have been triggered an Agree relation in the first place. Hence, if an Agree is a result of a doubling effect.

Such a relation is not restricted to two elements (one [iF], one [uF]), also multiple [uF]'s can establish a relation with a single [iF]. Ura (1996) and Hiraiwa (2001, 2005) refer to this phenomenon as *multiple Agree*. This is illustrated in (5) below for Swahili (Zwarts (2004)), which the noun class of the subject is manifested on multiple elements in the sentence.

- (5) Juma a-li-kuwa a-ngali a-ki-fanya kazi Swahili  
 Juma<sub>1</sub> SU<sub>1</sub>-PAST-be SU<sub>1</sub>-still SU<sub>1</sub>-PROG-DO work  
 'Juma was still working'

Both in (4) and (5) the manifestation of one semantic operator is manifested more than once, a phenomenon that is known as *doubling*.

Now, let us have a look at the operation Move. Checking requirements of uninterpretable features always trigger movement. It follows immediately that Move should follow from doubling properties, since Move is a superfunction of Agree (Move = Agree + Pied-piping + Merge). I illustrate this with an example taken from Robert & Roussou (2003). It has been argued that *Wh* fronting is triggered by an uninterpretable Wh feature [uWH] on C. By moving the Wh word, which carries an [iWH] feature, to Spec,CP, C's [uWH] feature can be checked against this [iWH]. This is illustrated in (6).



In (6) the question feature is present three times in total in the structure: as [iWH] on the Wh word, as [uWH] on C and as a deleted [iWH] on the trace. Given that the *Wh* term had to be fronted, it can be determined that C must contain an uninterpretable feature [uWH]. In other words, Move unfolds the presence of an uninterpretable feature [uWH] although this feature has not been spelled-out. Hence Move too results from a double manifestation of the Wh feature in the sentence.<sup>1</sup>

<sup>1</sup> It remains an open question why in (6) the checking relation cannot be established by Agree as well. Much debate is going on about this question. In some recent minimalist versions it is assumed that in English C° has an additional EPP feature that is responsible for the movement. For the moment I will not open this discussion. It should be noted however that Move is a superfunction of Agree and since doubling is a triggering force behind Agree, it is behind Move too.

Note that the presence of the [uWH] feature is visible as a consequence of the fact that movement of the *Wh* term is required. Hence, all visible properties of [uF]'s result from detectable doubling properties. Moreover, as we saw, it also works the other way round. Doubling is defined as an instance of multiple manifestations of a single semantic operator. As only one element may be the realisation of this semantic operation ([iF]) all other manifestations must carry [uF]. Thus, whenever there is doubling with respect to F, there is a [uF] present, and whenever a [uF] feature is present in a syntactic structure, there is doubling with respect to F.

Now we can reformulate the answer to the question asked above. How can an [iF] be distinguished from [F]? The answer is that whenever there is doubling with respect to F, there are (only) formal features ([iF]/[uF]). Following this line of reasoning, if there is no doubling with respect to F, there is no reason to assume that F is a formal feature. In those cases, every instance of F always corresponds to a semantic feature [F]. As mentioned before, the question is crucial for L1 acquisition, as every L1 learner needs to find out of which features a particular LI consists. Therefore I put forward the following hypothesis:

(7) *Flexible Formal Feature Hypothesis (FFFH)*

- a. Every feature [F] is first analysed as a semantic feature ([F]).
- b. Only if there are doubling effects with respect to F in the language input, [F] has to be reanalysed as a formal feature [i/uF].<sup>2</sup>

This hypothesis, if correct, has consequences for the architecture of grammar. It rejects the idea that the set of formal features is fixed by UG, and states that every semantic operator<sup>3</sup> in principle can be part of the syntactic vocabulary (i.e. the set of formal features) or remains within the realm of semantics. In this sense this hypothesis treats the formation of the set of formal features on a par with grammaticalisation. Before continuing the proposal and its consequences in abstract terms, I first provide a case-study which proves that this hypothesis makes in fact correct predictions.

### 3 Case study: Negation and Negative Concord

The case study to test the FFFH presented above concerns negation. Doubling with respect to negation is clearly detectable, since two semantic negations always cancel out each other. If two negative elements do not cancel out each other, but yield one semantic negation, at least one of the two negative elements must be uninterpretable. This phenomenon is well described and known as Negative Concord (NC).

One can distinguish three different types of languages with respect to multiple negation: (i) Double Negation (DN) languages, in which two negative elements always cancel out each other; (ii) Strict NC languages, in which every clause-internal negative element (both negative markers and *n*-words<sup>4</sup>) yields only one semantic negation; and (iii) Non-strict NC languages, where either a preverbal *n*-word or a preverbal negative marker establishes an NC relation with a preverbal *n*-word. However, a negative marker in this type of languages may not

<sup>2</sup> The FFFH is not a hypothesis for an L1 acquisition theory. It is motivated by learnability requirements and should, if correct, count as a prerequisite for L1 acquisition theories.

<sup>3</sup> For a discussion about what exactly constitutes the class of semantic operators the reader is referred to von Stechow (1995), Keenan & Stabler (2003) and Roberts & Roussou (2003: ch. 5).

<sup>4</sup> The term *n*-word is due to Laka (1990) and defined in Giannakidou (2002) as elements that seem to exhibit semantically negative behaviour in some contexts, but semantically non-negative behaviour in other contexts.

follow preverbal n-words. An example of a DN language is Dutch, an example of a Strict NC language is Czech and an example of a Non-strict NC language is Italian, as is illustrated in (8)-(10) below.

- (8) a. Jan ziet *niemand* Dutch  
 Jan sees n-body  
 ‘Jan doesn’t see anybody’  
 b. *Niemand* zegt *niets*  
 N-body says n-thing  
 ‘Nobody says nothing’
- (9) a. Milan *\*(ne)vidi nikoho* Czech  
 Milan NEG.saw n-body  
 ‘Milan didn’t see anybody’  
 b. Dnes *\*(ne)volá nikdo*  
 Today NEG.calls n-body  
 ‘Today nobody calls’  
 c. Dnes *nikdo \*(ne)volá*  
 Today n-body NEG.calls  
 ‘Today nobody calls’
- (10) a. Gianni *\*(non) ha telefonato a nessuno* Italian  
 Gianni NEG has called to n-body  
 ‘Gianni didn’t call anybody’  
 b. Ieri *\*(non) ha telefonato nessuno*  
 Yesterday NEG has called n-body  
 ‘Yesterday nobody called’  
 c. Ieri *nessuno \*(non) ha telefonato (a nessuno)*  
 Yesterday n-body NEG has called to n-body  
 ‘Yesterday nobody called (anybody)’

In Dutch, two negations cancel each other out, and thus every negative sentence contains only one negative element. This is either the negative marker *niet* or a negative quantifier, as illustrated below. Note that the locus of the negative operator at LF does not coincide with its relative position at surface structure, but this is due to quantifier raising (independent from negation) in (11) or V2 in (13). Hence there are no doubling effects with respect to negation. As a result from the FFFH it follows that negation in Dutch is not formalised (or grammaticalised): the only negative feature [NEG] in Dutch is a semantic feature.

- (11) Jan doet *niets*  $-\exists x.[\mathbf{thing}'(x) \ \& \ \mathbf{do}'(j, x)]$   
 [NEG]  
 Jan does n-thing
- (12) *Niemand* komt  $-\exists x.[\mathbf{person}'(x) \ \& \ \mathbf{come}'(x)]$   
 [NEG]  
 N-body comes
- (13) Jan loopt *niet*  $-\mathbf{walk}'(j)$   
 [NEG]  
 Jan walks NEG

Things are different, however, in NC languages. Let us start by discussing the Non-strict NC language Italian. In Italian postverbal n-words obligatorily need to be accompanied by the



negative marker *non* or a preverbal n-word. This means that a large part of negative sentences in the L1 input consists of sentences such as (14).

- (14) Gianni *non* ha visto *nessuno*  $\neg\exists x.[\mathbf{person}'(x) \ \& \ \mathbf{see}'(g, x)]^5$   
           [iNEG]        [uNEG]  
       Gianni NEG has seen n-body

Since (14) contains more than one negative element, but only one negation in its semantics, only one of the negative elements can be semantically negative and the other one must be semantically non-negative. The latter element must therefore carry an uninterpretable formal negative feature [uNEG], and negation being formalised in this language the negative operator carries [iNEG] and not [NEG]. Negation must take scope from the position occupied by *non*. *Non* thus carries [iNEG] and *nessuno* carries [uNEG]. This distribution cannot be reversed, since otherwise a sentence such as (15) is expected to be grammatical, *contra fact*.

- (15) \*Gianni ha visto *nessuno*  
       Gianni has seen n-body  
       'Gianni hasn't seen anybody'

*Non*'s [iNEG] feature also enables it to express sentential negation. This is shown in (16) where *non* functions as the negative operator.

- (16) *Non* ha telefonato Gianni  $\neg\mathbf{call}'(g)$   
       [iNEG]

The fact that *non* is the carrier of [iNEG] and n-words carry [uNEG] seems to be problematic in one respect, namely that Italian also allows sentences such as (17). Here *non* is absent (and must not even be included). Hence all overt negative elements carry [uNEG].

- (17) *Nessuno* ha telefonato a *nessuno*  $\neg\exists x\exists y[\mathbf{person}'(x) \ \& \ \mathbf{person}'(y) \ \& \ \mathbf{call}'(x, y)]$   
       [uNEG]                                [uNEG]

However, given the grammaticality and the semantics of the sentence, one element must have [iNEG]. Basically, there are two ways out. Either one analyses n-words as being lexically ambiguous between negative quantifiers and non-negative indefinites (cf. Herburger (2001)), but this would render (15) grammatical. The other way out is to assume that negation is induced by a (phonologically) abstract negative operator ( $Op_{-}$ ), whose presence is marked by the overt n-words. Then (17) would be analysed as follows:

- (18)  $Op_{-}$  *nessuno* ha telefonato a *nessuno*  
       [iNEG] [uNEG]                                [uNEG]

This analysis is supported by the fact that if the subject n-word is focussed and the negative marker *non* is included, the sentences achieves a DN reading. Hence, apart from the presence of *non*, a second negative operator must be at work.

- (19)  $Op_{-}$  *nessuno non* ha telefonato a *nessuno*  
       [iNEG] [uNEG] [iNEG]                                [uNEG]

Hence, given the fact that in Italian not every instance of negation is semantically negative, negation is formalised and every negative element carries a formal negative feature: n-words carry [uNEG] and the negative marker *non* and  $Op_{-}$  carry [iNEG].

In Czech, the application of the FFFH leads to slightly different results. First, since Czech is an NC language, negation must be formalised and n-words are attributed a feature [uNEG]. However the (default) assumption that the negative marker carries [iNEG] cannot be drawn

<sup>5</sup> For clarity reasons tense is neglected in all these readings

on this basis yet. The negative operator could also be left abstract. Hence, for the moment the value of the formal feature of the negative marker in (20) is left open.

- (20) Milan *nevidi* *nikoho*  $\neg\exists x.[\mathbf{person}'(x) \ \& \ \mathbf{see}'(\mathbf{m}, x)]$   
           [?NEG]   [uNEG]

In Italian we saw that *non* must be the negative operator, since negation takes scope from the position that it occupies. Consequently, no n-word is allowed to surface left from this marker (with the exception of constructions like (19)). However, in Czech n-words are allowed to occur both to the left and to the right of the negative marker. This means that negation cannot take scope from the surface position of *ne*. The only way to analyse *ne* then, is as a negative marker that carries [uNEG] and which establishes a feature checking relation (along with the n-words) with a higher abstract negative operator:

- (21) *Op<sub>-</sub>* *Nikdo* *nevolá*  $\neg\exists x.[\mathbf{person}'(x) \ \& \ \mathbf{call}'(x)]$   
           [iNEG] [uNEG] [uNEG]

As a final consequence, single occurrences of *ne*, cannot be taken to be realisations of the negative operator, but markings of such an operator. In (22) the negative marker indicates the presence of *Op<sub>-</sub>*, which on its turn is responsible for the negative semantics of the sentence.

- (22) Milan *Op<sub>-</sub>* *nevolá*  $\neg\mathbf{call}'(\mathbf{m})$   
           [iNEG] [uNEG]

Hence, in Czech even the negative marker is semantically non-negative. Czech and Italian thus differ with respect to the formalisation of negation to the extent that the negative marker in Italian carries [iNEG], whereas the negative marker in Czech carries [uNEG]. Note that this corresponds to the phonological status of the two markers: in Czech the negative marker exhibits prefixal behaviour, thus suggesting that it should be treated on a par with tense/agreement morphology. Italian *non* is a (phonologically stronger) particle, that can be semantically active by itself.

The application of the FFFH also drives in the direction of analysing NC as a form of syntactic agreement, a line of reasoning initially proposed by Ladusaw (1992) and adopted by Brown (1996) and Zeijlstra (2004). It should be noted however that these are not the only accounts for NC. Other accounts treat NC as a form of polyadic quantification (Zanuttini (1991), Haegeman & Zanuttini (1996), De Swart & Sag (2002)) or treat n-words as Negative Polarity Items (cg. Giannakidou 2000). The latter approaches both face problems, many of them addressed in the literature (cf. Zeijlstra (2004) for an overview). Unfortunately, space limitations prevent me here from addressing these issues here. The reader is referred to Zeijlstra (2004) for a discussion of how most of these problems can be explained away in a syntactic agreement approach of NC. Moreover, in the next section I discuss two consequences that follow from the syntactic agreement approach that is induced by the FFFH. These provide additional evidence for this explanation of NC.

A final point must be made regarding the range of variation that languages exhibit with respect to the expression of negation. Although I did not discuss every possible type of NC language (optional NC was left out of the discussion), the languages above cover the entire range of variation that one may expect: either every negative element is formalised as carrying a [uNEG] feature (Czech), or no element at all has been formalised (Dutch), or only some elements have been assigned [iNEG] while others have been assigned [uNEG] (Italian). All other kinds of NC languages could be analysed in the same manner. This means that the entire range of parametric variation with respect to the interpretation and expression of

negation follows from the proposal in (7).<sup>6</sup> Consequently, adopting (7) a parameter such as the NC parameter (a language exhibits/does not exhibit NC) or a subparameter responsible for the Strict vs. Non-strict NC distinction is a derived notion, not directly following from UG but as a by-product of a simple learnability mechanism.

## 4 Consequences

The FFFH and the exact analysis of NC in terms of syntactic agreement make several predictions that I discuss in this section. First I argue that the status of the negative feature (formal or semantic) has some consequences regarding the appearance and distribution of the negative projection (NegP after Pollock (1989)). Second I argue that the FFFH makes correct predictions about the consequences of diachronic change with respect to the obligatorily or optional occurrence of the negative marker.

### 4.1 Negative features and projections

Now let us look at the relation between the formal status of negative features and the syntactic status of negative markers. Negative markers come about in different forms. In some languages (Turkish) the negative marker is part of the verbal inflectional morphology; in other examples the negative marker is a bit stronger. Italian *non* is a strong particle, and the Czech particle *ne* is weak.<sup>7</sup> German *nicht* on the other hand is even too strong to be a particle and is standardly analysed as an adverb. Examples are in (23)-(25).

- |      |  |                              |
|------|--|------------------------------|
| (23) | John <i>elmalari sermedi</i> <sup>8</sup><br>John apples like.NEG.PAST.3SG<br>'John doesn't like apples' | Turkish<br>(affixal)         |
| (24) | a. Milan <i>nevolá</i><br>Milan NEG.calls<br>'Milan doesn't call'  | Czech<br>(weak particle)     |
|      | b. Gianni <i>non</i> ha telefonato<br>Gianni NEG has called<br>'Gianni didn't call'                      | Italian<br>(strong particle) |
| (25) | Hans kommt <i>nicht</i><br>Hans comes NEG<br>'Hans doesn't come'   | German<br>(adverbial)        |

Note also that it is not mandatory that a language has only one negative marker. Catalan has a strong negative particle *no* and an additional optional negative adverbial marker (*pas*)

<sup>6</sup> This leaves open many possibilities, e.g. about the number of negative markers, their syntactic status, their position in the clausal structure, etc. Several of these issues are discussed in the next sections. It is important however that the range of variation with respect to negation is restricted by two constraints: (i) a language has the possibility to express negation (for reasons of language use rather than grammatical reasons) and (ii) negation can, but does not need to be formalised.

<sup>7</sup> I refrain from the discussion whether Czech *ne* should be analysed as a clitical, prefixal or as a real particle. It will become clear from the following discussion that the outcome would not be relevant for the final analysis in terms X°/XP status.

<sup>8</sup> Example from Ouhalla (1991), also cited in Zanuttini (2001)

whereas in West Flemish the weak negative particle *en* is only optionally present, next to the standard adverbial negative marker *nie*. Standard French even has two obligatory negative markers (*ne ... pas*), as demonstrated in (26).

- |      |    |  |              |
|------|----|--|--------------|
| (26) | a. | <i>No serà (pas) facil</i><br>NEG be.FUT.3SG NEG easy<br>'It won't be easy'    | Catalan      |
|      | b. | <i>Valère (en) klaapt nie</i><br>Valère NEG talks NEG<br>'Valère doesn't talk' | West Flemish |
|      | c. | <i>Jean ne mange pas</i><br>Jean NEG eats NEG<br>'Jean doesn't eat'            | French       |

I adopt the standard analysis that negative affixes and weak and strong negative particles should be assigned syntactic head ( $X^\circ$ ) status, whereas negative adverbials are specifiers/adjuncts, thus exhibiting XP status (cf. Zanuttini (1997a,b), Rowlett 1998, Zanuttini (2001), Merchant 2001, Zeijlstra 2004).

The difference between  $X^\circ$  and XP markers has influence on functional structure.  $X^\circ$  negative markers must (by definition) be able to project themselves, yielding a clausal position  $\text{Neg}^\circ$ . On the other hand, XP negative markers may occupy the specifier position of a projection that is projected by a (possibly abstract) negative head  $\text{Neg}^\circ$ ,  $\text{Spec,NegP}$  (as is the standard analysis for most adverbial negative markers), but this is not necessarily the case. It could also be an adverbial negative marker that occupies an adjunct/specifier position of another projection, for instance a  $\nu\text{P}$  adjunct position. In that case it is not necessary that there is a special functional projection  $\text{NegP}$  present in the clausal structure (it is not excluded either).

Now the question follows: when is a negative feature able to project? Giorgi & Pianesi (1997) addressed this question in terms of their feature scattering principle, arguing that 'each feature can project a head.' However, given the modular view on grammar in which features are divided in different classes, the question emerges which kind of features can head a projection. One would not argue that every lexical semantic feature or every phonological feature might have its own projection. Feature projection is a syntactic operation, and should thus only apply to material that is visible to syntax. Hence, the most straightforward hypothesis is that only formal features can project. This means that a feature can only head a projection if [F] has been reanalysed as a formal feature [i/uF].

Consequently, it follows immediately that the availability of a negative projection  $\text{NegP}$  in a particular language then depends on the question whether negation has been reanalysed as a formal feature [i/uNEG] in this language. This makes the following prediction: only languages that exhibit doubling effects with respect to negation (i.e. only in NC languages)  $\text{NegP}$  may be available. This claim can easily be tested as it has been argued above, that  $X^\circ$  negative markers occupy a  $\text{Neg}^\circ$  position, whereas adverbial negative markers do not have to occupy a  $\text{Spec,NegP}$  position. The prediction following from this is that only in the set of NC languages one can find negative markers  $X^\circ$  (see (27)).

- |      |    |                  |    |             |
|------|----|------------------|----|-------------|
| (27) | a. | NC: [u/iNEG]/[X] | b. | Non-NC: [X] |
|      |    |                  |    |             |

In Zeijlstra (2004) this prediction has been tested for a threefold empirical domain (a sample of 267 Dutch dialectal varieties, a sample of 25 historical texts, and a set of 25 other



- NEG came nobody  
‘Nobody came’
- b. *Nadie* (\*no) vino  
NEG came nobody  
‘Nobody came’

#### 4.2.2 Dutch: from NC to DN

Similar observations can be made for Dutch. Middle Dutch was a language that used two negative markers *en/ne* ... *niet* to express sentential negation, as shown in (33). However, as (34) shows, in most cases which contained an n-word only the preverbal negative marker *en/ne* was present.

- (33) *Dat si niet en sach dat si sochte*<sup>12</sup> Middle Dutch  
That she NEG NEG saw that she looked.for  
‘That she didn’t see what she looked for’
- (34) *Ic en sag niemen* Middle Dutch  
I NEG saw n-body  
I didn’t see anybody

As in most languages exhibiting two negative markers, one of them disappears. 16<sup>th</sup> and 17<sup>th</sup> century Holland Dutch in most cases left out the preverbal negative marker *en/ne*, and only exhibited *niet*. As a consequence of this development, the presence of *en/ne* also lost ground in constructions with n-words, resulting in expressions like (35).

- (35) *Ic sag niemen* 17<sup>th</sup> Cent. Dutch  
I saw n-body  
I didn’t see anybody

Hence, the language input contained less and less constructions as the ones in (36), but more and more expressions in which an n-word was the only negative element in the sentence. As the cue to assign n-words a [uNEG] feature vaguely disappeared, n-words were no longer reanalysed as [uNEG], but kept their semantic [NEG] feature (37).<sup>13</sup>

- (36) a. *Op\_ en niemen*  
[iNEG] [uNEG] [uNEG]
- b. *Op\_ niemen en*  
[iNEG] [uNEG] [uNEG]
- (37) *Ic sag niemen*  
[NEG]

To conclude, the two developments described above show exactly how a change in the syntax of negative markers leads to a change in the interpretation of multiple negative expressions. Note that these latter changes follow completely from the FFFH and no other additional account has to be adopted.

<sup>12</sup> Lanceloet 20042.

<sup>13</sup> Similarly, the negative marker *niet* also did not get reanalysed anymore, thus keeping its [NEG] feature.

## 5 Conclusions

In this paper I first argued on theoretical ground that the set of formal features, i.e. the set of features that can head a functional projection, is not provided by UG, but is a result of L1 acquisition. Only those semantic features that exhibit (overt) doubling effects are formalised (or grammaticalised). This has been formulated in the FFFH. Consequently, as only formal features can project, the number of functional projections FP that a particular grammar has at its disposal is limited by the FFFH. Each grammar, based on the language input during L1 acquisition, makes a particular choice of semantic operators that can be realised as FP's. Thus clausal structure is subject to cross-linguistic variation and not a UG-based template.

In the second part of this paper I applied the FFFH to the domain of negation. Negation is a semantic operator that differs cross-linguistically in the way it surfaces in morphosyntax. Languages differ with respect to whether they exhibit doubling effects (known as NC) and thus the result of this application is that only in NC languages, negation is formalised. In DN languages negation is not realised as a formal feature.

The claims about the flexible formal status of negation are empirically testable. Not only requires it an analysis of NC in terms of syntactic agreement (cf. Zeijlstra (2004) who shows that such an analysis solves many problems that other analyses have been facing). It also makes correct predictions about the syntactic status of negative markers and the diachronic relation between the syntax of negative marker(s) and the occurrence of NC. First, it is shown that only NC languages may exhibit a negative marker  $Neg^{\circ}$ . Second, it follows that if the (optional) negative marker for independent reasons ceases to occur in particular contexts, this may influence the overt doubling effects and therefore alter the status of the language as a (Strict) NC language.

The FFFH, which is not only theoretically but also empirically well motivated, has consequences for the notion of parametric variation. Parametric variation seems not to be derived from the different ways that a functional head can be marked (cf. Roberts & Roussou (2001) for a proposal along these lines), but to follow from how a particular semantic operator is marked: either as a formal feature or not. If marked through some formal feature then a number of different options remain open: it may be manifested by an overt lexical head, it may trigger Move or Agree, etc. In any case, the parametric space can be said to follow from the FFFH in combination with general syntactic mechanism. This has been illustrated for a few possible ways to express sentential negation in section 3 (NC) and 4 (negative markers).

Finally, the proposal presented above allows formulating predictions in terms of typological implications, which can be tested empirically. This is an interesting result, as with Newmeyer (2004) the question whether typological implications count as linguistic evidence has recently become subject of debate. I hope to have shown in this paper that typological implications can be used a testing mechanism for different proposal concerning the status of formal features.

Of course, the FFFH is still programmatic in nature. It seems to make correct predictions for negation, but it should be evaluated for a number of other functional categories in order to determine its full strength. However, I think that the evidence provided in this paper sheds more light on exactly how semantics dictates the syntactic vocabulary.

## References

- Beghelli, F. & Stowell, T.: 1997, Distributivity and Negation. The syntax of *each* and *every*, in A. Szabolcsi, A. (ed), *Ways of scope taking*. Kluwer Academic Publishers, pp. 71-107.
- Belletti, A. (ed.), 2004, *Structures and Beyond. The cartography of Syntactic Structures*. Vol. 3, Oxford: Oxford University Press.

- Bobaljik, J. and Thrainsson, H.: 1998, Two heads aren't always better than one, *Syntax* **1**, 37-71.
- Borer, H.: 1984, *Parametric Syntax: Case Studies in Semitic and Romance Languages*, Dordrecht: Foris.
- Brown, S.: 1999, *The Syntax of Negation in Russian*, Stanford: CSLI Publications.
- Chomsky, N.: 1995, *The minimalist program*. Cambridge, MA: The MIT Press.
- Chomsky, N.: 2000, Minimalist Inquiries: the Framework, in R. Martin, D. Michael and J. Uriagereka (eds), *Step by Step. Essays in Honor of Howard Lasnik*, The MIT Press, pp. 89-155.
- Chomsky, N.: 2001, Derivation by Phase, in M. Kenstowicz (ed), *Ken Hale: a Life in Language*, The MIT Press, pp. 1-52.
- Cinque, G.: 1999, *Adverbs and functional heads*, Oxford: Oxford University Press.
- Cinque, G.: 2002, *Functional structure in DP and IP, The cartography of Syntactic Structures. Vol. 1*, Oxford: Oxford University Press.
- De Swart, H. & Sag, I. 2002. 'Negative Concord in Romance' *Linguistics & Philosophy* **25**, 373-417.
- von Stechow, K.: 1995, The formal semantics of grammaticalization. *NELS* **25**, 175-89.
- Giannakidou, A. 2000. 'Negative ... Concord?': *Natural Language and Linguistic Theory* **18**,457-523.
- Giannakidou, A.: 2002, *N-words and Negative Concord*, Ms. University of Chicago.
- Giorgi, A. & Pianesi, F.: 1997, *Tense and aspect: from semantics to morphosyntax*, Oxford: Oxford University Press.
- Haegeman, L. & Zanuttini, R.: 1996, Negative Concord in West Flemish' in A. Belletti and L. Rizzi (eds), *Parameters and Functional Heads. Essays in Comparative Syntax*, Oxford University Press, pp. 117-179.
- Haraiwa, K.: 2001, *Multiple Agreement and the Defective Intervention Effect*, Ms MIT.
- Haraiwa, K.: 2005, *Dimensions in Syntax*, Ms. University of Tokyo.
- Herburger, E.: 2001, The negative concord puzzle revisited, *Natural Language Semantics* **9**, 289-333.
- Iatridou, S.: 1990, About AgrP, *Linguistic Inquiry* **21**, 421-59.
- Jespersen, O.: 1917, *Negation in English*, Copenhagen, Host.
- Keenan, E. & Stabler, E.: 2003, *Bare Grammar, lectures on linguistic invariants*, Stanford: CSLI Publications.
- Koenenman, O.: 2000, *The Flexible Nature of Verb Movement*, PhD. Dissertation Utrecht University.
- Kratzer, A. 1998. 'More structural analogies between pronouns and tenses.' In: Strolovitsch & Lawson (1998).



- Ladusaw, W. A.: 1992, Expressing negation. In C. Barker and D. Dowty (eds), *SALT II*, Cornell Linguistic Circle.
- Laka, I.: 1990, Negation in Syntax: on the Nature of Functional Categories and Projections. PhD dissertation, MIT.
- Merchant, J.: 2001, Why no(t), Ms. University of Chicago.
- Neeleman, A. and Van der Koot, H.: 2002, The Configurational Matrix, *Linguistic Inquiry* **33**: 529-574.
- Newmeyer, F.: 2004, Typological Evidence and Universal Grammar, *Studies in language* **28**: 527-548.
- Ouhalla, J.: 1991, Functional categories and parametric variation, London/New York: Routledge.
- Pollock, J.-Y.: 1989, Verb Movement, Universal Grammar, and the Structure of IP, *Linguistic Inquiry* **20**, 365-424.
- Rowlett, P.: 1998, Sentential Negation in French, New York/Oxford: Oxford University Press.
- Rizzi, L.: 1997, The fine structure of the left periphery, in L. Haegeman (ed). 1997. Elements of grammar: Handbook in generative syntax, Kluwer, pp. 281-337.
- Rizzi, L.: 2004, The structure of CP and IP, The cartography of Syntactic Structures. Vol. 2, Oxford: Oxford University Press.
- Roberts, I. and Roussou, A.: 2003, Syntactic Change. A Minimalist Approach to Grammaticalisation, Cambridge: Cambridge University Press.
- Starke, M.: 2004 'On the Inexistence of Specifiers and the Nature of Heads.' in A. Belletti (ed), *Structures and Beyond. The cartography of Syntactic Structures. Vol. 3* Oxford University Press, pp. 252-68.
- Ura, H.: 1996, *Multiple Feature-Checking: A Theory of Grammatical Function Splitting*, PhD Dissertation, MIT.
- Zanuttini, R.: 1991, Syntactic Properties of Sentential Negation, PhD Dissertation, University of Pennsylvania.
- Zanuttini, R.: 1997a, Negation and clausal structure. A Comparative Study of Romance languages. Oxford studies in comparative syntax, New York, Oxford: Oxford University Press.
- Zanuttini, R.: 1997b, Negation and verb movement in L. Haegeman (ed), 1997, Elements of grammar: Handbook in generative syntax, Kluwer, pp. 214-245.
- Zanuttini, R.: 2001, Sentential Negation, in M. Baltin, & C. Collins (eds), 2001, *The Handbook of Contemporary Syntactic Theory*, Blackwell, pp. 511-535.
- Zeijlstra, H.: 2004, Sentential Negation and Negative Concord, PhD Dissertation, University of Amsterdam.
- Zwart, J.W.: 2004, Local agreement, Ms. University of Groningen.



# ADVERBIAL QUANTIFICATION AND FOCUS IN HAUSA

Malte Zimmermann  
Humboldt Universität Berlin

malte.zimmermann@rz.hu-berlin.de

## Abstract

The paper investigates the interaction of focus and adverbial quantification in Hausa, a Chadic tone language spoken in West Africa. The discussion focuses on similarities and differences between intonation and tone languages concerning the way in which adverbial quantifiers (AQs) and focus particles (FPs) associate with focus constituents. It is shown that the association of AQs with focused elements does not differ fundamentally in intonation and tone languages such as Hausa, despite the fact that focus marking in Hausa works quite differently. This may hint at the existence of a universal mechanism behind the interpretation of adverbial quantifiers across languages. From a theoretical perspective, the Hausa data can be taken as evidence in favour of pragmatic approaches to the focus-sensitivity of AQs, such as e.g. Beaver & Clark (2003).

## 1 Introduction

The paper investigates the semantic effects of grammatical focus marking and focus-background structure on adverbial quantification in Hausa, a Western Chadic tone language, which is spoken mainly in Northern Nigeria and the Republic of Niger.\* The discussion focuses on similarities and differences between intonation and tone languages concerning the way in which adverbial quantifiers, henceforth AQs, and focus particles, henceforth FPs, associate with focus constituents. The main purpose of the paper is to introduce new empirical data from a semantically under-researched language into the theoretical debate. It will emerge that typologically diverging languages do not differ much in how adverbial quantification and focus-background structure interact. Concerning their relevance to the theoretical debate, the Hausa data may be taken as evidence in favour of more pragmatically oriented approaches to the analysis of AQs, and to the interpretation of focus in general.

The paper is organized as follows. Section 2 provides a quick overview over the interaction of adverbial quantification and focus-background structure in intonation languages, such as English and German. Section 3 introduces the focus marking system of Hausa, which differs a lot from the accent-based focus-marking systems of intonation languages. Section 4 contains a few methodological remarks on semantic fieldwork in general. The core part of the paper is section 5, which presents the main empirical findings concerning the interaction of adverbial quantifiers and focus-background structure in Hausa. Section 6 provides a sketch for a unified analysis of AQs in Hausa and intonation languages, which gives rise to a prediction for the behaviour of AQs in intonation languages. Section 7 concludes.

## 2 Adverbial Quantification and Focus in Intonation Languages

Most, if not all semantic accounts of adverbial quantification are based on intonation languages, which mark focus prosodically by means of a nuclear pitch accent. In these

---

\* This article was written within the project B2 "Focusing in Chadic Languages" funded by the German Science Association (DFG) as part of the SFB 632 „Information Structure“. I would like to express my gratitude to the DFG, as well as to my Hausa consultants Malama Aisha Mahmud Abubakar, Malama Sa'adatu Garba, Malam Umar Ibrahim, Malam Rabi'u Shehu, Malam Balarabe Zulyada'ini, as well as Malam Mu'awiya for their patience and willingness to place themselves into ever more bizarre fictitious contexts. I am solely responsible for any errors and omissions.

languages, AQs exhibit focus sensitivity in that grammatical focus marking has a truth-conditional effect on their interpretation, see e.g. Lewis 1975, Rooth 1985, 1992, Partee 1991, von Stechow 1994, Herburger 2000, among many others. To recapitulate, consider the sentences in (1a-c), where a change in accent position induces a change in meaning:

- (1) a. MUSA always eats rice. *SUBJ-focus*  
 b. Musa always EATS rice. *V-focus*  
 c. Musa always eats RICE. *OBJ-, VP-, sentence-focus*

Following work by Partee (1991), semantic accounts of the focus-sensitivity of AQs try to capture their interpretation in terms of tripartite structures: the semantic representation of clauses containing an AQ is split up into three parts depending on their focus-background structure: the AQ is the quantificational operator, the background is mapped on the restriction of the quantifier, and the focus constituent is mapped on the nuclear scope of the quantifier. This is illustrated for (1a-c) in (2).<sup>1</sup>

(2)	<i>Operator</i>	<i>Restriction</i>	<i>Nuclear scope</i>
a.	always <sub>e</sub>	( $\exists x$ x eats rice at e) = Always, if somebody eats rice, it is MUSA.	(Musa eats rice at e)
b.	always <sub>e</sub>	( $\exists R$ Musa R-s rice at e) = Always, if Musa does something with rice, he EATS rice.	(Musa eats rice at e)
c.	always <sub>e</sub>	( $\exists y$ Musa eats y at e) = Always, if Musa eats something, he eats RICE. (= OBJ-focus)	(Musa eats rice at e)

A first empirical generalisation that emerges from (1) and (2) is given in (3):

- (3) *Focus-Sensitivity of AQs:*  
 The grammatically marked focus constituent is never mapped to the restriction, but to the nuclear scope of the AQ (Partee 1991).

According to (3), there is a tight relation between grammatical focus marking and the interpretation of AQs. In addition, semantic accounts assume an equally tight connection between the background of a clause and the semantic restriction of the AQ: according to this assumption, the background of a clause, with the focus constituent replaced by a variable, would be automatically mapped to the restriction. A variant of this proposal is found in Rooth (1999), where it is assumed that AQs do not associate with focus per se, but rather with the presuppositions induced by the focus-background structure of the clause.

However, recent studies of the focus-sensitivity of AQs have cast some doubt on the validity of the second claim. Cohen (1999) and Beaver & Clark (2003), henceforth B&C (2003), discuss a number of examples in which the background, i.e. material that is not grammatically marked for focus, is not automatically mapped to the restriction of the AQ. Consider (4) from B&C (2003:336, ex. (31)):

- (4) Mary always took *someone<sub>F</sub>* to the cinema.

The meaning of the background in (4) can be paraphrased as ‘Mary took x (=someone) to the cinema’. Given the above assumption that the background is automatically mapped on the restriction of the AQ, the meaning of the entire clause in (4) should therefore be the

<sup>1</sup> For the sake of simplicity, I assume without further argument that adverbial quantifiers quantify asymmetrically over events or situations only. See e.g. Heim (1990), de Swart (1991), and von Stechow (1994) for relevant discussion.

tautological ‘Always, if Mary took someone to the cinema, she took someone to the cinema.’, contrary to fact. Rather, the meaning of (4) can be paraphrased as in (4’)

(4’) Always, if *Mary went to the cinema*, she took someone with her.

The restriction of *always* in (4) is implied by, but not identical to the background of (4). Based on the interpretation of sentences such as (4), we therefore arrive at a second generalisation concerning the interaction of AQs with focus-background structure:

(5) *No direct association with backgrounded material:*

Backgrounded material, i.e. material that is not grammatically marked for focus, is not automatically mapped to the restriction of the AQ (see also B&C 2003: 340)

Rather, it seems that the contribution of the background to the identification of an AQ’s restriction is more indirect and mediated by the pragmatics.

Finally, even though AQs are focus-sensitive, they differ from focus particles (FPs) such as *only* in that they stand in a loser semantic (and syntactic) relation to the focus constituent (B&C 2003: 348ff.). This is illustrated by the degraded status of (6), a variant of (4) with *always* replaced by the - at first sight synonymous – FP *only* (B&C’s (32)):

(6) ?Mary *only* took *someone<sub>F</sub>* to the cinema.

To the extent that it is acceptable, (6) can only mean something like ‘the single person that Mary took to the cinema was someone’, which is not very informative to say the least. The difference between AQs and FPs also shows up in the minimal pair in (7ab) (B&C’s exs. (3) and (4)): The variant with *only* is ungrammatical, but the variant with *always* is fine:

(7) a. \*Sandy *only* feeds Nutrapup to *Fido<sub>F</sub>*, and she *only* feeds Nutrapup to *Butch<sub>F</sub>* too.  
b. Sandy *always* feeds Nutrapup to *Fido<sub>F</sub>*, and she *always* feeds Nutrapup to *Butch<sub>F</sub>* too.

B&C (2003) account for these differences by assuming that FPs such as *only* are focus-functional: they make direct reference to the focus-background structure of a clause in their truth-conditions, and often in form of syntactic licensing conditions as well. The truth-conditions for sentences containing the FP *only* are stated in (8a). Compare these with the truth-conditions for sentences containing the AQ *always* in (8b) (B&C 2003: 349):

(8) a.  $[[NP \text{ only } VP]] = \forall e [p(e) \rightarrow q(e)]$   
(with  $q = [[NP \text{ VP}]]$ , and  $p = [[NP \text{ VP}]]$  minus the content of focused material within the VP)

b.  $[[NP \text{ always } VP]] = \forall e [\sigma(e) \rightarrow \rho(e, e') \wedge q(e')]$   
(with  $q = [[NP \text{ VP}]]$ ,  $\sigma$  a contextually constrained variable over sets of situation, and  $\rho$  a contextually constrained variable over relations between events)

According to (8a), (7a) states that the only event of Sandy feeding somebody with Nutrapup is an event of Mary feeding Nutrapup to Fido, and the only event of Sandy feeding somebody with Nutrapup is an event of Mary feeding Nutrapup to Butch. As both conjuncts are uttered in the same context, this is clearly contradictory. In contrast, the interpretation of clauses with AQs such as *always* is largely governed by pragmatic factors. The connection between the restriction of *always*,  $\sigma$  in (7b), and the focus-background structure of the clause is established indirectly, in that  $\sigma$  must not contradict the presuppositions of the clause, *including those stemming from its focus-background structure*. For this reason, (7b) can receive an interpretation that is not contradictory, given appropriate values for  $\sigma$  and  $\rho$ . For example, if  $\sigma$  is the sets of events in which Sandy feeds some number of dogs, and if  $\rho$  is the temporal-and-physical-part-of relation, then (7b) would state that in every event in which Sandy feeds some dogs, she feeds Nutrapup to Fido, and in every event in which Sandy feeds some dogs, she

feeds Nutrapup to Butch (but she does not, say, feed Nutrapup to Cuddles because he is too old and has no teeth left) (see B&C 2003: 352). In this case, the restriction  $\sigma$  would not contradict the background presupposition of (7b), according to which Mary feeds Nutrapup to someone. The difference between AQs and FPs is stated again in (9):

- (9) Adverbial quantifiers stand in a looser semantic and syntactic relation to the focus constituent than focus particles.

Notice finally that the generalisation in (3) still holds. Since the meaning of the entire clause,  $q$ , is mapped to the nuclear scope of the AQ *always* (see also Partee 1999), it follows that the meaning of the focus constituent will be mapped to its nuclear scope, too. However, the effect of grammatical focus marking on the interpretation of AQ-sentences is only indirect: the focus-sensitivity of AQs arises because their interpretation depends on a contextually-salient set of events,  $\sigma$ , and because focus-marked material is usually not contextually salient and therefore not part of  $\sigma$ , see once again B&C (2003: 348).

### 3 Focus Marking in Hausa

This section discusses the basic patterns of grammatical focus marking in Hausa. Section 3.1 gives some general information on Hausa, which will ensure a better understanding of the empirical data to be introduced later. Section 3.2 shows how focus is grammatically marked in Hausa. Section 3.3 demonstrates that such focus marking is not obligatory with non-subjects, resulting in massive focus ambiguity.

#### 3.1 General Information on Hausa

Hausa belongs to the Western branch of the Chadic language family, which belongs to the Afro-Asiatic languages. Its grammatical system is well documented, see e.g. the grammars by Newman (2000) and Jaggar (2001). Hausa is a tone language with three lexical tones: a high tone, a low tone ( $\grave{}$ ), and a falling tone ( $\hat{\ }$ ). The basic word order is SVO and pronominal subjects can be dropped. Hausa has no overt case marking, which means that arguments are identified by their position relative to the verb and by subject agreement. Oblique arguments are marked by prepositions. The verb is not inflected for tense or agreement. Instead, temporal and aspectual information as well as subject agreement are encoded by means of a TAM-marker preceding the verb: The TAM-marker *taa* in (10), for instance, indicates that the subject is 3sg.f and that the sentence is in the perfective aspect.

- (10) Kànde taa                      dafà    kiifii.  
Kande 3sg.f.perf      cook    fish  
'Kande cooked fish.'

In the progressive aspect, the verb appears in its nominalized form. With many verb classes, this verbal noun and the following complement are linked by the nominal linker *-n/-r* 'of', which is typically found in associative *N-of-N*-constructions, cf. (11):

- (11) Ya-nàa                      gyaara-n      mootaa.  
3sg.m-prog    repairing-of    car  
'He is repairing the car.'

#### 3.2 Grammatical Focus Marking

Focus in Hausa is not marked by pitch accent, but syntactically: the focus constituent is moved to a focus position in the left periphery. Like other instances of A'-movement, such as *wh*-fronting and relativization, focus movement is indicated by a morphological change in the aspectual marker, which appears in the so-called relative form (Tuller 1986). In addition, the fronted focus constituent is optionally followed by the particle *nee/cee*, see e.g. Green (1997),

and Newman (2000).<sup>2</sup> (12a) exhibits the neutral SVO order. In (12b), a focused object NP has been fronted. (13) illustrates focus fronting with a PP-adjunct.

- (12) a. Kànde *taa* dafà kiifii.  
Kande 3sg.f.perf cook fish  
'Kande cooked fish.'
- b. *Kiifii*<sub>1</sub> (*nèe*) Kànde *ta* dafàa t<sub>1</sub>.  
fish PRT Kande 3sg.f.perf.rel cook  
'Kande cooked FISH.'
- (13) *Dà wukaa*<sub>1</sub> *nèe* ya sòokee shì t<sub>1</sub>. (Newman 2000:192)  
with knife PRT 3sg.perf.rel stab him  
'He stabbed him with a KNIFE.'

In contrast, focused subjects are focus-marked by (vacuous) movement: in the progressive and perfective aspect, the focus status of the subject is marked on the TAM-marker, which appears in the relative form. Thus, (12a) could not be used to answer the subject question 'Who cooked fish?'. Instead, one would have to use (14) with a short-voweled relative aspect marker (and optional particle).

- (14) *Kànde*<sub>F,1</sub>(*cèe*) t<sub>1</sub> ta dafà kiifii.  
Kande PRT 3sg.f.perf.rel cook fish  
'KANDE cooked fish.'

Section 5.1 will demonstrate how the fronting of different focus constituents effects the interpretation of adverbially quantified sentences.

### 3.3 No Obligatory Focus Marking with Non-Subjects

Closer scrutiny of the focus facts in Hausa shows that focused non-subjects need not be fronted, but can also remain *in situ* (Green and Jaggar 2003). As a matter of fact, the *in situ* variant is the preferred option with new-information focus (Hartmann and Zimmermann, to appear-a). Instances of *in situ* focus are grammatically unmarked, that is, they are marked neither syntactically nor prosodically, e.g. by pitch movement, duration or intensity (Hartmann and Zimmermann, to appear-a). (15A) illustrates such an unmarked focus constituent (*dawaakii*) in an answer to a *wh*-question:

- (15) Q: Mèe su-kà kaamàa? A: Sun kaamà *dawaakii*<sub>F</sub> (*nè*).  
what 3pl-perf.rel catch 3pl.perf catch horses PRT  
'What did they catch?' 'They caught HORSES.'

In this respect, Hausa differs drastically from intonation languages, which invariably have a (focus-marking) pitch accent somewhere in the clause, and which therefore exhibit obligatory focus marking.

The optional lack of focus marking leads to a considerable degree of focus ambiguity, which must be pragmatically resolved. The SVO order in (15A) could thus be used to answer the questions 'What did Kande cook?' (OBJ-focus), or 'What did Kande do?' (VP-focus), as well as 'What happened?' (sentence focus). This raises the question of how the absence of

<sup>2</sup> The particle *nee/cee* has received various analyses in the literature. Traditionally, it is called a *stabilizer* (Newman 2000). Alternatively, the particle has been analysed as a copula element in a cleft-like construction (McConvell 1973), or as a focus marker (Green 1997). Most recently, Hartmann and Zimmermann (to appear-b) provide semantic arguments that *nee/cee* should be analysed as a focus-sensitive marker of exhaustivity. As nothing hinges on the correct choice for the purposes of this article, I will simply gloss *nee/cee* as a particle (PRT).

grammatical focus marking with non-subjects affects the meaning of sentences with AQs. We will turn to this question in section 5.2.

Notice again, that unlike all other constituent, focused subjects must be marked. Presumably, this restriction, which is found in many African languages (Hartmann & Zimmermann 2004), has a functional origin. In their unmarked preverbal position, subjects frequently receives a default interpretation as topic of the clause (Givon 1976, Chafe 1976). Consequently, a subject will have to be marked whenever it does not function as the topic of the clause, for instance when it is focused.

Summing up, focus in Hausa is marked syntactically by fronting, and morphologically by a change in form of the perfective and progressive TAM-markers. Hausa differs from European intonation languages in that focus may, but need not be grammatically marked. This means that many instances of focus must be resolved pragmatically, based on the context: This is the case with non-subject foci that are realised *in situ*, as well as with instances of subject focus in the future and habitual aspect, both aspects without relative TAM-marking.

#### 4 Methodological Remarks on Semantic Fieldwork

Before we turn to the actual discussion of the focus-sensitivity of AQs in Hausa, a few general remarks on the methodology of semantic fieldwork are in order. After all, asking language consultants about meanings is difficult, especially when it comes to the subtle meaning differences arising from the interaction of AQs with the focus-background structure of a clause. Because of this problem, the Hausa data were collected following Matthewson's (2004) methodological guidelines for semantic fieldwork.

According to Matthewson (2004), the only licit elicitation methods for semantic fieldwork are the ones listed under (16):

- (16) i. Translations of entire clauses  
 ii. Truth-condition judgments relative to a context  
 iii. Felicity judgments relative to a context

In each case, the elicitation of judgments is achieved by asking whether a particular clause A is appropriate in a previously set up discourse context or situation.

A particularly daunting problem in the semantic analysis of sentences in a foreign language arises in connection with potentially ambiguous sentences. Straight translation tasks from the object language into the metalanguage generally fail, as the language consultant usually translates the sentence on its most prominent reading, afterwards rejecting translations of less prominent readings. In order to establish the meanings of potentially ambiguous clauses, one should therefore stick to the following strategies, the first three of which are taken from Matthewson (2004):

- (A) Never ask the consultant directly for an ambiguity judgment as this would be asking for an analysis. There is the danger that consultants may overlook or even discard less prominent readings. Instead,  
 (B) if you have a suspicion what the less preferred reading may be, ask for this reading first, by setting up an appropriate context and then asking for a truth-condition or felicity judgment.  
 (C) Choose examples that pragmatically force the less preferred reading.

In order to illustrate how one reading can be pragmatically forced over another, consider adverbially quantified transitive clauses in English with a pitch accent on the object NP. The pitch accent could indicate focus on the VP or on the object. Assume now that we want to test for the association of the AQ with object focus. In order to do so, one should look for an



example such as (17), which would make the VP-focus reading highly unlikely, or even false, due to our world knowledge. (17) is modelled on Hausa data actually used in the elicitation.

(17) Hausa people *mostly* [<sub>VP</sub> eat [<sub>NP</sub> TUWO]].

On the VP-reading, without any further context, (17) states that on most occasions on which Hausa people *do anything*, they eat tuwo, a kind of mush made from cassava, yams, rice or grain, which is eaten with almost any meal. As Hausa people usually do not spend the larger part of the day eating, (17) should be judged unlikely or even false on this reading. In contrast, on the OBJ-reading, (17) states that on most occasions on which Hausa people *eat anything*, they eat tuwo. Given the above remark on the eating habits of Hausa people, this is correct. The difference in truth-conditions or felicity between the two readings, therefore makes (17) a good test case for the existence of association with object focus.

(D) Control for the focus constituent in a clause by adding material in form of negative contrastive clauses, which serve to disambiguate the focus-background structure.

The Hausa example in (18) illustrates strategy (D). The first clause is at least four-ways ambiguous between an OBJ-, VP-, a sentence-focus, or even a SUBJ-focus reading, as there is no relative TAM-marker in the habitual aspect. Disambiguation is achieved by adding a negative contrastive, which is identical to the first clause except for the contrastive focus constituent *riigunàa* ‘dresses’:

(18) Yawanci maɗɪnki ya-kàn yi huulunàa, baa-yàa yî-n riigunàa  
 mostly tailor 3sg.m-hab make caps neg-3sg making-of dresses  
 ‘In most instances, a tailor makes HATS, not SHIRTS.’

The resulting structure in (18) only has the OBJ-focus reading because it is the object that is contrastively focused under negation. This discussion of the methods used in eliciting semantic data in Hausa sets the stage for the upcoming discussion of the interaction of Hausa AQs with focus.

## 5 Adverbial Quantification and Focus Marking in Hausa

This section presents the empirical findings concerning the semantic interaction of Hausa AQs such as *kullum* ‘always’, *yawanci/galibii* ‘mostly/usually’ and the habitual aspect marker *-kan* with the focus-background structure in that language. We will consider cases with grammatical focus marking and cases without grammatical focus marking in turn. Section 5.1 shows that Hausa AQs are sensitive to grammatical focus marking. Section 5.2 discusses the interpretation of adverbially quantified sentences in the absence of grammatical focus marking. Section 5.3 deals with differences between AQs and FPs in Hausa.

A major result of the discussion is that the interaction of AQs with the focus-background structure in Hausa is very similar to that found in intonation languages, despite the observed differences in the way that focus is grammatically marked. Furthermore, the discussion shows that the correct interpretation of adverbially quantified sentences in Hausa relies heavily on contextual information, especially when focus is not grammatically marked. The fact that the interpretation of AQs in Hausa is governed by pragmatic factors can be taken as another argument in favour of pragmatic approaches to the interpretation of AQs in general.

### 5.1 Hausa AQs are Sensitive to Grammatical Focus Marking

The investigation of the interaction of Hausa AQs with instances of grammatically marked focus shows that Hausa AQs are sensitive to the focus-background structure induced by grammatical focus marking, just like their counterparts in intonation languages. The focus-marked constituent must be mapped onto the nuclear scope and not onto the restriction of the AQ. The interpretation of the sentences in (19) and (20) differs accordingly, depending on which constituent is focus-marked by means of movement to a left-peripheral position.

- (19) a. yawancii      *waakee*<sub>F,1</sub>      (nèe)      Hàwwa ta-kàn      dafàa t<sub>1</sub>      *OBJ*  
 mostly      beans      PRT      Hawwa3sg.f-HAB      cook  
 ‘Most times, if Hawwa cooks something, it is *beans*.’
- b. yawancii      *Hàwwa*<sub>F,1</sub> cèe t<sub>1</sub>      ta-kàn      dafà      *waakee*      *SUBJ*  
 mostly      Hawwa      PRT      3sg.f-HAB      cook      beans  
 ‘Most times, if somebody cooks beans, it is *Hawwa*.’

In (19a), the object has been fronted, and the AQ ranges over situations in which Hawwa cooks something (in the absence of further contextual information). In (19b), the subject has been fronted, and the AQ ranges over situations in which somebody cooks beans. Notice that the focus status of the subject in (19b) is indicated by the presence of the optional particle *cee*. The examples in (20a-c) serve to illustrate the same point for ditransitive clauses, with focus on the direct object, indirect object, and subject respectively.

- (20) a. kullum *kud’ii*<sub>F,1</sub>(nee) na-kèe      bâ      Audù t<sub>1</sub>      *OBJ*  
 always money      PRT      1sg-prog.rel      give      Audu  
 ‘It is *money* that I always give to Audu.’
- b. kullum *Audù*<sub>F,1</sub> (nee) na-kèe      bâ      t<sub>1</sub>      *kud’ii*.      *IO*  
 always Audu      PRT      1sg-prog.rel      give      money  
 ‘It is to *Audu* that I always give money.’
- c. kullum *nii*<sub>F,1</sub> (nèe) t<sub>1</sub>      na-kèe      bâ      Audù *kud’ii*.      *SUBJ*  
 always 1sg      PRT      1sg-prog.rel      give      Audu      money  
 ‘Always I *myself* give money to Audu.’
- d. *kullum* nèe na-kèe      bâ      Audù *kud’ii*.      *AQ*  
 always PRT      1sg-prog.rel      give      Audu      money  
 ‘It is *every day* that I give Audu money.’

As (20d) shows, it is also possible to mark focus on the AQ itself.

The minimal pair in (21ab) does not differ in terms of word order. On the surface, both sentences show the unmarked word order SVO. Nonetheless, the relative TAM-marker *takèe* in (21b) marks the subject as being in focus. Correspondingly, the AQ *kullum* ‘always’ ranges over situations in which someone is cooking beans, stating that it is always Hawwa who is cooking beans. That the subject *Hawwa* is indeed in focus, can be seen from the fact that the sentence is considered inappropriate if two women are cooking beans, in particular if the particle *cee* is present.<sup>3</sup>

- (21) a. Kullum      Hàwwa      ta-nàa      dafà      *waakee*.      *OBJ*  
 always      Hawwa      3sg.f-prog      cook      beans  
 ‘Always, Hawwa is cooking BEANS.’  
 (consultant’s comment: She does not have to cook anything else)
- b. Kullum      *Hàwwa*<sub>F,1</sub> (cèe) t<sub>1</sub>      ta-kèe      dafà      *waakee*.      *SUBJ*  
 always      Hawwa      PRT      3sg.f-prog.rel      cook      beans  
 ‘It is HAWWA that is always cooking the beans.’

<sup>3</sup> At first sight, the exhaustivity effect in (21b) appear to be in contradiction to the non-exhaustive behaviour of *always* in English, which was pointed out in connection with the Fido-Butch-example in (7ab). I would like to contend, though, that the observed exhaustivity effect does not follow from the presence of the AQ *kullum*, but that it is either a semantic effect of the overt syntactic focus construction (à la Kiss 1998), or – more likely – that it follows from the presence of *nee/cee*, if *nee/cee* is indeed an exhaustivity marker as argued by Hartmann and Zimmermann (to appear-b), cf. fn.2. In any event, the fact that it is the subject *Hawwa* that is exhaustively quantified over shows clearly that Hawwa must be the focus of the utterance, as the exhaustivity operator typically ranges over the focus domain.

In (21a), on the other hand, there is no focus marking at all. As the consultant's comment shows, (21a) can receive a reading on which the AQ is interpreted relative to the focused object NP, and on which it states that whenever Hawwa cooks something, she cooks beans. We will turn to the interpretation of sentences without focus marking shortly.

Concluding this section, let us briefly take note that – perhaps not surprisingly – the interpretation of adverbially quantified sentences in other Chadic languages also depends on the focus structure of the clause. The examples in (22a-c) are taken from Gùrùntùm, another Western Chadic language, whose focus marking system differs from the Hausa one in two ways: First, focus in Gùrùntùm is marked morphologically by means of a focus marker *a* on the focus constituent. This *a*-marker precedes the focus constituent in case of NP- and PP-focus, and follows the focus constituent in case of sentence focus. Second, constituent focus is obligatorily marked. These differences notwithstanding, the data in (22a-c) illustrate that AQS in Gùrùntùm show the same kind of focus sensitivity as their counterparts in Hausa, or - for that matter - in intonation languages.

- (22) a. Kóo vùr mókáã Màì Dávà sh-á gányáhu. *OBJ*  
 every when Mai Dawa eat-foc rice  
 'Every day Mai Dawa used to eat RICE. (comment: this is about what MD ate)'
- b. Kóo vùr mókáã á Màì Dávà shí gányáhu. *SUBJ*  
 every when foc Mai Dawa eat rice  
 'It is only MAI DAWA that used to eat rice every day.'
- c. Kóo vùr-mókáã Màì Dávà sái tí shí gányáhu-à. *clause*  
 every when Mai Dawa then 3sg eat rice-foc  
 'Everyday, Mai Dawa used to eat RICE.'

In all three sentences, the syntactic position of the focus marker *a* in the clause has an effect on the interpretation of the AQ: The focus-marked constituent ends up in the nuclear scope of the adverbial quantifier.<sup>4</sup>

## 5.2 The Interpretation of AQS in the Absence of Focus Marking

Hausa AQS can also associate with material that is not grammatically focus-marked. This happens whenever focus is grammatically unmarked, such that the grammar imposes no constraints on the focus-background structure. In such cases, the association of the AQ with the unmarked focus constituent seems to be determined solely by pragmatic factors.

It is important that here as elsewhere, the phrasing 'the AQ associates with X' is intended as a shorthand for 'the AQ is interpreted relative to a sentence with focus on X'. In this respect, Hausa AQS differ from focus particles, which will be shown to truly associate with a focus constituent in the sense that they depend on a clearly identifiable focus constituent for a proper interpretation, see section 5.3.

The fact that AQS can occur in the absence of focus marking raises the question of whether the AQ can associate with more than one constituent in the clause in such cases. The following data suggest that this question can be answered in the affirmative: adverbially quantified sentences without grammatical focus marking are ambiguous between various

<sup>4</sup> Example (22c), where entire clause *tí shí gányáhuà* 'He ate rice' is in focus, is particularly interesting. Apparently, association of the AQ with the full clause is possible only once the clause has been emptied of all topic-like material, such as the preverbal subject *MaiDawa*, which is replaced by the pronoun *tí*. Evacuation of the topic *MaiDawa* leads to a syntactic tripartition into AQ, topic, and clause, which may very well be an overt reflex of the semantic representation of the sentence. Given the limited amount of data available, though, further clarification of this issue must await further research.

readings. The focus ambiguities that arise from the absence of focus marking are listed in (23) (abstracting away from foci on non-maximal constituents for ease of exposition):

(23) *Focus ambiguities arising from the absence of focus marking:*

- i. perfective/progressive: VP, OBJ, sentence
- ii. in all other aspects: VP, OBJ, SUBJ, sentence

Recall that the focus status of subjects must be indicated by a relative TAM-marker in the perfective and in the progressive aspect. It follows that sentences without focus marking are at least three-ways ambiguous in these two aspects, cf. (23i). In the habitual and future aspect, where there are no relative TAM-markers, sentences without focus marking are even four-ways ambiguous, cf. (23ii) and (18) above.

The ambiguity of adverbially quantified sentences without focus marking creates a methodological problem already raised in section 4: in spontaneous translation tasks, the VP<sub>FOC</sub>-reading, and where applicable the SUBJ<sub>FOC</sub>-reading, is often the dominant reading, thus suppressing the OBJ<sub>FOC</sub>-reading. In order to check for the availability of the less prominent OBJ<sub>FOC</sub>-reading, we therefore have to fall back on the methodological tools discussed in section 4 in connection with (17) and (18), i.e. strategies (C) and (D).

The progressive sentences in (24) and (25) below illustrate strategy (C). The possibility of subject focus is excluded, as the TAM-marker does not appear in its relative form. The sentences are all of the form *The Y usually drink X*, such that the VP<sub>FOC</sub>-reading would state that in most situations in which the Y do anything they drink X. The lexical material was chosen in such a way that the VP<sub>FOC</sub>-reading is most likely to be false, or at least highly implausible in the absence of further contextual information. In order to check for the availability of the OBJ<sub>FOC</sub>-reading, we varied the object and subject NPs in such a way that the resulting sentences should be true on this reading with some NP-combinations (the pairings *Hausa people - kunu*, and *Europeans - coca cola*), but false with others (the pairings *Hausa people - coca cola*, and *Europeans - kunu*). Indeed, the consultants' reactions, which are indicated after the relevant examples, matched these expectations. (24a), with the pairing *Hausa people - kunu*, was judged to be true. (24b), on the other hand, with the pairing *Hausa people - coca cola*, was strongly rejected.

- (24) a. Yawanci      hausawa      su-nàa      shân      kùunú      → *true*  
 mostly      Hausa.people      3pl-prog drinking      kunu.  
 'Most times, Hausa people drink kunu.'
- b. Yawanci      hausawa      su-nàa      shân      coca-cola      → *not true!*  
 mostly      Hausa people      3pl-prog drinking      coke.  
 'Most times, Hausa people drink coca cola.'

Conversely, (25a), with the pairing *Europeans - kunu*, caused amusement on the side of the consultants, whereas (25b), with the pairing *Europeans - coca cola*, was deemed appropriate:

- (25) a. Yawanci      turawa      su-nàa      shân      kùunú      → *laughter*  
 mostly      Europeans      3pl-prog drinking      kunu  
 'Most times, Europeans drink kunu.'
- b. Yawanci      turawa      su-nàa      shân      coca-cola      → *appropriate*  
 mostly      Europeans      3pl-prog drinking      coke.  
 'Most times, Europeans drink coca cola.'

The observed systematic variation in the judgments indeed seems to suggest that the AQ, here *yawanci* 'usually, most times', associates with the object NP in (24) and (25), in particular as this reading is the easiest to construe in the absence of further contextual information. It should be noted, though, that the observed judgments do not provide waterproof evidence

against a VP-focus, or even sentence focus interpretation of (24) and (25). After all, situations of Hausa people drinking *kunu* are perceived as more normal than Hausa people drinking coke (and conversely for the Europeans). It follows that interpretations such as ‘Whenever Hausa people do anything, they drink *kunu*’ (VP-focus) or ‘Whenever something happens, Hausa people drink *kunu*’ (sentence focus) are more likely to be accepted as true as their counterparts with *kunu* replaced by the Western (or rather Northern) drink *coca cola*.

In order to really be sure that AQs can associate with an unmarked focused object, we therefore have to fall back on strategy (D). In (26ab), the focus constituents of the first clause, marked by italics, are controlled for by the structure of the negative contrastive clause:

- (26) a. Gaalibii Håwwa ta-nàa dafà *waakee*, baa-tà dafà *shinkaafaa*  
 usually Hawwa 3sg.f-prog cook beans NEG-3sg.f. cook rice  
 ‘Normally, Hawwa cooks beans, not rice.’
- b. Gaalibii Håwwa ta-nàa dafà *waakee*, baa-tà *shaaré dàbee*  
 usually Hawwa 3sg.f-prog cook beans NEG-3sg.f. sweep floor  
 ‘Normally, Hawwa cooks beans rather than sweeping the floor.’

As the paraphrases show, the AQ *gaalibii* ‘usually’ associates with the object in (26a) and with the VP in (26b). Based on (26ab), we can therefore conclude that AQs in Hausa can associate with various constituents in the absence of grammatical focus marking.

More generally, the sentences in (24) to (26) support Beaver & Clark’s (2003) claim that material that is not *grammatically* marked for focus, be it by accent or movement, is not automatically mapped onto the restrictor of the AQ, cf. (5). Rather, part of the *grammatically* unmarked material is mapped onto the nuclear scope because it constitutes the focus constituent. In the case of Hausa, this state of affairs obtains because the information-structural category of focus is often not marked at all. In general, given that the determination of unmarked foci in Hausa relies on pragmatic resolution based on contextual information, it follows that the association of AQs with focus in this language is a pragmatic phenomenon, rather than a grammatically hard-wired process.

### 5.3 Adverbial Quantifiers vs. Focus Particles

In section 2, English adverbial quantifiers were shown to differ from focus particles in that the former stand in a loser syntactic and semantic relation to the grammatically marked focus constituent than the latter. This section shows that the same can be said for Hausa: as in English, the association of Hausa FPs, such as *sai* and *kawai* ‘only, just’, with focus constituents is subject to strict licensing conditions:

The focus-sensitive particle *sai* can only combine with overtly focus-moved NPs, cf. (27a). It never combines with *in situ* focus constituents, cf. (27b) (Kraft 1970):

- (27) a. Båshîr *sai ruwaa*<sub>F</sub> ya kaawoo  
 Bashir only water 3sg.m.perf.rel fetch  
 ‘Bashir fetched only water.’
- b. \*Båshîr yaa kaawoo *sai ruwaa*<sub>F</sub>  
 Bashir 3sg.m.perf fetch only water

The focus-sensitive expression *kawai* also occurs predominantly with focus constituents that have been overtly moved to the left periphery, cf. (28ab).

- (28) a. *Littàttàafai*<sub>F</sub> *kawài* dâalibai su-kà sàyaa.  
 books only students 3pl-perf.rel buy  
 ‘The students bought only BOOKS.’
- b. ??D’aalibai sun sàyi *littàttàafai*<sub>F</sub> *kawài*.

students 3pl.perf    buy    books            only

Marginally, *kawai* also occurs with *in situ* foci. If this happens, *kawai* has to be adjacent to the focus constituent immediately to its left. This is demonstrated in example (29B), taken from a collection of naturally occurring discourses (Randell et al. 1998).

- (29) A:    Nii kò, bá    ni                    sôn    dooyàa.  
           I    PRT NEG    1sg.cont        like    yam  
           ‘As for me, I don’t like yams.’
- B:    Tòo bàà        sai    kì                    ci    *shìnkaafaa*<sub>F</sub>    *kawài* ba?  
           PRT NEG        then    2sg.subj        eat    rice                    only    Q  
           ‘Well, but you don’t eat only rice, don’t you?’

As is clear from the immediately preceding context in (25A), the focus constituent in (25B) must be the object NP *shinkafa* ‘rice’, which is immediately followed by the focus-sensitive particle *kawai*.

The data in (27) to (29) show, then, that the FPs *sai* and *kawai* ‘just, only’ are in need of a clearly identifiable focus constituent with which to associate semantically. This constituent can be identified on the base of two criteria: First, the FPs are adjacent to it. In addition, the focus constituent plus FP are obligatorily (*sai*) or frequently (*kawai*) moved to the overt focus position in the left periphery of the clause. Similar facts hold for the FP *kađai* ‘only’, and for the particle *nee/cee* (Hartmann & Zimmermann, to appear-b).

The fact that Hausa FPs are in need of a clearly identifiable focus constituent argues for a syntactic and semantic specification in their lexical entry. FPs in Hausa appear to subcategorize for a nominal focus constituent with which they also associate semantically. Following Beaver & Clark (2003), one can capture this behaviour of FPs by specifying them as [+ focus-functional] in their lexical entry. On the other hand, we have seen that AQs do not impose similar restrictions on the grammatical realisation of the focus constituent. The focus constituent need not be marked, and the AQ does not generally occur adjacent to it. The difference in syntactic and semantic behaviour of AQs and FPs thus suggests a categorical distinction between the two types of expressions: While FPs are [+ focus-functional], AQs can be analysed as [- focus-functional], again following Beaver & Clark (2003).

To conclude, surface differences aside, the observed differences between AQs and FPs in Hausa appear to replicate similar differences between AQs and FPs in English and other intonation languages. Again, this similarity suggests that essentially the same basic mechanisms of interpretation are at work in both language groups. In the next section, we will therefore proceed to sketch a unified account of the interpretation of AQs in Hausa and in intonation languages.

## 6 AQs in Hausa and Intonation Languages: A Unified Analysis and a Prediction

In the preceding section, Hausa AQs were shown to resemble their counterparts in intonation languages when it comes to the association with constituents that are overtly marked for focus (section 5.1), and the differences between AQs and FPs (section 5.3). Furthermore, we concluded in section 5.2 that the association of Hausa AQs with focus is pragmatically governed. This conclusion is in line with Beaver & Clark’s (2003) findings for AQs in intonation languages (section 2), and more generally with other pragmatic approaches to focus-sensitivity and focus, see e.g. Rooth (1992), Dryer (1994), Roberts (1996), Büring (1997), and Kadmon (2001). From a theoretical perspective, then, the Hausa facts can be taken as evidence in favour of such more pragmatic approaches to the focus sensitivity of AQs over more grammaticized analyses that crucially rely on grammatical focus marking.

Given the observed similarities between Hausa AQs, on the one hand, and AQs in intonation languages like English on the other, it is tempting to come up with a unified analysis for AQs in both types of languages. The analysis, as sketched in (30), is based on Beaver & Clark's (2003) analysis of English AQs, see section 2.

(30) *Unified Analysis of AQs in Hausa and Intonation Languages:*

- i. AQs take their whole clause as nuclear scope. (see also Partee 1999)
- ii. The restriction is not provided by the grammar, but is pragmatically determined.
- iii. In intonation languages, and with instances of grammatically marked focus in Hausa, the restriction of the AQ must be compatible with all presuppositions, including those stemming from grammatical focus marking.
- iv. With unmarked focus in Hausa, the restriction must be compatible with the contextual information that determines the locus of focus.

The discussion of Hausa AQs is of interest to the discussion of AQs in English and other intonational languages for yet another reason: the Hausa data observed show clearly that there is no inherent need for grammatical focus marking with AQs. In intonation languages such as English, the picture is not so clear because it is blurred by the obligatory occurrence of a nuclear pitch accent in all sentences. In other words, English AQs are always accompanied by a clause-mate nuclear pitch accent, but possibly for independent reasons. Motivated by the facts from Hausa, then, one could adopt a more radical position and speculate that English AQs, too, do not require a constituent to be grammatically marked for focus in order to associate with it.

In order to find out whether or not this claim is correct, we have to find out if there are ever configurations in English in which an AQ can co-occur with a grammatically unmarked, i.e. fully destressed focus constituent. Previous studies have shown that FPs cannot: Rooth (1996) and Beaver et al. (2004) show that the associates of FPs such as *only* must be grammatically marked. If marking by pitch accent is impossible, e.g. with instances of so-called *second occurrence focus* (SOF), in which the associate of the FP is given and therefore blocked from carrying a nuclear pitch accent, it is marked by duration and intensity instead (see also Féry & Ishihara, to appear).

Given the observed differences between AQs and FPs, one may therefore wonder if English AQs behave differently in SOF-contexts. More precisely, the question is whether there is any kind of prosodic marking on the SOF *bicycles* in (31c), an example adapted from Beaver et al. (2004):

- (31) a. Both Peter and his siblings spent their youth with petty crimes and theft.  
 b. Peter always stole [BICYCLES]<sub>F</sub>.  
 c. Even his youngest brother PAUL always stole [bicycles]<sub>F</sub>.

If there is no prosodic marking on *bicycles*, English AQs will be fully identical to their Hausa counterparts in terms of grammatical behaviour. In particular, there will be nothing in the lexical entry of an English AQ that would require the AQ to co-occur with a prosodically marked constituent. If *bicycles* was prosodically marked, however, this could indicate that English AQs are not fully parallel to Hausa AQs after all, and that they are dependent on some sort of focus marking for the identification of the relevant background presuppositions that constrain the restriction of the AQ to take place. Hopefully, future phonetic studies of AQs in SOF-contexts will help to clarify this issue.

## 7 Conclusion

In this paper, I have investigated the semantic interaction of adverbial quantifiers and focus marking in Hausa. The main result was that intonation and tone languages such as Hausa do not differ fundamentally when it comes to the association of AQs with focused elements, despite the fact that focus marking in Hausa works quite differently. This may hint at the existence of universal mechanisms behind the interpretation of adverbial quantifiers across languages.

## References

- Beaver, D. and Clark, B.: 2003, *Natural Language Semantics* **11(4)**, 323-362.
- Beaver, D., Clark, B., Flemming, E., Jaeger, F.T., and Wolters, M.: 2004, *When Semantics Meets Phonetics: Acoustical Studies of Second Occurrence Focus*, Ms., Stanford University.
- Büring, D.: 1997, *The Meaning of Topic and Focus—The 59th Street Bridge Accent*. London: Routledge.
- Chafe, W.L.: 1976: Givenness, Contrastiveness, Definiteness, Subjects, Topics, and Point of View, in C. Li (ed), *Subject and Topic*, London, New York: Academic Press, pp.26-55.
- Cohen, A.: 1999, How Are Alternatives Computed?, *Journal of Semantics* **16**, 43–65.
- Dryer, M. S.: 1994, The pragmatics of association with *only*. Paper presented at the 1994. Winter Meeting of the L.S.A. Boston, Massachusetts.
- Féry, C., and Ishihara, S.: to appear, Interpreting second occurrence focus, in S. Ishihara & M. Schmitz (eds.), *Interdisciplinary Studies on Information Structure*. University of Potsdam.
- von Fintel, K.: 1994, *Restrictions on Quantifier Domains*, Ph.D. dissertation, University of Massachusetts, Amherst.
- Givón, T.: 1976, Topic, Pronoun and Grammatical Agreement, in C. Li (ed), *Subject and Topic*, London, New York: Academic Press, pp. 151-188.
- Green, M.: 1997, *Focus and Copular Constructions in Hausa*, PhD Dissertation, SOAS, London.
- Green, M. and Jaggar, P.: 2003, Ex-situ and in-situ focus in Hausa: syntax, semantics and discourse, in J. Lecarme, J. Lowenstamm and U. Shlonsky (eds), *Research in Afroasiatic Grammar 2*, Amsterdam: Benjamins, pp. 187-213.
- Hartmann, K. and Zimmermann, M.: 2004, Focus Strategies in Chadic: The Case of Tangale Revisited, in S. Ishihara, M. Schmitz and A. Schwarz (eds), *Interdisciplinary Studies on Information Structure (ISIS) 1*, Potsdam: Universitätsverlag Potsdam, pp. 207-244.
- Hartmann, K. and Zimmermann, M.: to appear-a, In Place - Out of Place: Focus in Hausa, in K. Schwabe and S. Winkler (eds), *On Information Structure, Meaning and Form*. Amsterdam: Benjamins.



- Hartmann, K. and Zimmermann, M.: to appear-b, Exhaustivity Marking in Hausa: A Re-Evaluation of the Particle *nee/cee*, in E. Aboh, K. Hartmann, and M. Zimmermann (eds), *Focus Strategies: Evidence from African Languages (Niger-Congo, Afro-Asiatic, West-Atlantic)*, Berlin: de Gruyter.
- Heim, I.: 1990, E-type Pronouns and Donkey Anaphora, *Linguistics and Philosophy* **13**, 137-177.
- Herburger, E.: 2000, *What Counts. Focus and Quantification*. Cambridge, Ma.: MIT Press.
- Kadmon, N.: 2001, *Formal Pragmatics: Semantics, Pragmatics, Presupposition and Focus*. Oxford: Blackwell.
- Kiss, K.E.: 1998, Identificational Focus Versus Information Focus, *Language* **74**, 245-273.
- Kraft, C. H.: 1970, Hausa *sai* and *dà* – a couple of overworked particles. In *Journal of African Languages* **9**, 92-109.
- Jaggat, P.: 2001, *Hausa*. Amsterdam: John Benjamins.
- Lewis, D.: 1975, Adverbs of Quantification, in E.L. Keenan (ed), *Formal Semantics of Natural Language*, Cambridge University Press, pp. 3-15.
- Matthewson, L.: 2004, On the Methodology of Semantic Fieldwork. *International Journal of American Linguistics* **70(4)**, 369-415.
- McConvell, P.: 1973, *Cleft Sentences in Hausa? A Syntactic Study of Focus*, PhD Dissertation, SOAS, London.
- Newman, P.: 2000, *The Hausa Language*. New Haven & London: Yale University Press.
- Partee, B. H.: 1991, Topic, Focus and Quantification, in S. Moore and A. Wyner (eds), *Proceedings of SALT I*, Ithaca, NY, pp. 159-187.
- Partee, B. H.: 1999, Focus, Quantification, and Semantics-Pragmatics Issues, in P. Bosch and R. van der Sandt (eds), *Focus: Linguistic, Cognitive, and Computational Perspectives*, Cambridge University Press, pp. 213–231.
- Randell, R., Bature, A. and Schuh, R. 1998. Hausa Bakar.  
(<http://www.humnet.ucla.edu/humnet/aflang/hausarbaka/>)
- Roberts, C.: 1996, Information Structure in Discourse: Towards an Integrated Formal Theory of Pragmatics, *OSU Working Papers in Linguistics* **49**. Papers in Semantics.
- Rooth, M.: 1985, *Association with Focus*, Ph.D. dissertation, University of Massachusetts, Amherst.
- Rooth, M.:1992. A Theory of Focus Interpretation. *Natural Language Semantics* **1**, 75–116.
- Rooth, M., 1996. On the Interface Principles for Intonational Focus, in T. Galloway and J. Spence (eds), *Proceedings of SALT VI*. Ithaca, NY, pp. 202–226.
- de Swart, H.: 1991, *Adverbs and Quantification : A Generalized Approach*, PhD dissertation, University of Groningen.
- Tuller, L.: 1986, Bijective Relations in Universal Grammar and the Syntax of Hausa, PhD Dissertation, UCLA, Los Angeles.



# WHEN THE DONKEY LOST ITS FLEAS: PERSISTENCE, CONTEXTUAL RESTRICTION, AND MINIMAL SITUATIONS \*

Eytan Zweig,  
New York University

eytanz@nyu.edu

## Abstract

This paper revisits the question of whether propositions in situation semantics must be persistent (Kratzer (1989)). It shows that ignoring persistence causes empirical problems to theories which use quantification over minimal situations as a solution for donkey anaphora (Elbourne (2005)), while at the same time modifying these theories to incorporate persistence makes them incompatible with the use of situations for contextual restriction (Kratzer (2004)).

## 1 Introduction

Kratzer (1989) introduces a framework for situation semantics that was taken as a starting point by a substantial body of later work. One property of this theory is that what is true of a small situation must remain true of larger situations that it is a part of. This is known as **persistence**. Kratzer's argumentation for this condition, however, is of a conceptual nature. This led most of the work which adopted her framework to overlook this condition, and neglect to incorporate it into their theories.

In this paper, I will return to the issue of persistence, with several goals in mind. First and foremost, I aim to show that the persistence condition is not just motivated on conceptual grounds, but it is justified empirically. While doing so, I shall also explore some of the requirements that are necessary for a proposition to be persistent. Finally, I shall discuss the consequences of persistence to different lines of research in situation semantics. Specifically, I will show that theories of donkey anaphora that require quantification over minimally small situations are in conflict with Kratzer's (2004) theory of contextual restriction, as the latter requires that quantification involve large situations in order to ensure persistence.

## 2 Persistent Propositions

Kratzer (1989) introduces a situation semantics (later partially revised in Kratzer (2002)) which relies heavily on the part-whole relationship of situations. Situations, according to this framework, are groupings of entities, their properties, and relations between them. Reference to situations is handled through situation variables, which can be quantified over just like other variables. Much of the power of this framework is derived from the fact that situations in this system are partially ordered by the sub-situation operator  $\leq$ . If  $s \leq s'$ , then  $s'$  may contain at least one entity, property, or relation that  $s$  does not. There is a maximal element to this ordering - the possible world, which, naturally, includes all the entities, properties, and relations that exist

---

\*I would like to thank Anna Szabolcsi, Paul Elbourne, Chris Barker, Zoltan Szabo, François Recanati, Lena Baunaz, John Brennan, Andrea Cattaneo, Tom Leu, Lisa Levinson, Liina Pykkänen, Laura Rimell, Oana Savescu-Ciucivara, and Jason Shaw as well as the SuB reviewers for all their useful discussion and criticism.

in that world. For brevity, I shall call a situation  $s'$  an **extension** of a situation  $s$  iff  $s \leq s'$  and  $s \neq s'$ .

In this system, a proposition is defined as a set of situations, such that a proposition  $p$  is true in a situation  $s$  if  $s \in p$ . Nothing said so far prevents a proposition from being true in a situation  $s$ , but false in some extensions of it. For example, take the proposition  $p$  which is expressed in (1):

(1) There are no living kings.

(1) is, under a straightforward analysis of its meaning, true of a situation  $s_1$  that includes only an individual  $x$  and the fact that  $x$  is alive. However, there may be a larger situation  $s_2$  that includes  $x$ , the fact that he lives, and the fact that he is a king. (1) is not true of  $s_2$ . But note that  $s_1 \leq s_2$ .

As mentioned above, Kratzer (1989) takes the view that this is an unwelcome result. She suggests that a condition be added such that all natural-language propositions be **persistent**, following the definition below:<sup>1</sup>

(2) A **persistent proposition** is a proposition of which it is true that, for every  $s$  such that  $s \in p$ , for every  $s'$  such that  $s \leq s'$  it holds that  $s' \in p$ .

With this condition in place, then, in the world described above,  $s_1$  cannot be a member of the proposition expressed by (1), due to the existence of  $s_2$ .

It is important to note that Kratzer does not enforce this condition by somehow filtering out non-persistent propositions. Rather, she provides denotations for quantifiers that encode persistence. For example, instead of the non-persistent denotation for *every* provided in (3), she suggests (4)<sup>2</sup>:

(3) **Non-persistent quantification:**

$\llbracket \text{every} \rrbracket = \lambda f_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda g_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda s$ . For all  $x_{\langle e \rangle}$ : if  $f(\lambda s.x)(s) = 1$ ,  $g(\lambda s.x)(s) = 1$

(4) **Persistent quantification:**

$\llbracket \text{every} \rrbracket = \lambda f_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda g_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda s$ . For all  $x_{\langle e \rangle}$ : if  $f(\lambda s.x)(w) = 1$ ,  $f(\lambda s.x)(s) = 1$  and  $g(\lambda s.x)(s) = 1$

The difference between the two quantifiers is as following: in (3), the quantifier is restricted to entities which have property  $f$  in  $s$ , and it predicates of them that they also have property  $g$ . In (4), the quantifier is restricted to all the  $f$ 's in the world, and it states that they have that property in  $s$ , as well as  $g$ . Thus, a proposition only holds of situations that include all the  $f$ 's in  $w$ , and in which all of them are also  $g$ 's. Both these properties will hold of every larger situation<sup>3</sup>.

While writing persistence into the determiner denotation ensures that all sentences end up denoting persistent propositions, it also complicates these denotations. Since Kratzer does not

<sup>1</sup>Terminology due Barwise and Perry (1983). It is important to distinguish this use of *persistent* from the unrelated use of the same term in Barwise and Cooper (1981), where it is used to denote "right upwards monotone".

<sup>2</sup>The denotations given below differ from Kratzer's in their notation, as I use the same formalism as Elbourne (2005). Nonetheless, the ideas are the same, with one major simplification: Kratzer (1989) deals with some distinctions which go beyond the scope of this paper, such as the distinction between propositions that are true accidentally and propositions that are true by some inherent fact about the nature of the world. I will ignore such distinctions here.

<sup>3</sup>This is actually not entirely correct. Take the sentence *Every professor owns an even number of hats* - there can be a situation  $s$  that includes all the professors, and each of them has an even number of hats in that situation, but there's a situation  $s'$  in which one professor has an additional hat. I will ignore this issue in the discussion that follows, since it will not carry over to the quantifier denotations that use minimal situations.

provide empirical justification for doing so, most of the literature following her work chose to use the simpler, non-persistent denotations<sup>4</sup>. The next section will examine one such theory, and show why this choice leads to empirical problems.

### 3 Minimal situations and donkey anaphora

#### 3.1 The Heim/Elbourne solution for donkey anaphora

One recent promising use of situation semantics has been to solve a problem that arises in the resolution of donkey anaphora. This line of research was first suggested by Heim (1990), and worked out in detail by Elbourne (2005) and Büring (2004). In the following discussion I shall make reference directly only to Elbourne's theory; however, a similar point could be made with Büring's implementation.

Situation semantics become necessary because of an apparent problem for the E-type analysis (Evans (1977), Evans (1980)) of donkey anaphora, itself one of the most attractive explanations of this phenomena. In the E-type analysis, the donkey pronoun is taken to have semantics similar to a definite description, such that (5) is interpreted as (6):

- (5) Every farmer who owns a donkey beats it.  
 (6) Every farmer who owns a donkey beats [the donkey].

However, there is a major problem with this solution: definite descriptions require a unique referent. Such a referent does not seem to be available in donkey anaphora; (5) can clearly be true in a context that contains multiple donkeys (and in fact, if there was only a single donkey, it would be hard to imagine (5) used with felicity).

The Heim/Elbourne solution relies on the insight that, due to the nature of situation theory, even if there is more than one donkey involved in the overall world, there are sub-situations of that world that contain only one donkey. Thus, it is possible to make use of those situations to ensure unique referents for the donkey pronouns.

All that needs to be done is to take care to only refer to situations small enough to contain exactly one donkey. For this purpose, instead of making reference to just any situations within the denotation of the quantifiers, instead they should quantify over **minimal situations**. A minimal situation such that  $p$  holds is a situation  $s \in p$  such that there is no situation  $s' \in p$  such that  $s' \leq s$ .

For example, the following is Elbourne's denotation for *every*:

- (7) **Minimal quantification:**  
 $\llbracket \text{every} \rrbracket = \lambda f_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda g_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda s_1$ . For all  $x_{\langle e \rangle}$ : for each minimal situation  $s_2$  such that  $s_2 \leq s_1$  and  $f(\lambda s.x)(s_2) = 1$ , there is a situation  $s_3$  such that  $s_3 \leq s_1$  and  $s_3$  is a minimal situation such that  $s_2 \leq s_3$  and  $g(\lambda s.x)(s_3) = 1$

Paraphrased informally, *every* quantifies not over individuals that have a certain property (the NP restriction), but over sub-situations of its argument situation that contain only the individual and said property. For each of these situations, *every* claims that it is possible to extend it in such a way that a second property (the VP denotation) holds true of the individual.

By adding this quantifier denotation to the E-type story, (5) can be informally paraphrased as (8):

<sup>4</sup>For a discussion of persistence in non-Kratzarian situation theory, see Cooper (1991)

- (8) Every situation can be divided up in such a way that for every sub-situation that involves a farmer, a donkey he owns, and nothing else, there is a situation that involves the farmer, the donkey, the ownership, and the fact that the farmer beats the unique donkey in that situation.

At first blush, this solves the problem, as, by virtue of being minimal, the minimal situation will never contain more than the single donkey necessary to make the subject have the property of being a farmer who owns a donkey. This donkey makes a good unique referent (within the context of the situation) for the definite description to pick up. Thus, the E-type reference problem seems to be solved<sup>5</sup>.

### 3.2 The Problem

The preceding discussion, however, contains a henceforth unstated assumption. Namely that, whenever donkey anaphora occurs, an appropriate minimal situation that will provide a unique referent is available. Unfortunately, this is not always the case.

#### 3.2.1 The donkey that lost its fleas

For example, take a world in which there are three farmers (A,B,C), each of which owns a donkey. Farmers A and B each take good care of their respective donkeys, grooming them daily. As a result, their donkeys have no fleas. Farmer C, however, does not groom his donkey, which has many fleas.

It is pretty uncontroversial that sentence (9) is true in this context (ignoring causality for the sake of simplicity):

- (9) Every farmer who owns a donkey which has no fleas grooms it.

But applying the minimal situation analysis as given above to this sentence, (9) is false in this scenario.

To see this, note that there is a situation (call it  $s^7$ ) which involves farmer C, his donkey, the owning relationship between them, but no fleas, nor possession relations between the fleas and the donkey.  $s^7$  conforms to the requirements of being a minimal situation that contains a farmer who owns a donkey which has no fleas. Due to the denotation of *every*, every such minimal situation needs to have an extension wherein the farmer in question (farmer C) grooms the donkey. However, there is no situation that satisfies that requirement, and thus the sentence is false.

#### 3.2.2 The donkeys hiding out of the situation's reach

A second manifestation of this problem can be seen in the following sentence:

- (10) Every man who owns a farm beats every donkey in it.

According to the minimal situation analysis as given above, this is a tautology.

This is because the restriction of the quantifier requires that the quantification be over minimal situations in which a man own a farm. These situations obviously do not include any donkeys, as

---

<sup>5</sup>There are further issues to be addressed as to what happens when a single farmer owns more than one donkey and similar cases. I refer the reader to Elbourne (2005) for detailed discussion.

none are mentioned in the quantifier's restriction. But every such situation has many extensions which have nothing to do with donkeys or beatings. Let's take one such minimal situation (call it  $s^{12}$ ). One such situation, for example, contains the man, the farm, the owning relationship between them, and also the man's blue hat, and nothing else. Call this situation  $s^{34}$ .  $s^{34}$  trivially satisfies the condition that the farmer beats every donkey in the farm in  $s^{34}$ , since there are no such donkeys. Since for every minimal situation in which a man owns a farm a similar arbitrary extension can be found, (10) is always going to be true<sup>6</sup>.

### 3.2.3 What went wrong

There is a clear intuitive notion of what is wrong in these examples. In (9), The minimal situation that includes farmer C and his donkey includes no fleas; yet it feels like it should not count as a minimal situation of *a farmer who owns a donkey with no fleas*, as the donkey in question does have fleas outside this situation. In (10), it does not feel sufficient that for every man/farm pair there is an arbitrary extension in which all the donkeys in that extension are beaten. Rather, it seems that the man should beat every donkey in an extension includes all the donkeys in the farm.

It is here that persistence is needed.

In (9), what is necessary is to quantify over minimal situations that involve a donkey with no fleas, **and** are not sub-situations of a situation for which said donkey has fleas. In (10), it is required that the man beat every donkey in the farm in the situation in question, and that there is no extension of that situation in which the farmer doesn't beat every donkey in the farm.

Thus, it can be seen that ignoring persistence creates problems for Elbourne's framework. The obvious way to correct these problems is to reintroduce persistence into the equation.

Before seeing how that can be done, it is important to note that the problem faced above is not a consequent of the fact that the sentences are generic and in present tense. For example, the same problem faced by (9) is equally faced by (11), which is neither:

- (11) Yesterday, every bald athlete who ran a race which had no celebrities in the audience won it.

## 4 Persistence - consequences and implementation

In the previous section, I found some problems for the Heim/Elbourne analysis of donkey anaphora and suggested that modifying their theory to ensure persistence will solve these problems. In this section I shall demonstrate this.

### 4.1 Persistence and monotonicity

Not all determiners need to have persistence explicitly written into their denotations. Those that denote quantifiers that are upwards monotone on both arguments are, in fact, persistent by default.

To see why monotonicity matters, it is helpful to look at the denotation of a quantifier that does not have persistence written in, such as the denotation of *every* given in (3), repeated below as (12):

---

<sup>6</sup>This ignores the possibility that *every* has an existence presuppositions. If such a presupposition is reintroduced, then (10) will no longer be a tautology. However, this does not solve the problem, as the sentence will only require that the man beats *at least one* donkey in his farm to be true.

$$(12) \quad \llbracket \text{every} \rrbracket = \lambda f_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda g_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda s. \text{ For all } x_{\langle e \rangle}: \text{ if } f(\lambda s.x)(s) = 1, g(\lambda s.x)(s) = 1$$

The quantifier is restricted to entities  $x$  that have property  $f$  in a situation  $s$ . Because the substitution relation  $\leq$  is upwards monotone, then, assuming that  $f$  does not in itself contain any downwards entailing operators, if something has the property  $f$  in  $s$  it has the property  $f$  in every  $s'$  such that  $s' \leq s$ . In other words, the set of  $x$ s that have property  $f$  in  $s$  is a subset of the set of  $x$ s that have the property  $f$  in  $s'$ .

Thus, going from a situation to an extension of it in essence replaces the domain argument of the quantifier by a superset of it. This is always safe if the determiner is upwards monotone in its restriction, but not if it is downwards or non-monotone in that argument. Parallel reasoning applies to the nuclear scope of the determiner. This means that if a determiner is upwards monotone in both arguments, nothing needs to be added for it to provide persistent quantification.

## 4.2 Quantifier monotonicity vs. sentence entailment

It is worth noting that it is the monotonicity of the quantifiers that matters, rather than the entailment properties of any particular sentence. For example, note that for (9), the quantifier *no fleas* is embedded in the restriction of the quantifier *every farmer*. This means that the argument slots of *no fleas* are actually an upwards entailing environment, as can be seen from the following inference pattern:

- (13) Every farmer who owns a donkey which has no fleas grooms it.
- a.  $\not\Rightarrow$  Every farmer who owns a donkey which has no red fleas grooms it.
  - b.  $\Rightarrow$  Every farmer who owns a donkey which has no parasites grooms it.

Based on this information, one could be led to expect that there should be no persistence problems associated with the arguments of *no*. But, as shown in section 3.2.1, that is incorrect. The reason is that while entailment is calculated by the sentence as a whole, persistence must be ensured in embedded propositions as well as matrix ones. (9) can be paraphrased as the follows:

- (14) Every  $x$  of which it holds that  $x$  **is a farmer that owns a donkey that has no fleas** is such that  $x$  grooms the relevant donkey.

For the whole sentence to express a persistent proposition, the bolded proposition must itself be persistent for each  $x$ . If it is not, then going from a situation to an extension of it may alter the domain of the matrix quantifiers, by changing whether individual farmers fall under the restriction or not. This is the nature of the problem in example (9).

Thus, the nature of the embedded quantifier is relevant, even if ultimately its arguments end up being an upwards entailment environment. This shows that the decision in Kratzer (1989) to include the persistence condition in the denotation of (non-upwards monotone) quantifiers is the correct way to handle persistence, and I will follow suit.

## 4.3 Implementing persistence

Since failures of persistence arise when a proposition that was true in a small situation fails to be true in a larger one, the best way to prevent this is to check that the proposition holds in as large a situation as possible. This is a potential problem, as the Heim/Elbourne solution for donkey anaphora relies on the presupposition that minimal situations give unique referents. Can persistence be implemented in a way that satisfies both demands?



In fact, there is no need to look beyond what was already discussed to find an implementation that makes this possible. The persistent quantification in Kratzer (1989) adds a condition that the individuals quantified must satisfy the restriction of a quantifier in the largest situation available (i.e., the entire world) **in addition** to the situation quantified over. This denotation allows checking persistence against the maximal situation  $w$ , while at the same time the actual quantification remains on truly minimal situations. Thus, the best of both worlds has apparently been achieved, at least as far as using situations to account for donkey anaphora. Adding such a condition to Elbourne's *every* results in the following:

(15) **Persistent minimal quantification:**

$\llbracket \text{every} \rrbracket = \lambda f_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda g_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda s_1$ . For every  $x_{\langle e \rangle}$ : if  $f(\lambda s.x)(w) = 1$ , then  $f(\lambda s.x)(s_1) = 1$  and for every minimal situation  $s_2$  such that  $s_2 \leq s_1$  and  $f(\lambda s.x)(s_2) = 1$ , there is a situation  $s_3$  such that  $s_3 \leq s_1$  and  $s_3$  is a minimal situation such that  $s_2 \leq s_3$  and  $g(\lambda s.x)(s_3) = 1$

This denotation of *every* (and a similarly modified denotation for *no*) would avoid both of the problems for Elbourne's system. In the case of the donkey that lost its fleas, the reasoning is simple: farmer C is not a farmer who owns a donkey with no fleas in  $w$ , and thus does not fall under the domain of quantification. The other problem is a bit more complex: the matrix *every* quantifies over all the men in  $w$  that own a farm, and for each minimal situation that includes such a pairing, it states that there is an extension wherein every donkey in [[the farm]] is beaten. So far, the persistence makes no difference. But the embedded *every* now quantifies over every entity in  $w$  that is a donkey in the farm in the relevant minimal situation, rather than just those donkeys that are present in an arbitrary situation. Thus, no donkeys can escape notice.

But this denotation is only possible under the assumption that reference to  $w$  in a determiner denotation is unproblematic. In the following section, it shall be shown that this does not fit comfortably with other recent uses of situation semantics.

## 5 Persistence and contextual restriction

One property of persistent quantification as discussed so far is that it is global; every quantifier in some sense quantifies over the whole world.

If nothing further is said, this leads to strange-looking predictions. Take the following sentence, for example:

(16) Every tree is laden with wonderful apples.

By global persistence, (16) would only be true if every tree in the entire world is laden with wonderful apples. Kratzer (1989) solves this by appealing to contextual domain restriction to fill in additional descriptive material. According to her, (16) really should be given a reading along the lines of the following:

(17) Every tree [in my orchard] is laden with wonderful apples.

This is an intuitively appealing notion, as it is a well-established fact that contextual restriction must come into play in exactly these sentences anyway. However, the viability of this option depends heavily on the way in which contextual restriction is implemented. While Kratzer (1989) does not provide an actual theory of contextual restriction, she is clear that this must be done by an additional mechanism rather than the situations themselves, explicitly rejecting the theory of contextual restriction provided in Barwise and Perry (1983) because it relies on

non-persistent propositions.

## 5.1 Contextual restriction via topic situations

In contrast to her earlier position, Kratzer (2004) proposes that contextual restriction should be accounted for not by adding descriptive material to the sentence, but rather by applying the proposition in question to a *topic situation*, which contains only the contextually relevant entities.

According to Kratzer, utterances in context represent an *Austinian proposition* (after Austin (1950)) - that is, a pairing of a topic situation and a proposition  $\langle s, p \rangle$ . An assertion operator ASSERT is responsible for applying the topic situation as a situation argument for the proposition (i.e., the one required by the  $\lambda s$  of the highest scope operator)

$$(18) \quad \llbracket \text{ASSERT} \rrbracket(\langle s, p \rangle) = p(s)$$

Since every embedded operator is passed a situation variable by the next higher operator which is a sub-situation of the situation parameter of that operator, this ensures that all quantifiers are restricted to elements of the topic situation.

Put differently, this system relies on the principle that each operator only has access to the situation that the operator above gives it, and can only pass down parts of that situation to lower operators. This, indeed, recaptures one of the intuitive uses of situations; they are used in order to talk about just part of the world<sup>7</sup>.

This principle would be nullified if direct reference to  $w$  is allowed, such as used above to ensure persistence. Doing so allows a quantifier to see information that was not strictly passed down to it by a higher operator. For example, imagine the following scenario: yesterday, a semantics exam was graded. Exactly one student got a B; surprisingly, she did so without making any actual errors, but just by failing to answer questions in a satisfactory manner. It is felicitous to say:

(19) Some student who made no errors got a B.

(19) requires the existence of a student who made no mistakes in the relevant context - i.e., on her semantics exam. It will not be falsified if that same student made an error in her phonology exam.

However, if persistence is checked relative to the world, then the error on the phonology exam will be enough to remove the student from the domain of quantification (for there are errors in  $w$  which she made), thus falsifying the sentence.

### 5.1.1 Local persistence

Accepting the theory of contextual restriction in Kratzer (2004), then, means that a way of implementing persistence is necessary: one wherein persistence is local to the situation which the quantifier received as an argument.

Note that, if minimal situations are ignored, local persistence actually comes for free in Kratzer (1989). The denotation of *every* given in (3) (repeated below as (20)) is only problematic as far

<sup>7</sup>Note that Kratzer (2004) does not specifically rule out an additional mechanism for contextual restriction. In fact, she argues that such a mechanism must exist for restrictions that are based on cultural conventions. But for the purposes of this paper, what is important is that normal contextual restriction, i.e. the kind that determines the relevant apples for the use of *every apples* in ((16)), is handled via topic situations.

as persistence is concerned because the situation variable it was passed was taken to be totally unrelated to the global domain in which persistence was desired. If, following Kratzer (2004), this situation variable is taken to always reflect the contextual domain wherein persistence needs to hold, (3) (repeated as (20)) will suffice.

$$(20) \quad \llbracket \text{every} \rrbracket = \lambda f_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda g_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda s. \text{ For all } x_{\langle e \rangle}: \text{ if } f(\lambda s.x)(s) = 1, g(\lambda s.x)(s) = 1$$

In the Heim/Elbourne system, however, things are not so simple. The first problem is that having the property specified in the restriction is only checked in a minimal situation, not in the actual contextual situation. This can be solved with a minimal modification of (15), replacing the reference to  $w$  with reference to *every*'s situation parameter  $s_1$ , as follows:

(21) **Locally persistent minimal quantification:**

$$\llbracket \text{every} \rrbracket = \lambda f_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda g_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda s_1. \text{ For every } x_{\langle e \rangle}: \text{ if } f(\lambda s.x)(s_1) = 1, \text{ then for every minimal situation } s_2 \text{ such that } s_2 \leq s_1 \text{ and } f(\lambda s.x)(s_2) = 1, \text{ there is a situation } s_3 \text{ such that } s_3 \leq s_1 \text{ and } s_3 \text{ is a minimal situation such that } s_2 \leq s_3 \text{ and } g(\lambda s.x)(s_3) = 1$$

(21) can handle the problem of the disappearing fleas as well as (15) can. Simply put, it is not sufficient that a minimal situation can be found that contains a farmer, his donkey, and no fleas, it is also necessary that he has no fleas in the context situation. This is all that is necessary to get the correct reading for that sentence.

However, there is a second problem. Unlike in the simple case of (3), in the minimal situation-based theory embedded quantifiers no longer have access to everything in the topic situation, but only have access to what is in the situation passed down to them from the higher quantifier, as desired. This, unfortunately, reintroduces the other problem. To see this, let's return to (10), repeated as (22):

$$(22) \quad \text{Every farmer who owns a farm beats every donkey in it.}$$

As before, the minimal situation (call it  $s_{farm}$ ) in which a farmer  $x$  owns a farm contains no donkeys. Now take an arbitrary extension ( $s_{farm+}$ ) of that situation, such that  $s_{farm+}$  contains no donkeys. By the definition of the quantifier, it is now necessary to check whether *beats every donkey in it* is true of  $x$  in  $s_{farm+}$ . This involves passing  $s_{farm+}$  as the situation parameter of the embedded quantifier *every*. This is the largest situation which the persistence condition of *every* can see. But there are no donkeys in the farm in  $s_{farm+}$ . Thus, the persistence condition is toothless in this scenario.

Thus, domain restriction that relies on situations variables being passed down from one operator to the next prevents using persistence to solve the problem of elements hiding outside minimal situations.

### 5.1.2 Possible alternatives

Other methods of using situations for domain restriction may not suffer from this problem:

One possible solution is to claim that the topic situation is always available for direct reference in a discourse. Thus, it is possible to use the definition in (15), simply replacing the reference to  $w$  with  $s_{topic}$ :

(23) **Locally persistent minimal quantification (alternative):**

$\llbracket \text{every} \rrbracket = \lambda f_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda g_{\langle \langle se \rangle, \langle st \rangle \rangle} \lambda s_1$ . For every  $x_{\langle e \rangle}$ : if  $f(\lambda s.x)(s_{topic}) = 1$ , then  $f(\lambda s.x)(s_1) = 1$  and for every minimal situation  $s_2$  such that  $s_2 \leq s_1$  and  $f(\lambda s.x)(s_2) = 1$ , there is a situation  $s_3$  such that  $s_3 \leq s_1$  and  $s_3$  is a minimal situation such that  $s_2 \leq s_3$  and  $g(\lambda s.x)(s_3) = 1$

Another possibility, raised by Recanati (2004), is that topic situations are not used to saturate a situation argument slot, but rather are added as a form of semantic enrichment. Such a system would differ enough from Kratzer (2004) that the results above would not necessarily hold for it (though other problems may well rise, based on the exact implementation).

## 6 Conclusion

This paper explored the notion of persistence and has shown that the form in which it is implemented has crucial consequences for the applications of situation semantics in linguistics. Not paying proper attention to persistence introduces empirical problems for the system of Elbourne (2005). Attempting to solve these problems taught us more about the nature of persistence and how it interacts with minimal situations. Among the lessons was that implementing a persistent minimal situations approach to donkeys is impossible if the contextual restriction method proposed in Kratzer (2004) is also used.

Thus, the basic lesson of this discussion is that persistence is important. By attending to it, problems may be avoided and hidden problems may be uncovered.

## References

- Austin, J. L.: 1950, Truth, *Philosophical Papers (3<sup>rd</sup> edition)*, Oxford University press, Oxford, pp. 117–133.
- Barwise, J. and Cooper, R.: 1981, Generalized quantifiers and natural language, *Linguistics and Philosophy* **4**, 159–219.
- Barwise, J. and Perry, J.: 1983, *Situations and attitudes*, CSLI Publications, Stanford, California.
- Büring, D.: 2004, Crossover situations, *Natural Language Semantics* **12**, 23–62.
- Cooper, R. P.: 1991, Persistence and structural determination, in J. Barwise, J. M. Gawron, G. Plotkin and S. Tutiya (eds), *Situation Theory and its Applications, Volume 2*, Vol. 26 of *CSLI Lecture Notes Series*, CSLI Publications, Stanford, California, pp. 295–309.
- Elbourne, P.: 2005, *Situations and Individuals*, MIT Press, Cambridge, Mass.
- Evans, G.: 1977, Pronouns, quantifiers and relative clauses, *Canadian Journal of Philosophy* **7**, 467–536.
- Evans, G.: 1980, Pronouns, *Linguistic Inquiry* **11**, 337–362.
- Heim, I.: 1990, E-type pronouns and donkey anaphora, *Linguistics and philosophy* **13**, 137–177.
- Kratzer, A.: 1989, An investigation of lumps of thought, *Linguistics and philosophy* **12**, 607–653.

Kratzer, A.: 2002, Facts: Particulars or information units, *Linguistics and philosophy* **25**, 655–670.

Kratzer, A.: 2004, Covert domain quantifier restrictions. U. Mass Ms.

Recanati, F.: 2004, *Literal Meaning*, Cambridge University Press, Cambridge, England.