Wide Scope Indefinites: Dead Relatives

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1 Introduction: the problem

Consider the sentence in (1).

(1) If a relative of mine dies, I will inherit a fortune.

This sentence - originally from Ruys (1999), based on parallel examples from Ruys (1992), and going back to examples from Fodor and Sag (1982) - has become famous and largely discussed in the linguistics literature, because it exhibits an *exceptional wide scope* or *long distance* reading. This reading can be made visible in a context like the following. Imagine Donald Duck uttering (1), keeping in mind that he has one and only one relative who is very wealthy, namely Uncle Scrooge. With this background, the sentence is true on one particular reading, namely when the indefinite *a relative of mine* is understood to bear an exceptional wide scope reading. This reading, illustrated in (2)[1], can be paraphrased as follows: there is a certain relative of the speaker and if this relative dies, the speaker will inherit a fortune.

(2) $\exists x[\mathsf{relative\_of\_speaker}(x) \wedge [\mathsf{die}(x) \rightarrow \mathsf{inherit\_fortune}(\mathsf{speaker})]]$

Under this wide scope reading, the sentence is true. As we know, there is a certain relative of Donald Duck, namely Uncle Scrooge, that will make Donald Duck rich, if he dies.

But we also know that all the other relatives of Donald Duck are not particularly wealthy. And hence the narrow or surface scope reading of the indefinite, illustrated in (3), is false.

(3) $\exists x[\mathsf{relative\_of\_speaker}(x) \wedge \mathsf{die}(x)] \rightarrow \mathsf{inherit\_fortune}(\mathsf{speaker})$

[1] As long as the matters that are discussed do not hinge on a specific treatment, we will treat conditionals as material implications, just to not overly complicate things and to have matters as perspicuous as possible. This is not to mean that we believe this to be an adequate treatment of conditionals.

The reading in (3) would be true in a context where Donald Duck inherits a fortune if any (no matter which) relative of his dies. As the only wealthy relative of Donald Duck is Uncle Scrooge, only the wide scope reading is true in the given context. And hence, this reading is particularly easily available.

Comparing (1) to cases with other quantifiers, e.g. a universal one, it is surprising indeed that the sentence exhibits a wide scope reading for the indefinite.

(4) If every relative of mine dies, I will inherit a fortune.

With the universal quantifier *every relative of mine* in subject position of the *if*-clause, the sentence has only the surface scope (i.e. the narrow scope) reading, illustrated in (5). It says that the speaker will inherit a fortune only if every single relative of his dies.

(5) $\forall x[\mathsf{relative\_of\_speaker}(x) \rightarrow \mathsf{die}(x)] \rightarrow \mathsf{inherit\_fortune}(\mathsf{speaker})$

Crucially, the wide scope reading in (6) is not available.

(6) $\forall x[\mathsf{relative\_of\_speaker}(x) \rightarrow [\mathsf{die}(x) \rightarrow \mathsf{inherit\_fortune}(\mathsf{speaker})]]$

In words: for every relative of the speaker it holds that if s/he dies, the speaker will inherit a fortune. This is the same reading as the narrow scope reading for the indefinite, illustrated in (3). For the sentence to be true it suffices that only one of the speaker's relatives dies for the speaker to inherit a fortune. This reading is clearly not available.

That (4) has only the surface (i.e. narrow scope) reading is not surprising, because the universal quantifier is embedded in a scope-island, namely the *if*-clause, which means that movement from within the *if*-clause is prohibited. This can be verified by looking at overt movement mechanisms such as wh-movement, for example, which is illicit out of an *if*-clause (see 7b)[2].

(7) a. If Uncle Scrooge dies, Donald Duck will inherit a fortune.
b. *Who$_i$ if t$_i$ dies, will Donald Duck inherit a fortune?

Other extraction islands are, for example, complex noun phrase islands (*Peter heard the rumor that Maria bought a horse. – *What$_i$ did Peter hear the rumor that Maria bought t$_i$?*), see Ross 1967. As illustrated, overt extraction is prohibited in these contexts. If quantifier scope readings are derived via quantifier raising (QR), which is a syntactic mechanism, it is predicted that QR is constrained in similar ways as overt movement and that also QR is prohibited in these contexts (see chapter *Quantifiers, scope, and pseudo-scope* of this Companion). In particular, extraction from islands like the *if*-clause island in (1), (4), and (7) should be banned. Hence we predict no ambiguity for sentences (1) and (4). Yet, we observe that (1) has two readings: the narrow scope reading (which is false in the given context) and the wide scope reading, which would involve island-free movement, were it to be derived via QR. This is why indefinites are often claimed to exhibit *exceptional* wide scope readings. And this is also what most theories that aim at explaining long distance readings of indefinites set out to explain.

[2] I should add a caveat here, namely that overt movement is not always subject to the same constraints as covert movement.

For conceptual reasons, it is not attractive to propose an island-free covert extraction mechanism for indefinites to derive the wide scope readings. The concept of quantifier raising was motivated by the observation that scope readings are usually island-constrained. In other words, covert extraction was observed to be banned in similar contexts where overt extraction is prohibited (cf. ex. (4) and (7)), which made it plausible to assume a covert syntactic extraction mechanism to derive inverse scope readings. It would hence be highly unattractive to propose that this mechanism is now insensitive to syntactic islands for some subclass of scope takers, if the observation that quantifiers do show scope behavior that is syntactically constraint was the motivation for postulating a movement-based scope mechanism in the first place. Furthermore, there is also an empirical side to this conceptually unattractive move, which was first discussed by Ruys (1992) and is hence often referred to as the *Ruys observation*. Considering plural indefinites such as *three relatives of mine*, one observes that these indefinites also allow for an exceptional wide scope interpretation, but a collective one and not a distributive one[3].

(8) If three relatives of mine die, I will inherit a fortune.

The sentence has a narrow scope and a wide scope reading. The narrow scope reading says that the speaker will inherit a fortune if any three relatives of the speaker die (maybe because the speaker knows that all her relatives will bequeath her a certain amount of money and she considers only the sum of these three amounts a fortune). The wide scope reading is true in case there are three specific relatives of the speaker, say Aunt Ann, Uncle Bernie, and Uncle Charles, and the speaker inherits a fortune if these three relatives die – let's say because the three own a palace together and the speaker inherits this palace only when all three of them die. Importantly, this wide scope reading is a collective wide scope reading, i.e. all three relatives have to die to make the antecedent condition true. An island-free QR approach, however, would derive a wide scope distributive reading, because the trace left behind via QR would be a trace of individual type (see Heim and Kratzer 1998, ch. 7 and chapter *Quantifiers, scope, and pseudo-scope*, this Companion for details). This wide scope distributive reading actually does not exist. The reading would be: there are three specific relatives of the speaker and if one of these three relatives dies, the speaker will inherit a fortune. Hence, the assumption of island-free QR would derive readings that do not exist (wide scope distributive readings) and there would still be readings that could not be derived via this mechanism (wide scope collective readings) (see Reinhart 1997 for intensive discussion)[4].

The *Ruys observation* has been challenged from time to time (see Abusch 1994; Geurts 2010; Kempson and Meyer-Viol 2004; Martí 2005) and different examples have been brought up for which it is argued that they support a distributive wide scope reading. Martí (2005) presents data that seem to suggest that for

[3]For distributive vs. collective readings, see chapter *Distributivity, collectivity, and cumulativity* of this Companion.

[4]See Ruys (2003) for discussion of the fact that the two readings, i.e. the distributive and the collective wide scope reading, are not independent. In fact, the distributive wide scope reading is a special case of the collective wide scope reading.

Spanish, QR out of certain islands is possible, which is evidenced by her observation that the Spanish plural indefinite determiner *algunos* allows for collective and distributive readings outside of some, but not all islands. She suggests a mechanism of relativized QR, i.e. QR which is relativized towards the scope island, to account for the observed exceptional wide scope distributive readings. Endriss (2009) proposes (based on a suggestion by Manfred Krifka) that distributive wide scope readings are possible if (and only if) there is focal stress on the determiner of the wide scope indefinite. It is hence suggested that (8) can receive a distributive wide scope reading in a context where *three* is in focus (see Endriss 2009, p. 111, her ex. (4.8) for a variant of the following example).

(9) a. How many relatives will bequeath you a fortune if they die?
b. If THREE relatives of mine die, I will inherit a fortune.

It has to be stressed, however, that such wide scope distributive readings – to the extent that they exist – constitute the exception rather than the rule. Even if it cannot be upheld that wide scope distributive readings do not exist at all, these readings are not very frequent at best. What is more, (Winter, 1997, p. 416-17) discusses examples that favor distributive wide scope readings with respect to world knowledge and yet only support (non-sensical) collective readings. This strongly suggests that wide scope distributive readings are not freely available.

(10) #Every artist who was born in three cities became famous.

For (10), the only reading that would make sense would be the wide scope distributive reading: there are three cities, say New York, Paris, and London, such that every artist who was born in one of the cities became famous. However, this reading does not seem to be available, evidenced by the fact that (10) seems very odd. It is hence advisable to treat wide scope distributive readings as the exceptions that they are and strive for explanations of exceptional wide scope that derive wide scope collective readings and treat wide scope distributive readings as marginal cases that call for a different explanation.

In the following we will discuss approaches that aim at an explanation for the peculiar scope behavior of indefinites, i.e. the fact that they can take exceptional wide collective scope, and discuss their empirical and theoretical advantages as well as (their) shortcomings[5].

Before we turn to the discussion of different approaches towards the interpretation of wide scope indefinites, let me mention a complication of the cases at hand that is often neglected: it is actually only a small subset of indefinites that allows for exceptional wide scope, namely simple singular indefinites like *an N*, *some N*, *one N*, bare numeral indefinites like *two N*, and potentially also some other plural indefinites like $some_{pl}$ *N* and *several N*. Modified numerals like *at most three N*, *at least three N*, *exactly three N*, *more than three N*, etc. on the other

[5]Note that there is a contribution in the sister series to this Companion, The Blackwell Companion to Syntax (Ruys 2006), which is also concerned with the unexpectedly wide scope of indefinites. It discusses the conceptual and empirical arguments against free QR in more detail than this article, but does not discuss all the approaches to exceptional wide scope, especially the more recent ones, in the same detail.

hand, pattern with other quantifiers and induce no ambiguity when they are embedded in extraction islands[6].

In other words, the problem of the exceptional wide scope behavior of indefinites has actually two sides: 1. it has to be explained why sentences that involve an indefinite embedded in an extraction island still exhibit a wide scope reading for this indefinite (this is what most of the literature concentrates on and what we will be focusing on in this contribution), and 2. it has to be explained why not all, but only some indefinites have this property. Part (2.) of the problem is often ignored in the literature. For reasons of space, we, too, cannot take a closer look at the specific class of indefinites that allow for this exceptional behavior and the characteristics that might single out these indefinites and set them apart from other indefinites and quantifiers that do not allow for exceptional wide scope. We point the interested reader to the contributions in Szabolcsi (1997a) (in particular Szabolcsi 1997b; Beghelli and Stowell 1997), as well as de Swart (1999), and Szabolcsi (2010) for some relevant discussion on this matter. In Reinhart (1997), Schwarzschild (2002), and Umbach (2005) one can find syntactic and pragmatic considerations that might single out non-modified numerals as wide scope indefinites and set them apart from modified numerals. The work of Endriss (2009) is directly concerned with exactly the question of how to single out the correct class of quantifiers. She develops a mechanism – which is in fact a mechanism that interprets topical DPs (see section 5.1.3 below) – that sets out to explain why only those indefinites that we observe to take exceptional wide scope show this peculiar property. We will not be concerned with this problem any further in this contribution, however.

2 Specificity

Before we turn to the approaches that aim at explaining exceptional wide scope readings, some words of caution are in order. Often, the wide scope readings we are concerned with here are also called *specific readings*. Below, we will very briefly discuss our understanding of *specificity* and its relation to exceptional wide scope readings. For further discussion, we refer the reader to chapter *Kinds of (non-)specificity* of this Companion.

Unfortunately, there is not an agreed-upon definition for *specificity*. And there exist many very different understandings of specificity (see Farkas 1994 for an overview). Sometimes, simple wide scope readings are viewed as specific readings, sometimes only exceptional wide scope readings. Others call specific only those readings that involve a certain state in the speaker's mind, namely when the speaker wants to refer to a certain object ('what the speaker has in mind'). This view is often referred to as *epistemic specificity*. And there is a third view, namely that specific readings, also referred to as *de re* readings, only come about in opaque contexts, e.g. in the scope of of attitude verbs such as *believe* or *want*. Under this conception, specificity cannot come about in purely transparent contexts and the *de dicto*/*de re* ambiguity is not treated as a scope ambiguity, as orig-

[6]It is questionable, however, whether modified numerals should be treated as quantifiers in the first place, see chapter *Modified numerals* of this Companion.

inally proposed by Quine (1956). It is rather conceived of as stemming from the interplay of indefinites with (certain) opaque verbs (see Zimmermann 1993; Ioup 1977; Enç 1991 for discussion).

To discuss the derivations of (exceptional) wide scope readings that we are after in this article, we have to keep in mind that there are readings that might look like long distance readings, but are actually derivable via some other mechanism that is based on one of the views of specificity alluded to above.

3 A first solution: the approach of Fodor and Sag (1982)

In their seminal paper[7], Fodor and Sag (1982) not only aimed at explaining the exceptional wide scope behavior of indefinites, but also at relating the ambiguity involved in our initial example (1) to the intuition that there is a similar ambiguity involved in a simple statement like the following (Fodor and Sag 1982, p. 355, ex. (1)).

(11) A student in the syntax class cheated on the final exam.

Although this example involves no other scope taking element (neither a second quantifier nor an *if*-clause or any other scope operator), there seems to be an ambiguity involved. In one reading, the sentence simply makes a numerical statement that the set of student-cheaters on the final exam was not empty. In the other reading, the speaker seems to have a certain student in mind about whom she makes the predication that this student cheated on the final exam. Fodor and Sag (1982) raise the point that this intuitively felt ambiguity actually corresponds to two semantically distinct readings and that it is not just a pragmatic distinction. They argue that this ambiguity stems from a lexical ambiguity of the indefinite determiner. An indefinite such as *a student in the syntax class* thus has two lexical meanings, one quantifier meaning $\lambda P[\exists x[\mathsf{student\_in\_syntax\_class}(x) \wedge P(x)]]$ and one referential meaning where it denotes and directly refers to the individual the speaker has in mind. If the indefinite is interpreted quantificationally, it is predicted to show the properties of other quantificational expressions, which means in particular that it respects scope islands. If, on the other hand, it is interpreted referentially, it patterns with other referential and thus scopeless expressions like proper names.

From what has been said it follows that the indefinite in (1) would have to be interpreted referentially to derive the (alleged) exceptional wide scope reading we are after. It also follows directly that (allegedly) island-escaping indefinites, which are necessarily referential and thus scopeless, should not be able to take various scope-positions, but only what corresponds to widest scope. And indeed, crucial motivation for Fodor and Sag's approach comes from examples that lack certain scope readings that would be possible in theory. These sentences seem to exhibit a quantificational reading, which corresponds to the narrowest scope reading, and a referential reading corresponding to the widest scope read-

[7] See also chapter *Kinds of (non-)specificity* of this Companion for further discussion of Fodor and Sag (1982).

ing, and no further *intermediate scope reading*. The following two examples are from (Fodor and Sag, 1982, p. 374, ex. (69) and p. 375, ex. (73)).

(12) a. Each teacher overheard the rumor that a student of mine had been called before the dean.

b. If a student in the syntax class cheats on the exam, every professor will be fired.

Fodor and Sag (1982) argue that (12a) has only two readings, namely one that corresponds to the quantificational narrow scope reading and one that corresponds to the referential or widest scope reading. The narrow scope reading can be paraphrased as: each teacher overheard the rumor that some student or other of the speaker had been called before the dean. The referential reading can be translated as: there is a certain student of the speaker such that each teacher overheard the rumor that this student had been called before the dean. Crucially, so Fodor and Sag (1982) argue, (12a) lacks an intermediate scope reading which would be a reading where the indefinite takes scope below the quantifier *each teacher*, but above the verb phrase *overheard the rumor*, which induces an opaque context. This non-existent reading would be a reading along the following lines: for each teacher there is a possibly different student such that the teacher overheard the rumor that this student (varying with the teachers) had been called before the dean. I will refer to such readings as *exceptional wide intermediate scope readings* (*intermediate*, because the indefinite would take scope between two other operators and *exceptional wide*, because the position would be outside of an island, here: a complex noun phrase).

Also (12b) lacks a similar exceptional wide intermediate scope reading. The sentence can either mean that every professor will be fired if one student or other in the syntax class, no matter which, cheats on the exam or that there is a certain student in the syntax class and every professor will be fired if this student cheats on the exam. But again there is no intermediate scope reading which would be true under the following circumstances: for every professor there is a certain possibly different student in the syntax class such that if this student cheats on the exam the professor will be fired.

Considering only these two motivating examples of Fodor and Sag (1982), it could be concluded that exceptional wide intermediate scope readings do not exist. And this would be excellent evidence for their lexical ambiguity account indeed. Yet, since Fodor and Sag (1982) first presented their theory many counterexamples to their original claim have been brought up (see Farkas 1981; King 1988; Ruys 1992; Abusch 1994; Kratzer 1998; Reinhart 1997; Winter 1997).

4 Intermediate scope and functional readings

In the following, we will discuss some of the classic counterexamples to Fodor and Sag's (1982) claim of the non-existence of intermediate scope readings. We will also tackle the question why some sentences, as the original examples from Fodor and Sag (1982), do seem to lack intermediate scope readings, while others, like the counterexamples to be discussed, allow for them rather easily (see

in particular Ebert et al. 2009). To make the point, it will be important to distinguish between what Endriss (2009) (based on thoughts in Schwarz 2001a,b and Chierchia 2001) calls *genuine intermediate scope* and *functional wide scope*.

As (Kratzer, 1998, p. 166) points out, a minimal modification of (12a) suffices to bring an (apparent) intermediate scope reading to the fore (see Ruys 1992; Abusch 1994 for further examples along these lines).

(13) Each teacher$_i$ overheard the rumor that a student of his$_i$ had been called before the dean.

This sentence supports a reading saying that for each teacher there is a certain student of his such that the teacher overheard the rumor that this student had been called before the dean. This is a reading where the indefinite seems to take intermediate scope, namely below *each teacher* and above *overheard the rumor*. The only difference between (12a) and (13) lies in the presence of the bound pronoun *his* as opposed to *mine*. Some researchers, e.g. Matthewson (1999) and Schwarzschild (2002), have thus concluded that the presence of an overt bound pronoun (or the possibility to accommodate a covert one) is decisive for the availability of an intermediate scope reading.

But example (13) and similar examples that involve bound pronouns do not constitute genuine intermediate scope readings, but rather instances of functional wide scope readings. The alleged intermediate scope reading of (13) would thus not be a reading where the indefinite takes literal intermediate scope, but rather a reading where there is a function involved, which takes wide scope (or one that is free and is contextually bound[8]). The functional reading could be formalized as follows.

(14) $\exists f[\mathsf{student}_{fn}(f) \wedge \forall x[\mathsf{teacher}(x) \rightarrow \mathsf{overheard}(x, \mathsf{call\_before\_dean}(f(x)))]]$

The formula translates as follows: there is a function f into students such that each teacher x overheard the rumor that a student assigned to him via the function, i.e. $f(x)$, had been called before the dean. In other words: for each teacher there is a student assigned to him such that the teacher overheard the rumor that this student had been called before the dean. This comes, of course, very close to an intermediate scope reading. Kratzer (1998) dubs such (apparent) intermediate scope readings as in (13) **??**, because they involve some functional mechanism and no genuine scope shifting[9]. For quite some time such functional readings have been taken to successfully represent intermediate scope readings. The most popular instantiations of such functional interpretations of exceptional wide and intermediate scope readings are the *choice function approaches* of Egli and von Heusinger (1995); Reinhart (1997); Winter (1997); Kratzer (1998), and others. These approaches and the problems that come with them will be discussed in detail in section 5.1.3.

[8]We will discuss the difference between these two positions, i.e. wide scope existential binding of a function and a free functional variable that is contextually bound, below in section 5.1.3.

[9]For lack of an appropriate alternative term, I will refer to the *readings* under discussion as *intermediate scope readings*, no matter whether there actually is a scope shifting mechanism involved or not. I will also speak of *(exceptional) wide scope readings*, even in cases when the theoretical approach under discussion does not assume a scope mechanism to be in use.

In the following, I will show that functional readings are readings of their own that can and should be distinguished from genuine intermediate scope readings, even if this distinction has gone unnoticed in the original literature. To distinguish between functional and genuine intermediate scope readings empirically, we will show that the two readings license different kinds of continuations.

Groenendijk and Stokhof (1984, section 3.4) point out that the difference between functional and non-functional pair-list readings is not only important in the context of questions (see also Krifka 2001), but also when it comes to scope phenomena. A functional continuation is licensed when there is a function that can be referred back to, while a pair-list continuation is licensed when there is a real dependency of one quantificational operator on another, i.e. a genuine narrow or intermediate scope reading. To illustrate how different continuation possibilities can reflect different scope readings consider the following example from (Ebert et al., 2009, their ex. (6a)).

(15) Every student will leave the party if some lecturer shows up.

Ebert et al. (2009) claim that (15) only has a run-of-the-mill wide scope reading and a functional wide scope reading, but no genuine intermediate scope reading, which is evidenced by the fact that (16a,b) are both possible continuations, but (16c) is not.

(16) a. Namely Prof. Humpty.
(enforces wide scope reading for the individual)

b. Namely, her supervisor.
(enforces functional wide scope reading)

c. #For Ann it is Prof. Hob, for Mary Prof. Nob, ...
(would enforce genuine intermediate scope reading)

Ebert et al. (2009) further argue that the reason for the missing intermediate scope reading has to do with the fact that there is no topic-comment structure embedding verb. According to their reasoning, genuine intermediate scope readings are only licensed if there is a topic-comment structure embedded in another (see Ebert et al. 2009 for details and section 5.2.2 below)[10].

At this point we have distinguished between functional wide scope and genuine intermediate scope readings empirically via their licensing continuation contexts. It is furthermore possible to show that the readings are actually distinct and logically independent. The following German example is from (Endriss, 2009, p. 137, ex. (4.49)). It shows that there are sentences that make the functional wide scope reading true and the genuine intermediate scope reading false in the same context (cf. Schwarz 2001a; Chierchia 2001 for related arguments and the same conclusion that functional readings have to be distinguished from intermediate scope readings).

[10]Kratzer (1998) makes a related prediction, namely that what we would call genuine intermediate scope readings arise only in the context of attitude verbs with a *de re* reading of an eventuality argument.

(17) Genau drei Studenten haben angekündigt, die Party sofort zu
exactly three students have announced the party immediately to
verlassen, wenn EIN Dozent kommt.
leave if some lecturer comes
'Exactly three students have announced that they will leave the party immediately if a/some lecturer shows up.'

This sentence arguably has four readings, a widest scope reading, a narrow scope reading, a functional wide scope reading and a genuine intermediate scope reading depending on the the interpretation of *EIN Dozent 'some lecturer'*. We will only be concerned with the latter two. The functional wide scope reading is true if there is a function f from students to lecturers such that exactly three students have announced that they would leave the party immediately if the lecturer assigned to the respective student by f turns up. For concreteness' sake, let us assume f is the supervisor function. The functional reading would be true in a scenario where three students, A, B, and C and no other students, have announced that they would leave if their respective supervisors, $\mathsf{S}_{\mathsf{of}\,A}$, $\mathsf{S}_{\mathsf{of}\,B}$, and $\mathsf{S}_{\mathsf{of}\,C}$, turn up. Let us furthermore assume that D has also announced that he would leave the party in case the lecturer of the advanced syntax course turns up and this lecturer is not his supervisor. In such a situation the functional reading would still be true – there is a function f, the supervisor function, and exactly three students x announced that they would leave the party if $f(x)$ turns up. But obviously, the genuine intermediate scope reading is false in this scenario, because it is not true that for exactly three students there is a certain (possibly different) lecturer such that the students announced that they would leave the party if this lecturer turns up. In fact, there are four such students. It can also easily be shown that these readings are different from the widest scope reading (where there has to be the same unpopular lecturer for all three students) and the narrowest scope reading (where the appearance of just one random lecturer would suffice to cause the three students to leave the party). To show that genuine intermediate scope readings and functional wide scope readings are actually distinct, one last step is missing: one would have to find readings that make the intermediate scope reading true, but the functional reading false. Obviously, if there are no restrictions on the kind of function that can be involved, it will be impossible to find intermediate scope readings that are not functional readings at the same time, because every pair-list assignment can also be expressed as a functional relation. We will elaborate on the nature of functions in functional readings in the following.

To distinguish between functional wide scope and genuine intermediate scope, it is inevitable to acknowledge the fact that the functions that we deal with in our formulae to represent functional readings have to be *natural*[11]. The difference between natural and non-natural functions is well-established in linguistics and primarily known from discussions about answers to *wh*-questions (see in particular Chierchia 1993; Sharvit 1997 for discussion). For the present purposes, it

[11]We will see below in section 5.1.3 that if we do not restrict the involved functions to natural functions, we run into serious problems, i.e. the functional approaches would predict readings that actually do not exist.

suffices to understand that pair-list enumerations do not constitute natural functions in the relevant sense. (Endriss, 2009, p. 92-95) suggests that natural functions have to be *nameable* and *informative*. So, for example, the correct translation of the formula in (14) would be: there is a *natural* function f into students such that each teacher x overheard the rumor that a student assigned to him via the function, i.e. $f(x)$, had been called before the dean. In particular this prevents 'unnatural' arbitrary pairings of teachers and students to count as instantiations of the function f, which means that genuine intermediate scope readings, i.e. simple pair-list readings, could not be derived via such a functional construal. Going back to example (17), it is now simple to imagine a scenario where the functional reading is false, but the genuine intermediate scope reading is true. Whenever there are exactly three students that announced that they would leave if a certain lecturer (a different one for each of them) turns up, but there is no nameable and informative concept for the relation between lecturer and student, the functional reading is false and the intermediate scope reading will be true.

Having carefully distinguished between genuine intermediate scope and functional wide scope, we can now see that genuine exceptional wide intermediate scope readings do in fact exist (see Schwarz 2001a; Chierchia 2001; Ebert and Endriss 2007; Endriss 2009; Ebert et al. 2009, who systematically distinguish between functional wide scope readings and genuine intermediate scope readings). While examples (12a,b) suggested the non-existence of intermediate scope readings and (13) as well as (15) could only establish the existence of functional wide scope readings, (17) demonstrates the existence of genuine (non-functional) intermediate scope readings. Further examples from the literature that arguably bear genuine intermediate scope readings in the sense discussed above come from (Farkas, 1981, p. 64, her ex. (17a), our ex. (18a)) and (Kratzer, 1998, p. 178, her ex. (22a), our ex. (18b) (based on an example from Abusch 1994)).

(18) a. Most linguists have looked at every analysis that solves some problem.

b. Everyone of them is moving to Stuttgart because some woman lives there.

The relevant reading of (18a) is: for most linguists there is a certain problem such that they have looked at every analysis that solves this problem. For (18b) it is: for everyone of a contextually determined set of people it holds that there is a certain woman such that he moved to Stuttgart because of this woman. Both readings are instances of genuine intermediate scope readings, which are distinguishable from the respective wide and narrow scope readings as well as the respective functional wide scope readings.

5 Further approaches to exceptional wide scope

Based on the observations of Fodor and Sag (1982) and the generally acknowledged fact that island-escaping intermediate scope readings exist and pose a challenge to their approach, a wealth of different kinds of solutions to the exceptionally wide scope behavior of indefinites has been proposed. I distinguish

between two main types of approaches: *pseudoscope approaches* and *scope based approaches*. As we have pointed out above, the assumption of island-free QR would be highly problematic in empirical as well as theoretical terms. Hence, all serious approaches to exceptional wide scope seek to circumvent this problem and propose some other mechanism to deal with the relevant readings. This includes what I call *scope based approaches* that allow for island-free scope shifting without recourse to an assumption of island-free QR.

5.1 Pseudoscope approaches

Pseudoscope approaches take the stance that what seem to be exceptional wide scope readings are actually not scope readings at all. The indefinite does not take actual scope outside the scope island, but some other interpretation mechanism makes it seem as if it was. The approach of Fodor and Sag (1982) is a prominent representative of a pseudoscope approach. In its island-escaping reading the indefinite is interpreted as a referential expression and hence it seems that it takes wide scope, although it is actually not scope-shifted and remains inside its island. Fodor and Sag (1982) argue that for this reading to come about the speaker has to have a referent in mind to which she wants to refer. And hence this approach is also a representative of *speaker's reference approaches*, which will be discussed in the following subsection. There are two more families of very influential pseudoscope approaches that will be examined: *domain restriction approaches* (subsection 5.1.2) and *choice function approaches* (subsection 5.1.3).

5.1.1 Speaker's reference approaches

Several solutions to the problem of exceptional wide scope rely on the idea that the speaker intends to refer to a certain referent he has in mind, which then invokes a referential-like reading of the indefinite with maximal scope. Apart from Fodor and Sag (1982), these are most prominently the approaches of Kratzer (1998); Bende-Farkas and Kamp (2001); Kamp and Bende-Farkas (2006); Kamp (2006); and Dekker (2002). While the approach of Fodor and Sag (1982) was motivated by the belief that intermediate scope readings do not exist, the other approaches can derive such readings by allowing the reader to have not only referents, but functions in mind. Consequently, speaker's reference approaches, if they allow for intermediate scope readings, can only derive functional wide scope readings, but not genuine intermediate scope readings.

Importantly, under this view, there is a speaker-hearer asymmetry involved that is crucial for this treatment of island-free scope readings. The speaker knows the referent (or some important property of it) and intends to refer to it, but all the hearer can acknowledge is the speaker's intent to refer to a certain referent without knowing which referent the speaker refers or intends to refer to. This referential view is closely related to the referential reading of definites (as opposed to their attributive readings), as argued for by Donnellan (1966) (see also Kripke 1977 and chapter *Speaker's reference and Smith's murderer* of this Companion).

The main point here is that there is an important distinction in the speaker's mind that sets specific readings apart from non-specific ones. So in the end, this

has nothing to do with scope. And hence ex. (11), without any scope-bearing element (apart from the indefinite), is subject to the same kind of ambiguity as e.g. ex. (1), where the indefinite is embedded in the *if*-clause island. This view does not distinguish between the two cases that other theories clearly set apart. Farkas (1994, 2002) refers to *epistemic specificity* when the speaker's state of mind is considered crucial and to *scopal specificity* when there are scopal differences involved.

All theories that treat exceptional wide scope readings as readings that come about due to a certain state of mind of the speaker have to develop a theory such that a speaker's intentions eventually enter semantics. After all, we are dealing with semantic ambiguities and different readings that are based on different truth conditions. Fodor and Sag (1982) develop such a theory based on a Kaplanian system of demonstrative interpretation, but with 'private ostension' determining the individual 'the speaker has in mind'. In their approach, a sentence containing a specific indefinite is true in the specific reading if and only if the intended referent fulfills the sentence predicate. It is not entirely clear whether all proponents of speaker's reference theories would subscribe to this view, which is disputable at the very least and has been questioned at several places. Ludlow and Neale (1991) construct scenarios of 'mischaracterization', where a speaker has a referent in mind and characterizes him as N, although in fact he is not an N and, even worse, no N exists. And (Endriss, 2009, pp. 127ff) builds scenarios of 'incorrect reference', where the speaker has a referent in mind that actually does not verify the sentence predicate, but another referent (also falling under the denotation of the indefinite's NP complement) does. These cases are closely related to the widely-discussed cases of mistaken identity for referentially used definites in Donnellan (1966)[12]. In these cases, the sentence under discussion would come out as false, although it would intuitively be judged as true, and there are parallel cases, where the opposite is the case. For further discussion and arguments against the referential treatment of indefinites or the claim that the speaker's referent has a direct influence on the truth conditions, see also Dekker (1998); Stalnaker (1998); and Dekker (2002).

Bende-Farkas and Kamp (2001) and Kamp and Bende-Farkas (2006) take the speaker-hearer asymmetry more seriously than it is usually done. They distinguish between the *specific use* and the *specific interpretation* of an indefinite. If an indefinite is used specifically, it has a mental representation – it is *anchored* – and the sentence containing the indefinite constitutes a singular proposition. Even if the hearer does not know what the anchor is, she can still recognize the speaker's intention to use this indefinite as an anchored one. If a hearer has a specific interpretation of an indefinite, she infers that an indefinite has been used specifically by the speaker, and builds her representation accordingly.

Interestingly, it is well known that not only the hearer does not have to be acquainted with a certain referent to understand it as specific, but also the speaker

[12] A classic example is a case where a speaker refers to a man with a glass of water in a martini glass as *the man drinking a martini* because she takes the substance in the glass to be martini. Strictly speaking (or 'semantically speaking'), the definite does not single out the man the speaker intends to refer to in this case (see, among others, Kripke 1977 and chapter *Speaker's reference and Smith's murderer* of this Companion).

can use an indefinite specifically although she does not have a specific referent in mind or does not have further identifying information (see e.g. Geurts 2010).

(19) (My grandmother told me that) I will inherit a fortune if some relative of mine dies. But I don't know who this is.

The first sentence of (19) clearly receives a specific reading in the sense that there is a certain relative of the speaker such that if this relative dies the speaker will inherit a fortune. Yet the speaker might not be able to identify the referent that makes the sentence true. There are two ways to save the speaker's reference approaches, even in cases where identifying the referent is impossible for the speaker. Either people resolve to the concept of *relative specificity* (see von Heusinger 2002), where the person selecting the verifying referent is not necessarily the speaker, but there can be some other person that specificity is relativized to (here: the grandmother). Others take the stance that specificity is strictly speaker-dependent, but the speaker does not have to have a referent in mind, but possibly an identifying property (in (19) this could be: the relative that owns a palace (and whose identity the speaker does not know)).

Both approaches are problematic in their own right and counterexamples to both of them have been brought up, among others, by Ludlow and Neale (1991); Umbach (2004); and Endriss (2009).

5.1.2 Domain restriction approaches

The last-mentioned view – that it is not necessarily a referent the speaker has in mind, but rather an identifying property of this referent – has been defended by a number of scholars based on different arguments (see, among others, Portner and Yabushita 2001; Schwarzschild 2002; Breheny 2003). Just as in the speaker's reference approaches, it is argued in these theories that there is a speaker-hearer asymmetry involved. But this time, the speaker does not intend to refer to a specific individual that is known to her, but there is an identifying property that this individual has and that is known to the speaker and (possibly) not to the hearer. If the speaker now utters an indefinite like *a horse*, she might actually mean to refer to *a horse with black coat that belongs to the speaker's neighbor*. So the restrictor of the DP denotation is implicitly restricted as is usually assumed to be the case for quantifiers in general. In this case, however, we are dealing with an extreme restriction to a singular such that the restrictor comprises only one element. The theory that has become most widespread among these extreme domain restriction theories is the one of Schwarzschild (2002). Schwarzschild (2002) refers to the speaker-hearer asymmetry as the *privacy principle* and as an indefinite where the restrictor is (implicitly) restricted to a singleton set as *singleton indefinte*. Let us reconsider example (1) from the beginning. If *relative of mine* is actually implicitly restricted to *relative of mine that owns a palace* and if there is only one such relative, the indefinite acts like a scopeless expression, because obviously there is no possibility for any variation with a c-commanding operator (here: the *if*-clause). After all, there is only one such object.

Crucially, indefinites can be singletons with respect to an operator that they

depend on. (Schwarzschild, 2002, p. 295, his ex. (13)) gives the following example.

(20) Every boy voted for a movie that his mother said was her favorite.

The assumption here is that the indefinite is still a singleton indefinite, but this time a singleton indefinite that depends on another operator, namely *every boy*: there is only one movie *per boy* that the boy's mother said was her favorite. This assumption then accounts for intermediate scope readings. For example, (18a) is interpreted as involving some implicit domain restriction of the indefinite such that it may read as *Most linguists have looked at every analysis that solves some problem that they have worked on most extensively*. The restrictor set of the indefinite is, by assumption, implicitly narrowed down in such a way that it contains only one problem per linguist. That is, for most linguists there exists exactly one problem that the linguist has worked on most extensively and the linguist has looked at every analysis that solves this problem. This reading is actually a functional wide scope reading, which, as we have discussed above, looks very similar to the intermediate scope reading.

Domain restriction approaches are subject to the same kind of problems as speaker's reference approaches (in particular the problematic view that the epistemic state of the speaker influences truth conditions and the related problem of the assignment of false truth conditions in cases of 'mischaracterization' or incorrect reference).

5.1.3 Choice function approaches

The choice function approaches are the most popular ones among the proposals towards the handling of exceptional wide scope phenomena. In these approaches (see, among others, Egli and von Heusinger 1995; Reinhart 1997; Winter 1997; Kratzer 1998; Matthewson 1999) it is assumed that indefinites can be interpreted via choice functions. A choice function is a function that, when applied to a set, yields an element of that set (the definition below is based on the formulation in Reinhart 1997).

(21) Choice Function:

$$\mathsf{CF}(f_{\langle\langle e,t\rangle,e\rangle}) \leftrightarrow \forall X_{\langle e,t\rangle}[X \neq \emptyset \rightarrow f(X) \in X]$$

A choice function representation for the exceptional wide scope reading of ex. (1) would look as follows:

(22) $\exists f[\mathsf{CF}(f) \wedge [\mathsf{die}(f(\mathsf{relative})) \rightarrow \mathsf{inherit\_fortune}(\mathsf{speaker})]]$

The formula can be phrased as: there is a choice function f and if the element selected by this function, when applied to the set of the speaker's relatives, dies then the speaker will inherit a fortune. In this formula the choice function is existentially bound at the outermost position via a mechanism of *unselective binding*. That is, an indefinite like *a relative* is translated as $f(\mathsf{relative})$ and the free variable f of the term then gets existentially bound via this binding mechanism.

In fact, there is disagreement about the question whether choice functions need to be existentially bound or whether they are better interpreted as free variables that get bound by context. The first position is most prominently defended by Reinhart (1997) and Winter (1997), the second by Kratzer (1998).

The advantage of these approaches is evident: the indefinite stays *in situ*, i.e. no exceptional wide dislocation mechanism has to be assumed, and yet the wide scope reading can be derived. We will see later on that it is in fact exactly this alleged advantage, the *in situ* interpretation of the indefinite, which is the source for a wealth of different problems that the choice function approaches struggle with.

For the moment, however, note that there is one other crucial fact that falls out immediately from this choice-functional treatment of indefinites, namely the locality of distributivity (see the discussion around ex. (8) above). Under the assumption that an indefinite like *three relatives of mine* denotes a set of plural individuals or a set of sets with three members each, a choice function interpretation of ex. (8), repeated below as (23a), yields the correct result (see Winter 1997 for discussion).

(23) a. If three relatives of mine die, I will inherit a fortune.

b. $\exists f[\mathsf{CF}(f) \wedge [\mathsf{die}(f(\mathsf{3relatives\_of\_speaker})) \rightarrow \mathsf{inherit\_fortune}(\mathsf{speaker})]]$

As the indefinite stays *in situ*, it is expected that also its distributive properties stay inside the boundaries of the *if*-clause island. Hence what is derived, is a collective wide scope reading: there is a choice function f and if the element chosen by f applied to the set of plural individuals of three relatives of the speaker dies, then the speaker inherits a fortune. As *die* is a distributive verb, the three relatives under discussion have to die separately, which means that some distributivity operator is applied. This operator is triggered by the verb, however, and is hence predicted to operate strictly locally. Distributivity stays local. And this is the reading that is empirically attested. In this respect, the choice function approach fares much better than any wide dislocation mechanism like QR which would predict wide scope distributive readings, as shown above.

It also performs much better than unselective binding mechanisms for individual variables. In Heim's (1982) approach, indefinites denote free restricted individual variables that can be unselectively bound. The indefinite *a relative* is translated as $\mathsf{relative}(x)$ and the variable x can then be existentially closed. In this approach it has to be prohibited that the variable gets bound from outside an *if*-clause, because binding the individual variable from an outermost closure position would yield readings that actually do not exist (as was noted by Heim 1982 already) and does not represent the exceptional wide scope reading we are after. Consider the representation in (24) as an incorrect representation of the wide scope reading of (1).

(24) $\exists x[[\mathsf{relative}(x) \wedge \mathsf{die}(x))] \rightarrow \mathsf{inherit\_fortune}(\mathsf{speaker})]$

If the *if*-clause is treated as material implication, the formula would be true just in case there exist non-relatives of the speaker, because the antecedent of the *if*-clause could be made false by choosing such a non-relative as value for x. As

an implication with a false antecedent is always true, the entire formula would be true in this case. This problem is sometimes referred to as the *Donald Duck problem* in the literature, going back to discussions in Reinhart (1992, 1997). This is so because – under the assumption that Donald Duck does not satisfy the restrictor predicate (here: is not a relative of the speaker) – the existence of Donald Duck makes the formula true and thus trivializes the truth conditions. Crucially, the fact that the unselective binding mechanism yields wrong results does not hinge on a material implication analysis of *if*-clauses. Equally wrong results are derived under a different treatment of *if*-clauses (e.g. the closest world semantics of Lewis and Stalnaker; see Endriss 2009, p. 154) and in other (downward entailing) contexts. As we have seen, a choice function approach, in contrast, yields the correct results at least for the exceptional wide scope reading of ex. (1).

Reinhart (1997) argues that indefinites are lexically ambiguous between a choice function interpretation and a quantificational one. The choice function interpretation derives the (possibly exceptional) wide scope reading, the quantificational interpretation the narrow scope reading. In contrast to that, Winter (1997) takes it that indefinites are always interpreted via choice functions. Both approaches allow for existential binding from any possible position. Hence, also the narrow scope reading can be represented by a choice function reading of the indefinite with low existential binding.

(25) $\exists f[\mathsf{CF}(f) \wedge \mathsf{die}(f(\mathsf{relative}))] \rightarrow \mathsf{inherit\_fortune}(\mathsf{speaker})$

In words: if there is a choice function f and the element selected from the set of relatives of the speaker, dies, then the speaker inherits a fortune. This is equivalent to the narrow scope reading of the indefinite.

When the first choice function approaches to exceptional wide scope were proposed, the subtle difference between genuine intermediate scope and functional wide scope that we discussed in section 4 was not in focus. These approaches set out to derive exceptional wide and (what looks as) intermediate scope without distinguishing genuine intermediate and functional scope readings. With the background we have, we will, however, stick to the differentiation between functional and genuine readings, when it plays a potential role. Whenever the exact derivation mechanism of the reading is irrelevant and we discuss readings as such, I will refer to them as 'intermediate scope readings', meaning readings that look as if there is an intermediate scope taker (even if the reading actually comes about via some functional mechanism and not by way of genuine scope taking).

Intermediate scope readings are easily accounted for in the Reinhart-/Winter-style choice function approaches, where the choice function variable can be existentially closed at any position. For the intermediate scope reading, existential closure is inserted at an intermediate position, i.e. above some scope operator and yet below another. Clearly, nothing prevents the choice function approaches of Reinhart (1997) and Winter (1997), which rely on the assumption of free existential closure at any position, from deriving intermediate scope readings also for sentences that arguably do not support such a reading, as e.g. (12a,b).

This shortcoming is the point of departure for Kratzer's (1998) approach.

She takes Fodor and Sag's (1982) insight that certain sentences lack intermediate scope readings seriously and starts out from the contrast between (12a) and (13), repeated below in (26a,b).

(26) a. Each teacher overheard the rumor that a student of mine had been called before the dean.

b. Each teacher$_i$ overheard the rumor that a student of his$_i$ had been called before the dean.

(26a) supports only the exceptional wide scope reading and a narrow scope reading for the indefinite, while (26b) seems to allow for an intermediate scope reading. In our terminology and with the background introduced in section 4, it is, however, not a genuine intermediate scope reading we are dealing with in (26b), but actually what we would refer to as a functional reading. It is this functional reading and the fact that (26a) is missing this reading that motivates Kratzer's (1998) choice function approach. She argues that specific or referential indefinites can be interpreted via choice functions, but these functions are not existentially bound, but left free so that their value will be determined by context. This has a very similar effect as binding the choice function only at outermost position (cf. Matthewson 1999 for such a proposal). A Kratzer-style choice function representation of sentence (26a) looks as follows.

(27) $\forall x[\mathsf{teacher}(x) \rightarrow \mathsf{overhear}(x, \mathsf{send\_to\_dean}(f(\mathsf{student\ of\ speaker})))]$

The function variable f is interpreted as a free choice function. There is no possibility for variation and hence this approach predicts only this widest scope reading for the indefinite (and a narrow scope reading that is derived via a quantificational interpretation of the indefinite). Crucially, the approach correctly predicts no intermediate scope reading. Comparing this to sentence (26b), one observes that for this sentence there is a reading where the indefinite is dependent on the outermost quantifier *each teacher*. Kratzer argues that this dependence is triggered by the fact that there is a bound pronoun within the argument of the choice function[13]. These pronouns have to be bound to the person that is in the position to identify the referent under discussion; in this case this would be the respective teachers. This means that the choice function has to be parameterized towards the quantifier that binds the pronoun. A formal representation of (26b) is given below.

(28) $\forall x[\mathsf{teacher}(x) \rightarrow \mathsf{overhear}(x, \mathsf{send\_to\_dean}(f_x(\mathsf{student\ of}\ x)))]$

While $f(\mathsf{student\ of\ speaker})$ in (27) will necessarily yield the same result in all possible contexts, $f_x(\mathsf{student\ of}\ x)$ in (28) may yield different values for different choices of teachers, which makes it possible to interpret the value of the indefinite as co-varying with the teachers.

The difference in the availability of intermediate scope readings for (26a) and (26b) is Kratzer's main argument against the free closure mechanism of Reinhart

[13]Overt bound pronouns are not the only source for dependent, i.e. apparent intermediate scope, readings. They can also be triggered by covert implicit arguments of adjectives like *certain* or *local* and particular contextual factors.

and Winter. Further evidence for her approach comes from minimal pairs such as (29a,b). These examples have been brought up by (Chierchia, 2001, ex. (48a), (49a), p. 73) (based on similar examples from Jason Stanley that he presented at the Cornell Conference on Pragmatics 1999).

(29) a. Every student was examined by every professor competent in some problem.

b. Every professor competent in some problem examined every student.

(29a) seems to support an intermediate scope reading, but (29b) does not. This can be explained as a weak crossover effect in Kratzer's (1998) account, because for the intermediate scope reading to arise the indefinite has to contain a covert variable. To bind this variable in (29b), *every student* would have to be raised over this indefinite resulting in a weak crossover configuration[14].

Having discussed the different variants of the choice function approaches, I will show in the following that all these approaches suffer from one or other problem. These problems have been discussed extensively in the literature. For reasons of space, I cannot present all of them, but I will mention the most prominent of the problems. Additionally, I point the reader to Ruys (1999); Geurts (2000); von Stechow (2000); Chierchia (2001); Endriss (2009) for further discussion. Before going into the heart of the subject, I would like to stress that most of the inadequacies of the choice function approaches actually stem from the fact that the indefinite is interpreted *in situ*. In other words, what has been advocated as the main advantage of these approaches turns out to be their main disadvantage at the same time. Furthermore, it is worth mentioning that not all choice function approaches are subject to the same kind of criticism, as we will see below.

A well-acknowledged problem arises from the original choice function definition in (21), repeated below, and led to different solutions that have been proposed by the proponents of the choice function approaches.

(30) Choice Function:

$$\mathsf{CF}(f_{\langle\langle e,t\rangle,e\rangle}) \leftrightarrow \forall X_{\langle e,t\rangle}[X \neq \emptyset \rightarrow f(X) \in X]$$

The problem is usually referred to as the *empty set problem*. Take the sentence *Yesterday, I met with an ex-wife of Pope Francis*. The indefinite *an ex-wife of Pope Francis* has an empty restrictor set, since there is no ex-wife of the Pope. According to our intuitions, the sentence must be false. Yet, according to the above choice function definition, it would come out as true, because $X \neq \emptyset$ is false and hence $f(X)$ can return any arbitrary element that makes the sentence predicate

[14] A similar argument can be made for the non-availability of a functional wide scope reading for (12b) above: the functional element attached to *a student* cannot be bound to *each teacher*, because this would lead to a weak crossover configuration. This is evidenced by the fact that adding an overt bound pronoun leads to ungrammaticality (see Chierchia 2001, section 3.1 for a related example and relevant discussion). And hence a functional wide scope reading is excluded. Further arguments can be found in Schlenker (2006) (see also Szabolcsi 2010, pp. 96-102 for discussion).

true. In other words, as long as the speaker met someone the day before, the sentence would come out as true. In order to overcome this unwanted result, different solutions have been proposed. Geurts (2000) defines a special object $*$ that does not satisfy any predicate to handle such cases, Reinhart (1997) suggests making use of partial functions such that sentences like the pope example above would come out as undefined under a wide scope reading of the indefinite. And Winter (1997) lifts the type of choice functions such that they take a set and return a generalized quantifier and not just an element of the set[15]. If a choice function is applied to an empty set it returns the empty set quantifier, which then, applied to any predicate, makes the sentence false.

While there are different solutions to the *empty set problem*, it is actually only an instance of a more general problem that I would like to refer to as the *Reniers problem*, because to my knowledge it has first been discussed in Reniers (1997) in its general form. Like the *empty set problem* (and also related to the *Donald Duck problem* with an unselective binding mechanism for individual variables) it is a result of the fact that the indefinite stays *in situ*, but the choice function is bound from an outside position. Reniers (1997) points out that the choice function approaches cannot derive the correct representations for sentences where indefinites are embedded in downward entailing contexts, if there are no further restrictions on the choice functions (see also Chierchia 2001, and Endriss 2009, pp. 168-170).

(31) 1. *No girl$_i$ hates a horse she$_i$ rode.*

2. $\exists f[\mathsf{CF}(f) \wedge \neg\exists x[\mathsf{girl}(x) \wedge \mathsf{hate}(x, f_x(\mathsf{horse\_x\_rode}))]]$

3. $\neg\exists x[\mathsf{girl}(x) \wedge \exists y[\mathsf{horse\_x\_rode}(y) \wedge \mathsf{hate}(x, y)]]$

The choice function approaches then derive readings that actually do not exist. The most prominent reading of (31a) is the narrow scope reading of the indefinite, as illustrated in (31c). But nothing prevents the derivation of the wide scope choice function representation in (31b). This representation does not reflect the wide scope reading of the indefinite, however, but represents a reading the sentence does not have – at least, if no further restrictions are imposed on the choice functions that are involved. The formula in (31b) is true in all models where every girl does not hate all horses she rode. In such scenarios, one can easily find a function f that maps each girl to a horse she actually does not hate. Here, it would be true that no girl hates the horse f assigns to her. The formula thus is true for cases that reflect readings the sentence actually does not have. It would be appropriate to reflect the reading of: *No girl hates all the horses she rode*.

If, however, one restricts choice functions to natural functions, the approaches undergenerate: they cannot derive all readings that are existent. They fail to derive readings that we would refer to as genuine intermediate scope readings (see in particular Geurts 2000; Chierchia 2001; Schwarz 2001a, and Endriss 2009, pp. 165-181 for discussion). Hence, depending on the exact formulations of the approaches, they either overgenerate or undergenerate. Although Kratzer's (1998)

[15] To be more precise, the choice function returns the principal ultrafilter $\lambda P.P(a)$ generated from the element a, which is an element of the argument set of the choice function.

approach is the one best equipped to handle the problematic readings, her approach is also prone to certain instances of the *Reniers problem*, namely when it comes to negations of intermediate scope readings as in *Not every linguist studied every conceivable solution that some problem might have* (from Chierchia 2001), i.e. also her approach cannot account for all readings that arguably exist. Chierchia (2001) introduces the relevant examples; reactions can be found in Kratzer (2003); and (Endriss, 2009, pp. 170-174) re-evaluates the discussions and brings forth further problematic cases of a different kind. (Endriss, 2009, pp. 175) concludes that all arguments that have been put forth for the choice function approaches are actually only arguments for the fact that there exist exceptional wide functional readings, just as there exist functional readings in general (pace Winter 2004). That is, also indefinites like *more than three horses*, which are known to be unable to escape scope islands, support functional readings, but these are harder to detect and hence often overlooked. In other words, the matter of functionality is orthogonal to the matter of exceptional wide scope. To account for the full range of exceptional wide scope readings, one hence needs a functional mechanism (to account for functional readings) and a scope shifting mechanism (to account for genuine intermediate scope readings). Schwarz (2001a) and Endriss (2009) make most explicit that it is hence impossible to derive all kinds of readings without applying a mechanism that effectively shifts the scope of the involved indefinite. In the next section, we will briefly introduce two families of approaches that make use of genuine scope shifting mechanisms as opposed to the pseudoscope approaches that were discussed in this section.

5.2 Scope based approaches

One of the first to propose a scope shifting mechanism to exceptional wide scope was Abusch (1994), who makes use of a Cooper storage mechanism. The more recent ones can be distinguished into *presupposition based approaches* and *topicality based approaches*.

5.2.1 Presupposition based approaches

Several authors explain exceptional wide scope via presupposition accommodation. Two of the first approaches in this vein are van Geenhoven (1998) and Yeom (1998). Van Geenhoven (1998) argues that indefinites can either denote predicates that can be incorporated by the verb or, when they are specific, they introduce a free variable that triggers the presupposition that there is an individual satisfying the description. Yeom (1998) argues that ordinary indefinites are ambiguous between a specific and a quantificational reading, but *certain*-indefinites in English only denote specific indefinites. These indefinites presuppose the existence of their referent and someone's (not necessarily the speaker's) cognitive contact with it. That is, Yeom's approach combines certain aspects of the speaker's reference approaches with the presuppositional approaches. The presuppositions that, according to these approaches, come with specifically used indefinites have to be resolved via presupposition accommodation. When more than one operator is involved, there is not only one position for the presupposition to be

evaluated. The presupposition can be accommodated locally, globally, or at an intermediate position. Being a pragmatic mechanism, presupposition accommodation is not expected to be subject to any island constraints and hence it is predicted that indefinites can scope out of islands via such a mechanism. The difference between widest scope and intermediate scope can be captured by global vs. intermediate accommodation of presuppositions. As intermediate accommodation is dispreferred over global accommodation in general, this explains why intermediate scope readings are often marginal. Deriving intermediate scope via accommodation, these approaches establish genuine scope readings and thereby genuine intermediate scope and not only functional wide scope. They thus do not run into the problems of the pseudoscope approaches, discussed in the previous section. Other approaches relying on the idea of accommodation to account for specific readings of indefinites are: Krifka (2001); Geurts (2010); Jäger (2007) (see Endriss 2009, pp. 138-152 for further discussion and problems[16] of these approaches).

5.2.2 Topicality based approaches

Finally, there are approaches where topicality plays a crucial role for the explanation of exceptional wide scope readings: Cresti (1995) and Endriss (2009). While Cresti (1995) bases her proposal on a notion of discourse topicality, for Endriss (2009) it is the aboutness-topical status of an indefinite that is responsible for its wide scope behavior. Inspired by a familiarity view of topicality, i.e. the conviction that topics are usually familiar in the discourse, Cresti (1995) argues that a topic-marked constituent bears an existence presupposition. When an indefinite, which introduces a new referent into the discourse, is marked for topicality, it also triggers a presupposition that there exists an entity fulfilling the indefinite's restrictive predicate. This presupposition again has to be accommodated as in the approaches discussed in the previous section. So Cresti's approach is a presuppositional approach, but one where the presupposition is triggered by the topical status of the indefinite.

In Endriss' (2009) approach, it is also the topical status of the indefinite that causes its wide scope interpretation. The main motivation for this kind of explanation is the fact that the same quantifiers that show exceptional wide scope can be topic-marked in languages that have syntactic or morphological topic-marking strategies. And what is more, whenever one observes these quantifiers as being topic-marked, they are interpreted as taking (possibly exceptional) wide scope. Endriss (2009) shows this especially for German and the topic-marking strategy of left-dislocation, but discusses also other means of topic-marking like e.g. *wa*-marking in Japanese. Crucially, it turns out that, across languages, the limited class of wide scope indefinites comprises exactly the same elements as the class of topic-able quantifiers. For this reason, the two phenomena are traced back to the same source. Building on the aboutness topic concept of Reinhart

[16]One of the most obvious problems of these approaches is of conceptual nature. It has to be assumed that a specific indefinite comes with a very special kind of presupposition, namely one that has to be always accommodated. Binding is no option, because indefinites introduce new discourse referents.

(1981) and ideas in Jacobs (1984) and Searle (1969), Endriss (2009) argues that topics are introduced in a separate speech act of topic introduction and only afterwards the actual speech act of assertion (or question or command, etc.) is performed. In other words, topics come first, because they are what the speaker wants to talk about and what consequently has to be established first. This is responsible for the wide scope effect of topical indefinites.

Following Reinhart (1981), the aboutness topic is understood to be the *address* where the information conveyed by the sentence will be stored during the context update. Quantifiers do not provide sensible addresses per se, but some of them, indefinites, make available representatives that stand proxy for them and can serve as the anchor for the information update. Formally, the minimal witness set of the quantifier serves as this representative. We assume that an utterance is structured into a topic part α_T, which is the indefinite in our case, and a comment part α_C. The schematic interpretation of an assertion with a topic-marked indefinite α_T and a comment α_C is then as follows.

(32) $\mathsf{Topic}\big(\exists P[\mathsf{MW}(P, \alpha_T)]\big)\ \&\ \mathsf{Assert}\big(\alpha_C(\mathcal{F}(P))\big)$

In a separate speech act, i.e. a topic-establishing speech act (cf. Jacobs, 1984), the discourse referent for the representative P of the topical quantifier α_T is created. In a next step, P is treated as the argument of the comment part α_C. For all technical details, in particular what concerns the process of finding a suitable representative of a quantifier, when it succeeds and when it fails, formal definitions of minimal witness sets, and the function[17] $\mathcal{F}$, we refer the reader to Endriss (2009). Importantly for our concerns, the topical quantifier α_T takes necessarily wide scope over all operators in α_C, because the commmon ground is first updated with the topic-establishing speech act, before it will be updated with the comment part.

Because the proposed mechanism is not syntactic, but discourse-pragmatic, it is again expected that this mechanism is not island-sensitive. Intermediate scope readings are established via the independently motivated assumption of nested topic-comment structures (see also Ebert et al. 2009). Only when we have a topic-comment structure embedded in another one can we expect intermediate scope readings. Operators that embed topic-comment structures are in particular clause-embedding operators such as *say*, *report*, etc. Like in the presuppositional approaches, this mechanism derives genuine intermediate scope readings and not only functional wide scope ones. The functional readings are triggered by functional expressions, but derived by the same underlying scope mechanism as non-functional readings.

Consider the following example from Endriss (2009).

(33) *(Last week, I went to a horse-race every day. It was funny:)*

1. #Alle Pferde haben alle Rennen gewonnen, die an EInem Tag
   All horses had all races won that at one day
   stattfanden.
   took-place

[17] In a nutshell, it is a type-shifting operator that lifts P to the correct type to be an argument of α_C.

'All horses won all races that had taken place on one day.'

2. Von allen Pferden wurde berichtet, sie hätten alle Rennen
   Of all horses was reported they had all races
   gewonnen, die an EInem Tag stattgefunden hatten.
   won that at one day taken-place had
   'All horses were reported to have won all races that had taken place on one day.'

(33a) is odd. The intermediate scope reading, however, which apparently is not available, would be a reasonable one: each horse had a lucky day on which it won all races. Although this reading is the only one that would make sense, it becomes only available when a topic-comment structure embedding operator is inserted, i.e. *berichten* (*to report*, see (33b)).

The fact that only certain quantifiers are topic-able and others are not is explained by an interplay of the lexical semantics of quantifiers and the interpretation mechanism of topical entities, which is responsible for the wide scope interpretation of topic-marked indefinites in the end (see Endriss 2009 for details).

6 Final remarks

The subtlety of judgements about the availability of exceptional wide scope and intermediate scope readings for certain indefinites in certain configurations call for experimental investigations in this domain. Questions that should be and partly have been investigated are: 1. which indefinites allow for exceptional wide scope in which language (see Martí 2007 and Alonso-Ovalle and Menéndez-Benito 2013 for an investigation of Spanish indefinites and Ionin 2010a, Ionin 2010b, Ionin to appear-a, as well as Ionin to appear-b for English), 2. are there language-specific differences (see Ionin et al. 2011 for English vs. German indefinites), 3. are there differences concerning the wide scope behavior between different indefinites within one language (see Ionin 2010a for an investigation of *a* vs. *a certain* and Ionin 2010b for a comparison of the behavior of *a*, *a certain*, *one*, and modified numerals like *at least one*), 4. are intermediate scope readings and functional readings readily available and for which indefinites in which contexts (see Alonso-Ovalle and Menéndez-Benito 2008 for an investigation of Spanish indefinites and Ionin 2010a for experimental investigations of English indefinites)? Experimental research in this field has mainly focused on English and Spanish so far. Further – especially cross-linguistic – investigations are still outstanding.

References

Dorit Abusch. The Scope of Indefinites. *Natural Language Semantics*, 2:83–135, 1994.

Luis Alonso-Ovalle and Paula Menéndez-Benito. Another Look at Indefinites in Islands. University of Massachusetts Amherst and Boston, 2008.

Luis Alonso-Ovalle and Paula Menéndez-Benito. Exceptional Scope: The Case of Spanish. In Cornelia Ebert and Stefan Hinterwimmer, editors, *Different Kinds of Specificity Across Languages*, Studies in Linguistics and Philosophy, pages 123–153. Springer, Dordrecht, 2013.

Filippo Beghelli and Tim Stowell. Distributivity and Negation. In Anna Szabolcsi, editor, *Ways of Scope Taking*, pages 71–108. Kluwer Academic Publishers, Dordrecht, 1997.

Ágnes Bende-Farkas and Hans Kamp. Indefinites and Binding: From Specificity to Incorporation. Lecture notes (revised version) for 13th ESSLLI, Helsinki, 2001.

Richard Breheny. Exceptional-Scope Indefinites and Domain Restriction. In Matthias Weisgerber, editor, *Proceedings of the conference 'sub 7 – Sinn und Bedeutung'. 7th annual meeting of the Gesellschaft für Semantik*, number 114 in Konstanzer Arbeitspapiere Linguistik, pages 38–52. Fachbereich Sprachwissenschaft, Universität Konstanz, 2003.

Gennaro Chierchia. Questions with Quantifiers. *Natural Language Semantics*, 1: 181–234, 1993.

Gennaro Chierchia. A Puzzle About Indefinites. In Carlo Cecchetto, Gennaro Chierchia, and Maria Teresa Guasti, editors, *Semantic Interfaces*. CSLI Publications, Stanford, 2001.

Diana Cresti. *Indefinite Topics*. PhD thesis, MIT, 1995.

Paul Dekker. Speaker's Reference, Descriptions, and Information Structure. *Journal of Semantics*, 15(4):305–334, 1998.

Paul Dekker. A Pragmatic View upon Indefinites. In Klaus van Heusinger, Ruth Kempson, and Wilfried Meyer-Viol, editors, *Proceedings of the Workshop "Choice Functions and Natural Language Semantics"*, Arbeitspapier 110 des Fachbereichs Sprachwissenschaft, pages 17–34, Konstanz, 2002. Universität Konstanz.

Keith S. Donnellan. Reference and Definite Descriptions. *The Philosophical Review*, pages 7281–304, 1966.

Christian Ebert and Cornelia Endriss. Functional Topics. In Estela Puig-Waldmüller, editor, *Proceedings of the Sinn und Bedeutung XI*, pages 194–208. Universitat Pompeu Fabra, Barcelona, 2007.

Christian Ebert, Cornelia Endriss, and Stefan Hinterwimmer. Embedding Topic-Comment Structures Results in Intermediate Scope Readings. In Martin Walkow Muhammad Abdurrahman, Anisa Schardl, editor, *Proceedings of NELS 38*, Amherst, 2009. GLSA.

Urs Egli and Klaus von Heusinger. The Epsilon Operator and E-Type Pronouns. In Urs Egli, Peter E. Pause, Christoph Schwarze, Arnim von Stechow, and Götz Wienold, editors, *Lexical Knowledge in the Organization of Language*, number 114

in Current Issues in Linguistic Theory, pages 121–141, Amsterdam, 1995. Benjamins.

Murvet Enç. The Semantics of Specificity. *Linguistic Inquiry*, 22(1), 1991.

Cornelia Endriss. *Quantificational Topics. A Scopal Treatment of Exceptional Wide Scope Phenomena*. Studies in Linguistics and Philosophy. Springer, 2009.

Donka Farkas. Quantifier Scope and Syntactic Islands. *CLS*, 17:59–66, 1981.

Donka Farkas. Specificity and Scope. In Lea Nash and Georges Tsoulas, editors, *Actes du Premier Colloque. Langues & Grammaire*, volume 8, pages 119–137. Université Paris, Paris, 1994.

Donka Farkas. Varieties of Indefinites. In Brendan Jackson, editor, *Proceedings of SALT 12*, Ithaca, NY, 2002. Cornell University.

Janet Fodor and Ivan Sag. Referential and Quantificational Indefinites. *Linguistics & Philosophy*, 5:355–398, 1982.

Veerle van Geenhoven. *Semantic Incorporation and Indefinite Descriptions*. CSLI Publications, Stanford, 1998.

Bart Geurts. Indefinites and Choice Functions. *Linguistic Inquiry*, 31:731–738, 2000.

Bart Geurts. Specific Indefinites, Presupposition, and Scope. In Rainer Bäuerle, Uwe Reyle, and Thomas Ede Zimmermann, editors, *Presuppositions and Discourse: Essays Offered to Hans Kamp*, pages 125–158. Emerald Group Pub, Bingley, 2010.

Jeroen Groenendijk and Martin Stokhof. *Studies on the Semantics of Questions and the Pragmatics of Answers*. PhD thesis, University of Amsterdam, Amsterdam, 1984.

Irene Heim. *The Semantics of Definite and Indefinite Noun Phrases*. PhD thesis, University of Massachusetts, Amherst, 1982.

Irene Heim and Angelika Kratzer. *Semantics in Generative Grammar*. Blackwell Publishers, Massachusetts, 1998.

Klaus von Heusinger. Relative Specificity. In Graham Katz, Sabine Reinhard, and Philip Reuter, editors, *Sinn und Bedeutung 6. Proceedings of the Sixth Meeting of the Gesellschaft für Semantik*, pages 115–131. Universität Osnabrück, Institut für Kognitionswissenschaft, 2002.

Tania Ionin. The Scope of Indefinites: An Experimental Investigation. *Natural Language Semantics*, 18(3):295–350, 2010a.

Tania Ionin. An Experimental Study on the Scope of (Un)modified Indefinites. *International Review of Pragmatics*, 2:228–265, 2010b.

Tania Ionin. Some Indefinites Scope Out of Islands: An Experimental Investigation. In A. Aguilar-Guevara, J. Zwarts, and B. Le Bruyn, editors, *Weak Referentiality*, Studies in Language Companion Series. John Benjamin, to appear-a.

Tania Ionin. Certain Properties of Certain Indefinites: An Experimental Perspective. In Luis Alonso-Ovalle and Paula Menéndez-Benito, editors, *Epistemic Indefinites*. Oxford University Press, to appear-b.

Tania Ionin, Cornelia Ebert, and Britta Stolterfoht. One Indefinite Scopes Out of Islands: An Experimental Study of Long-Distance Scope in English and German. Poster presented at 50 Years of Linguistics at MIT: A Scientific Reunion, Massachusetts Institute of Technology, December 9-11, 2011.

Georgette Ioup. Specificity and the Interpretation of Quantifiers. *Linguistics and Philosophy*, 1(2):233–245, 1977.

Joachim Jacobs. Funktionale Satzperspektive und Illokutionssemantik. *Linguistische Berichte*, 91:25–58, 1984.

Gerhard Jäger. Partial Variables and Specificity. In Uli Sauerland and Penka Stateva, editors, *Presupposition and Implicature in Compositional Semantics*, pages 121–162. Palgrave McMillan, 2007.

Hans Kamp. Dividing the Proving of Indefinite Nown Phrase Usee into Three Parts. manuscript, 2006.

Hans Kamp and Ágnes Bende-Farkas. Epistemic Specificity from a Ccommunication-theoretic Perspective. manuscript, 2006.

Ruth Kempson and Wilfried Meyer-Viol. Indefinites and Scope Choice. In Marga Reimer and Anne Bezuidenhout, editors, *Descriptions and Beyond: An Interdisciplinary Collection of Essays on Definite and Indefinite Descriptions and other Related Phenomena*. Oxford University Press, Oxford, 2004.

Jeffrey King. Are Indefinite Descriptions Ambiguous? *Philosophical Studies*, 53: 417–440, 1988.

Angelika Kratzer. Scope or Pseudoscope? Are there Wide-Scope Indefinites? In Susan Rothstein, editor, *Events and Grammar*, pages 163–196. Kluwer Academic Publishers, Dordrecht, 1998.

Angelika Kratzer. A Note on Choice Functions in Context. Ms, 2003.

Manfred Krifka. Non-novel Indefinites in Adverbial Quantification. In Cleo Condoravdi and Gerard R. Renardel de Lavalette, editors, *Logical Perspectives on Language and Information*, pages 1–40. CSLI Publications, Stanford, 2001.

Saul Kripke. Speaker's Reference and Semantic Reference. *Midwest Studies in Philosophy*, 13:255–276, 1977.

Peter Ludlow and Stephen Neale. Indefinite Descriptions: In Defense of Russell. *Linguistics and Philosophy*, 14(2):171–202, 1991.

Luisa Martí. Spanish *algunos* and the Syntactic Sensitivity of Indefiniteness. CASTL/Universitetet i Tromsø, Norway, 2005.

Luisa Martí. Restoring Indefinites to Normalcy: an Experimental Study on the Scope of Spanish *algunos*. *Journal of Semantics*, 24:1–25, 2007.

Lisa Matthewson. On the Interpretation of Wide-scope Indefinites. *Natural Language Semantics*, 7:79–134, 1999.

Paul Portner and Katsuhiko Yabushita. Specific Indefinites and the Information Structure Theory of Topics. *Journal of Semantics*, 18:221–297, 2001.

Willard van Orman Quine. Quantifiers and Propositional Attitudes. *Journal of Philosophy*, 53:177–187, 1956.

Tanya Reinhart. Pragmatics and Linguistics. An Analysis of Sentence Topics. *Philosophica*, 27:53–94, 1981.

Tanya Reinhart. Wh-in-situ: an Apparent Paradox. In Paul Dekker and Martin Stokhof, editors, *Proceedings of the 8th Amsterdam Colloquium*, 1992.

Tanya Reinhart. Quantifier Scope: How Labour is divided between QR and Choice Functions. *Linguistics & Philosophy*, 20:335–397, 1997.

Fabien Reniers. How to (S)cope with Indefinites. Master's thesis, University of Utrecht, 1997.

John R. Ross. *Constraints on Variables in Syntax*. PhD thesis, MIT, Cambridge, Massachusetts, 1967.

Eddy Ruys. *The Scope of Indefinites*. PhD thesis, Utrecht University, 1992.

Eddy Ruys. Unexpected Wide Scope Phenomena. Ms, 1999.

Eddy Ruys. Genealogy of a Mutant Meme. or: how Tanya Reinhart made an innocent observation difficult to follow, and how a generation of linguists managed to get it wrong. Ms, 2003.

Eddy Ruys. Unexpected wide scope phenomena. In Martin Everaert and Henk van Riemsdijk, editors, *The Blackwell Companion to Syntax*. Blackwell Publishing Ltd, 2006.

Philippe Schlenker. Scopal Independence: A Note on Branching and Wide Scope Readings of Indefinites and Disjunctions. *Journal of Semantics*, 23:281–314, 2006.

Bernhard Schwarz. Two Kinds of Long-Distance Indefinites. Extended Manuscript, 2001a.

Bernhard Schwarz. Two Kinds of Long-Distance Indefinites. In Robert van Rooij and Martin Stokhof, editors, *Proceedings of the Thirteenth Amsterdam Colloquium*, pages 192–197, Amsterdam, 2001b. Institute for Language, Logic and Information, University of Amsterdam.

Roger Schwarzschild. Singleton Indefinites. *Journal of Semantics*, 19.3:289–314, 2002.

John Searle. *Speech Acts: An Essay in the Philosophy of Language*. Cambridge University Press, London, 1969.

Yael Sharvit. *The Syntax and Semantics of Functional Relative Clauses*. PhD thesis, Rutgers University, 1997.

Robert Stalnaker. On the Representation of Context. *Journal of Logic, Language, and Information*, 7:3–19, 1998.

Arnim von Stechow. Some Remarks on Choice Functions and LF-Movement. In Klaus von Heusinger and Urs Egli, editors, *Reference and Anaphoric Relations*, pages 193–228. Kluwer Academic Pubishers, Dordrecht, 2000.

Henriette de Swart. Indefinites between Predication and Reference. In *Proceedings of SALT 9*, pages 273–297, Ithaca (NY), 1999. University of Cornell, Cornell University Press.

Anna Szabolcsi. *Ways of Scope Taking*. Kluwer Academic Publishers, Dordrecht, 1997a.

Anna Szabolcsi. Strategies for Scope Taking. In Anna Szabolcsi, editor, *Ways of Scope Taking*, pages 109–154. Kluwer Academic Publishers, Dordrecht, 1997b.

Anna Szabolcsi. *Quantification*. Cambridge University Press, Cambridge, MA, 2010.

Carla Umbach. Cataphoric Indefinites. In Cécile Meier and Matthias Weisgerber, editors, *Proceedings of the conference 'sub 8 – Sinn und Bedeutung'. 8th annual meeting of the Gesellschaft für Semantik*, number 117 in Konstanzer Arbeitspapiere Linguistik, pages 301–316. Fachbereich Sprachwissenschaft, Universität Konstanz, 2004.

Carla Umbach. Why Do Modified Numerals Resist a Referential Interpretation? In Efthymia Georgala and Jonathan Howell, editors, *Proceedings of SALT XV*. Cornell University, 2005.

Yoad Winter. Choice Functions and the Scopal Semantics of Indefinites. *Linguistics & Philosophy*, 20:399–467, 1997.

Yoad Winter. Functional Quantification. *Research on Language and Computation*, 2 (4):331–363, 2004.

Jae-il Yeom. *A Presuppositional Analysis of Specific Indefinites*. Garland Publishing, 1998.

Thomas Ede Zimmermann. On the Proper Treatment of Opacity in Certain Verbs. *Natural Language Semantics*, 1:149–179, 1993.