German Integrated Verb Second Clauses, Relative Clauses, and Information Structure

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Abstract

In this paper we present data of German integrated verb second clauses and verb final relative clauses, which at first sight seem problematic for a compositional analysis. However, we show that the compositional analysis of restrictive relative clauses in (Janssen, 1982) can be adapted, but cannot be sustained due to overgeneration and must be considered unintuitive in light of the paratactic syntactic analysis for the verb second clauses from Gärtner (2001). Hence we present a conceptually simpler analysis along the lines of Endriss and Gärtner (to appear), which makes use of information structural properties of the involved clauses. We conclude with a brief discussion on the compositional status of such an approach.

1   Introduction

German provides for a special brand of verb second clauses, which can replace standard verb final relative clauses in certain contexts. This is illustrated in the following examples[1] (a), where (/) indicates a non-final marking of the boundary (e.g. a high boundary tone or continuation rise). Thus the second clause appears *integrated* into the first clause w.r.t. intonation. In Gärtner (2001), these instances are therefore referred to as *integrated verb second clauses* (IV2). The examples in (b) show the corresponding versions, where the second clause functions as a restrictive relative clause. In (c) IV2 are constrasted with independent V2 declarative sentences. Here both sentences constitute distinct intonational units, indicated by (\), a final boundary marking (e.g. falling tone, drop, pause, etc.).

(1)   a. Das Blatt hat eine Seite, (/) die ist ganz   schwarz.
           The sheet has one side   that is completely black.

       b. Das Blatt hat eine Seite, (/) die ganz   schwarz ist.
           The sheet has one side   that completely black   is.

           'The sheet has one side that is completely black.'

       c. # Das Blatt hat eine Seite. (\) Die ist ganz   schwarz.
           The sheet has one side.   It   is completely black.

           'The sheet has one side. It is completely black.'

(2)   a. Apfeldorf hat viele Häuser, (/) die stehen leer.
           Apfeldorf has many houses   that stand   empty.

       b. Apfeldorf hat viele Häuser, (/) die leer   stehen.
           Apfeldorf has many houses   that empty stand.

           'Apfeldorf has many houses that are vacant.'

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[1]The examples are taken from Gärtner (2001).

c. Apfeldorf hat viele Häuser. (\\) Die   stehen leer.
   Apfeldorf has many houses.   They stand empty.

   'Apfeldorf has many houses. They are vacant.'

Concerning the syntax, Gärtner (2001) argues that IV2 have to be treated parat-
actically as follows (where π stands for *paratactical*).

(3)
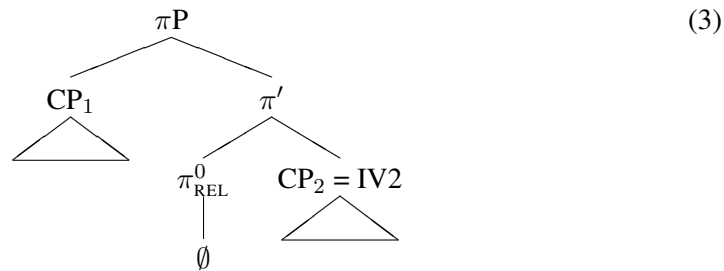
This is evidenced by, among other things, the facts that IV2 must occur extraposed,
i.e. at the right edge of CP$_1$ and that the pronoun is not a relative pronoun but a weak
demonstrative (see (Gärtner, 2001) for an elaborate discussion).

   Semantically, in fact, the IV2 in (a) show a similar behaviour as the restrictive
relative clause counterparts in (b) concerning interpretation. For instance, (1a) and
(1b) both say that the sheet has one completeley black page. This is in contrast
with the sequence of V2 declarative clauses in (1c), where the pragmatically odd
meaning is conveyed that the sheet has only one page and that this page is black.
This effect is due to a Horn-scale implicature which arises after having processed
the first sentence. The fact that this implicature does not arise in the case of (1a)
provides another argument for the non-autonomy of IV2. Though syntactically (1a)
and (1c) are both analysed as S-S constructions, in case of IV2 the initial sentence
is not computed in isolation and no implicature is triggered. Likewise, (2a,b) state
that there are many vacant houses in Apfeldorf. Again this is different from the
(c) variant, which makes the statement that Apfeldorf overall has many houses. At
first sight, from the semantic point of view, it seems that an analysis of the IV2
phenomena should yield a restrictive interpretation of the clause w.r.t. to the DP it
seems attached to. Such a relative clause analysis was proposed by Gärtner (2001)
and Brandt (1990).

   Let us in the following explore the possible readings of (2) in closer detail. Ac-
cording to Partee (1988), *many* is ambiguous between a proportional and a cardinal
reading.

cardinal : $\mathsf{many}_{\mathrm{card}}(A)(B)$ $\equiv$ $|A \cap B| \geq n;$ n a contextual number
proportional : $\mathsf{many}_{\mathrm{prop}}(A)(B)$ $\equiv$ $\frac{|A \cap B|}{|A|} \geq k;$ k a contextual percentage

(4)

In a proportional reading of (2a), an interpretation of the second clause as restrictive
w.r.t. the noun *Häuser* would result in the statement that many vacant houses are

such that they are in Apfeldorf[2]:

$$\text{many}_{\text{prop}}[x, \ (\text{house}(x) \wedge \text{vacant}(x)), \ \text{have}(\text{apfeldorf}, x)] \qquad (5)$$

However, as a closer look reveals, the restrictive relative clause construal does not give the correct results. (5) is clearly not what (2a) and (2b) mean. They rather say that many of the houses in Apfeldorf are such that they are vacant. So the interpretation we are actually looking for is the following.

$$\text{many}_{\text{prop}}[x, \ (\text{house}(x) \wedge \text{have}(\text{apfeldorf}, x)), \ \text{vacant}(x)] \qquad (6)$$

This seems to suggest the following generalization:

(7) *many* incorporates the entire remaining matrix clause information into its restrictor, while the information of the second clause constitutes its nuclear scope.

So the restrictive relative clause analyses of Gärtner (2001) and Brandt (1990) seem to be on the wrong track (for the proportional reading).

Due to the ambiguity of *many*, one would also expect that there is a cardinal reading with IV2s. This prediction is confirmed by the following data where *many* can be interpreted as cardinal:

(8) Es gibt viele Häuser, (/) die stehen leer.
      It   gives many houses   that stand   empty.

Sentence (8) in its preferred reading states that the number of empty houses is (surprisingly) high. It does not necessarily mean that among the contextually relevant houses there are many empty ones. This shows that also with IV2, the cardinal reading is still available[3]. However, with the cardinal reading of *many* the generalization from above cannot be tested. This is due to the fact that the restrictor and nucleus cannot be told apart due to the symmetry of $\text{many}_{\text{card}}$.

For other quantifiers, the generalization in (7) is also easy to overlook, as the two different ways of determining the restrictor and nuclear scope yield equivalent interpretations. For instance, in the case of (1a) and (1b) the statement that there is a side of the sheet which is black is equivalent to the statement that there is a black side which the sheet has. Note that this is true for all quantifiers D which are conservative and symmetric as the following holds (cf. Barwise and Cooper (1981)).

$$D(A \cap B, C) \equiv D(A \cap C, B)$$

Because of this fact, we conclude that it only *seems* that IV2 and verb final clauses are interpreted as restrictive relative clauses as Gärtner (2001) and Brandt (1990)

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[2]In the remainder of this text, we use a more appropriate notation $\text{many}[x, A(x), B(x)]$ (which is equivalent to $\text{many}(A)(B)$)

[3]Thanks to Sigrid Beck and Manfred Krifka for calling our attention to this.

claim. The actual analysis has to go along the lines of generalization (7) made above.

Complicating the picture even further, the generalization does not seem to hold for all quantifiers. Consider the following variants of (2) containing *die meisten (most)* instead of *viele (many)*.

(9) a. * Apfeldorf hat die meisten Häuser, (/) die stehen leer.
       Apfeldorf has most   houses   that stand empty.

    b. Apfeldorf hat die meisten Häuser, (/) die leer   stehen.
       Apfeldorf has most   houses   that empty stand.

    'Most houses that are vacant are in Apfeldorf.'

As (9a) illustrates, the IV2 construction is illicit with a DP headed by *die meisten*. In fact, only a proper subclass of indefinites licenses the use of IV2s. With a verb final clause, (9b) actually has the restrictive RC interpretation that was unwarranted in the *viele* case. (9b) indeed states that Apfeldorf has the largest group of (contextually relevant) vacant houses.

At first sight, the paratactic analysis in (3) on the one side and the desired interpretation on the other side constitute an obvious problem for a compositional analysis. In the following section we will investigate to what extent the compositional treatment of relative clause constructions from Janssen (1982) can be adapted to yield the desired readings.

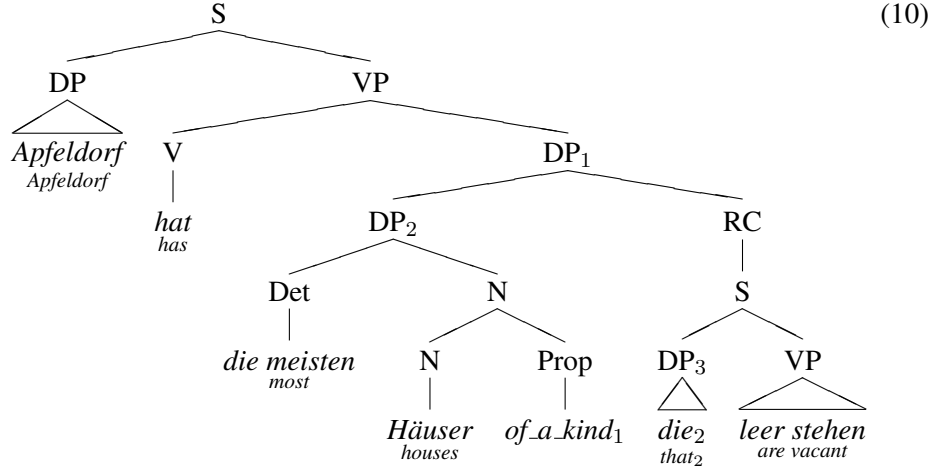## 2   Relative Clauses and Compositionality

In (Janssen, 1982), Theo Janssen discusses the compositional interpretation of three options of RC attachment to its adjacent DP in English: attachment to the noun (the *CN-S analysis*), attachment to the DP (the *T-S analysis*[4], henceforth *DP-S analysis*), and attachment to the determiner (the *Det-S analysis*). Furthermore he investigates the more intricate case of RC constructions in Hittite from Bach and Cooper (1978), where the relative clause is a sentence that is adjoined left or right of the matrix sentence. With respect to the S-S attachment, Hittite resembles German IV2 sentences. Janssen proposes an *S-S analysis* of Hittite relative clauses that is based on his DP-S analysis of relative clauses for English. In the following we will illustrate the DP-S analysis of restrictive RCs and extend it to an S-S analysis that accounts for the German non-restrictive IV2 cases.

Consider example (9b), where the second clause is a (standard) verb final relative clause that has to be interpreted restrictively, as we argued above[5]. Janssen's

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[4]where 'T' stands for 'term', the equivalent to DP in the Montagovian framework

[5]The exposition here is simplified and differs slightly from the one in Janssen, e.g. with respect to category names and the treatment of the relative clause without the Montagovian 'such that' construct.

DP-S analysis proceeds along the following structure.

$$\text{(10)}$$

(tree diagram)

S
— DP
  — Apfeldorf (*Apfeldorf*)
— VP
  — V
    — hat (*has*)
  — DP$_1$
    — DP$_2$
      — Det: die meisten (*most*)
      — N
        — N: Häuser (*houses*)
        — Prop: of_a_kind$_1$
    — RC
      — S
        — DP$_3$: die$_2$ (*that$_2$*)
        — VP: leer stehen (*are vacant*)

Janssen derives the restrictive interpretation of the second clause by introduction of a syntactic variable *of_a_kind$_1$* (translated as a set type variable P_1), which combines with the noun *Häuser* to $\lambda x[\text{house}(x) \wedge P_1(x)]$. This serves as the restrictor of *most* which yields the DP interpretation

$$[\![\text{DP}_2]\!] = \lambda Q[\text{most}[x, \ (\text{house}(x) \wedge P_1(x)), \ Q(x)]]. \tag{11}$$

The second clause is interpreted as the open proposition $\text{vacant}(z_2)$ containing the free variable z_2, that corresponds to a syntactic variable *die$_2$*. At the RC node, an application of an indexed unary rule abstracts over this variable and transforms the open proposition into the property

$$[\![\text{RC}]\!] = \lambda z_2 \text{vacant}(z_2). \tag{12}$$

By application of another indexed rule at the DP$_1$ node, the RC can eventually be 'quantified in' the resulting DP.

$$[\![\text{DP}_1]\!] = \lambda P_1 [\![\text{DP}_2]\!]([\![\text{RC}]\!]) = \lambda Q[\text{most}[x, \ (\text{houses}(x) \wedge \text{vacant}(x)), \ Q(x)]] \tag{13}$$

Completing the analysis of the sentence we get the correct restrictive interpretation

$$\text{most}[x, \ (\text{house}(x) \wedge \text{vacant}(x)), \ \text{have}(\text{apfeldorf}, x)]. \tag{14}$$

This DP-S analysis with its approach to 'quantify in' later information can be extended to IV2s and the paratactic analysis in (3) by deferring the 'quantifying-in' of the CP$_2$ information until the analysis of CP$_1$ is completed. Furthermore, in order to account for the non-restrictive interpretation of (2a), we could propose an additional syntactic variable *do_sth$_n$* (translated as a property variable Q_n) for the nuclear scope of the quantifier in the DP. Then the remaining matrix clause information and the CP$_2$ information can 'quantify in' the restrictor variable (corresponding to *of_a_kind$_m$*) and the nuclear scope variable (*do_sth$_n$*), respectively.
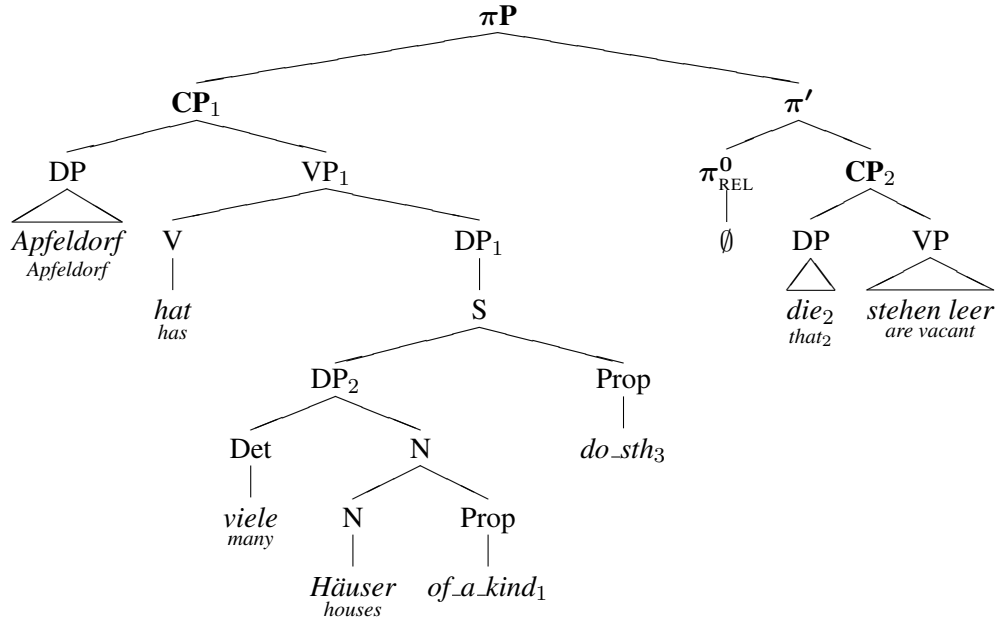
According to this construal, DP$_1$ is interpreted as

$$\llbracket \text{DP}_1 \rrbracket \quad = \quad \lambda P_1 \mathsf{many}[x, \ (\mathsf{house}(x) \land P_1(x)), \ Q_3(x)] \qquad (15)$$

abstracting over the restrictor variable P_1. Hence, the matrix verb *hat (has)* ends up in the restrictor of its object.

$$\llbracket \text{VP}_1 \rrbracket \quad = \quad \lambda y \mathsf{many}[x, \ (\mathsf{house}(x) \land \mathsf{have}(y,x)), \ Q_3(x)] \qquad (16)$$

The VP finally combines with the subject to yield the interpretation of the first clause. Eventually, 'quantifying in' of the π' (which now plays the role of RC in (10)) results in

$$\lambda Q_3 \llbracket \text{CP}_1 \rrbracket (\llbracket \pi' \rrbracket) = \mathsf{many}[x, \ (\mathsf{house}(x) \land \mathsf{have}(\mathsf{apfeldorf}, x)), \ \mathsf{vacant}(x)] \ (17)$$

which is the desired, non-restrictive reading for (2a). Although this is the correct meaning, this analysis suffers from certain problems.

The first problem with these examples is the fact that the correspondence between syntactic category and semantic type is not obeyed. In the IV2 case, the completed analysis of CP$_1$ would essentially result in a generalized quantifier despite its syntactic status of a clause. CP$_1$ could also occur as an isolated sentence and would then receive an entirely different interpretation of truth-value type. This mismatch is to be expected, because the underlying syntactic configuration does not reflect the semantic structure w.r.t. the semantic arguments of the quantifier. For instance, in simple sentences such as *Apfeldorf hat viele Häuser. ('Apfeldorf has many houses.')* the information about both the restrictor and the nuclear scope

of *many* is present in the clause and hence the information of the entire clause can be a proposition of truth-value type. This is different in the IV2 case (2a), where the information in the first clause only contributes to the restrictor, while the second clause contributes to the nuclear scope.

Second, and perhaps more importantly, such a 'quantifying in' analysis over-generates[6]. For instance, in an analysis of the DP *every boy who likes a girl who is blond* (with stacked relative clauses for *boy*), the same syntactic variable *of_a_kind$_2$* may occur once in the 'matrix' DP *every boy* and once in the embedded DP *a girl* as follows:

$$\text{(18)}$$
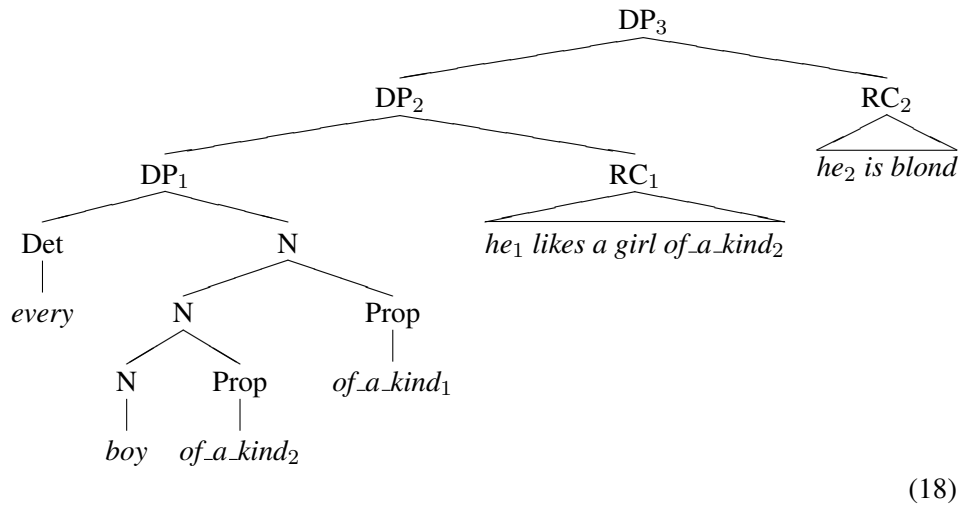
'Quantifying in' the RC$_1$ interpretation into the DP$_1$ using *of_a_kind$_1$* results in

$$\llbracket DP_2 \rrbracket = \lambda Q \forall y[(\mathsf{boy}(y) \wedge P_2(y) \wedge \exists x[\mathsf{girl}(x) \wedge P_2(x) \wedge \mathsf{like}(y,x)]) \to Q(y)]. \quad (19)$$

The final 'quantifying in' of the RC$_2$ results in

$$\llbracket DP_3 \rrbracket = \lambda Q \forall y[(\mathsf{boy}(y) \wedge \mathsf{blond}(y) \wedge \exists x[\mathsf{girl}(x) \wedge \mathsf{blond}(x) \wedge \mathsf{like}(y,x)]) \to Q(y)] \quad (20)$$

resulting in the unavailable interpretation *every blond boy who likes every blond girl*. The operation of 'quantifying in' the RC$_2$ simultaneously binds both variables P_2 and contributes its information to both the restrictor of the matrix and the embedded NP. This is unwarranted, of course. Janssen (1982) himself points to another problem of a DP-S analysis concerning scope relations with stacked relative clauses. He concludes that only a CN-S analysis can account for these data. However, this option is not available here. The paratactic syntactic analysis of IV2 constructions and the desired interpretations make it necessary to adopt an S-S analysis that makes heavy use of 'quantifying in'. Such an analysis runs into problems similar to the one in (18). For instance, a sentence such as

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[6]Thanks to an anonymous reviewer for pointing this out to us.

(21) Eine Norwegerin kennt eine Schwedin, (/) die ist blond.
     A   Norwegian knows a   Swede   that is blond.

     'A Norwegian knows a Swede who is blond.'

receives an unavailable interpretation that can be paraphrased as *a blond Norwegian knows a blond Swede*, if both DPs share the same syntactic variable do_sth_i.

Maybe unsurprisingly, a compositional analysis is possible by unleashing the full power of the Montagovian framework. However, such an approach is prone to heavy overgeneration and it is hard to see, how an intuitively adequate compositional analysis along the syntactic structure alone could work for these examples. In the next section we propose an interpretation mechanism which is less dependent on syntactic structure but makes heavy use of *information structure* instead.

3   IV2 and Information Structure

In Section 1, we have already mentioned the fact that IV2 clauses do not build a fully separate intonational unit, but have to be integrated into the main clause. Matrix clause and IV2 then form one information structural unit together (cf. Brandt (1990)). This is also evidenced by the fact that focus-sensitive particles such as *sogar (even)* can find their associate within the IV2, which is not self-evident given the paratactic analysis (see Gärtner, 2001, p. 110)[7]:

(22)   a. Ich kenne sogar Leute, (/) die lesen CHOMskys Bücher.
          I   know even people   that read Chomsky's books.

          'I know people who even read Chomsky's books.'

       b. Even Chomsky is an x such that I know people who read x's books

Furthermore, IV2 constructions share certain characteristics with *presentational structures* (Lambrecht, 1988), such as (23).

(23) Once upon a time, there was an old cockroach who lived in a greasy paper bag.

In (23) the matrix clause introduces a new discourse referent (a *pre-topic* as Endriss and Gärtner (to appear) call it) which simultaneously serves as an *(aboutness) topic* of the attached relative clause in the sense of Reinhart (1982). According to (Lambrecht, 1988, p. 322), presentational structures are 'minimal processing units', contrary to a sequence of isolated sentences.

The close connection of the two clauses can be realized in some variants of English by *presentational amalgams*[8] (Lambrecht, 1988, p.319)

(24) There was a farmer had a dog.

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[7]Note that *sogar (even)* can associate with elements that are not syntactically c-commanded by it.
[8]also called *contact clauses*

As Lambrecht himself notes, these characteristics are similar in the case of IV2s. Here CP_1 sometimes carries little 'informational content', besides the introduction of a new pre-topic which is used as the topic in CP_2 for predication. Consider the following pair, for instance (see Endriss and Gärtner, to appear).

(25)   a. Im Sommer gab es plötzlich diesen Moment, (/) da   stimmte
              In summer gave it suddenly that   moment   there fitted
              einfach alles.
              simply everything.

              'There was that moment in the summer where everything was perfect.'

    b. #Im Sommer gab es plötzlich diesen Moment ($\backslash$).

The IV2 construction in (25a) is felicitous. Here CP_1 serves the purpose of introducing that moment in summer, of which CP_2 states that it was perfect. On the other hand, CP_1 as an isolated sentence sounds odd due to its little 'informational content' as such.

Yet another point in favour of the topical status of the CP_1 is the fact that (2a) is not good as an answer to *What is there in Apfeldorf?*, which illustrates that the (pre-)topic established in CP_1 and the IV2 clause cannot be focussed together. On the other hand, (2a) is particularly well suited as a reply to *Tell me something about (the houses in) Apfeldorf!*. All these findings let Endriss and Gärtner (to appear) conclude that CP_1 and CP_2 are closely connected and form one information structural unit, in which CP_1 constitutes the topic and CP_2 the focus. This resembles closely the analysis of den Dikken (2005) of presentational amalgams of Lambrecht (1988) which is as follows[9].

(26)
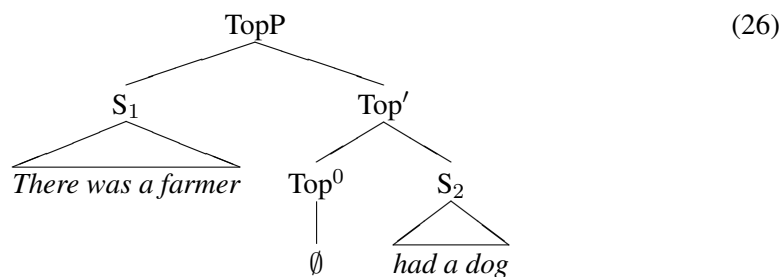
Given these findings, one can make use of the fact elaborated in Herburger (2000), that the semantic arguments of weak quantifiers (in the sense of Milsark (1977)) are determined by information structure. Focal material constitutes the nuclear scope and topical material the restrictor[10], independent of the syntactic

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[9]Both den Dikken (2005) and Lambrecht (1988) directly apply their analyses of presentational sentences to IV2-constructions as well. See (Endriss and Gärtner, to appear) for some remarks on why such a direct correspondence does not hold.

[10]In (Herburger, 2000) the decisive category for this mapping is focus alone, whereas we assume it to be topic.

structure[11].

(27) a. Many Scandinavians [won the Nobel prize in LIterature]$_F$

      $\mathsf{many}[x,\ \mathsf{scandinavian}(x),\ \mathsf{nobel\_prize\_winner}(x)]$

   b. Many [ScandiNAvians]$_F$ won the Nobel prize in literature.

      $\mathsf{many}[x,\ \mathsf{nobel\_prize\_winner}(x),\ \mathsf{scandinavian}(x)]$

As the interpretations for each of the above examples show, (27a) can only mean that many Scandinavians are such that they won the nobel prize, whereas (27b) states that many of the Nobel prize winners are Scandinavians. In this latter case, the focussed complement of *many* determines the nuclear scope and the VP the restrictor, although the syntactic structure dictates the exact opposite.

This sensitivity to information structure (and the insensitivity to syntactic structure) is the key to account for IV2 constructions. As argued above, the CP$_1$ constitutes the topic, whereas the CP$_2$ contains focal information. Analogously to (27) we hence get the desired interpretations for (1–2a).

(28) [Das Blatt hat eine Seite]$_{\mathrm{TOP}}$, (/) [die ist ganz schwarz]$_F$

      $\exists x[\mathsf{page}(x) \wedge \mathsf{have}(\mathsf{sheet}, x) \wedge \mathsf{black}(x)]$

(29) [Apfeldorf hat viele Häuser]$_{\mathrm{TOP}}$, (/) [die stehen leer]$_F$

      $\mathsf{many}[x,\ (\mathsf{house}(x) \wedge \mathsf{have}(\mathsf{apfeldorf}, x)),\ \mathsf{vacant}(x)]$

Note that (28) illustrates that for a symmetric quantifier such as *ein (a)* the restrictor cannot be told apart from the nuclear scope. It hence only *seems* that IV2 clauses are interpreted as standard restrictive relative clauses, i.e. in the restrictor. This difference comes out in the case of *many* in (29) where the IV2 clause information ends up in the nuclear scope and yields the desired interpretation.

Concerning verb final clauses, we noted in the preceding section that the interpretation for (2b) is the same as for the IV2 clause. However, this is only true for an 'out-of-the-blue' utterance with a certain information structure. Actually the interpretation should vary with the information structure if we assume the mechanism of Herburger (2000), contrary to IV2 constructions where the information structural properties are restricted as described above[12]. The following examples show that we can indeed apply the same mechanism to derive the desired readings.

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[11]Cohen (2001) raises doubt on this analysis of *many* and provides a different analysis, which derives a different interpretation. He argues that his result is actually the correct one and often confused with the interpretation provided by Herburger (2000). However, we doubt that his approach can account for the full range of data. An elaborate discussion would lead to far astray from the topic of this paper.

[12]Following earlier work by Wechsler (1991) and Reis (1997) (among others), Gärtner (2001, 2002) assumes that V2-clauses possess (proto-)assertional force, which prevents them from being fully backgrounded or serving as purely topical information.

(30) A: Kennst du viele Linguisten?
      'Do you know many linguists?'

      B: (Eigentlich nicht, aber) ich kenne viele Linguisten, die [über IV2 forschen.]$_F$
      '(Actually no, but) I know many linguists, who [work on IV2].'

      many$[x, \ (\mathsf{linguist}(x) \wedge \mathsf{know}(\mathsf{I}, x)), \ \mathsf{work\_on\_iv2}(x)]$

(31) A: Was für Bekannte hast du denn so?
      'What are your friends like?'

      B: Ich kenne (beispielsweise) [viele Linguisten, die über IV2 forschen.]$_F$
      'I know [many linguists, who work on IV2], (for instance).'

      many$[x, \ \mathsf{know}(\mathsf{I}, x), \ (\mathsf{linguist}(x) \wedge \mathsf{work\_on\_iv2}(x))]$

(32) A: Hast du schon mit vielen IV2-Forschern zusammengearbeitet?
      'Have you collaborated with many IV2 researchers?'

      B: (Zusammengearbeitet nicht, aber) ich [kenne]$_F$ (zumindest) viele Linguisten, die über IV2 forschen.
      '(I haven't collaborated with them, but at least) I [know] many linguists, who work on IV2.'

      many$[x, \ (\mathsf{linguist}(x) \wedge \mathsf{work\_on\_iv2}(x)), \ \mathsf{know}(\mathsf{I}, x))]$

Despite identical syntactic structure, the meanings of (30–32) differ and are fully determined by information structure, which is induced by the preceding questions.

Another point that can be explained by considering information structure concerns the class of determiners that license IV2 constructions. As already illustrated in (9), some determiners are illicit in these cases.

(33) a. Ich kenne viele / drei Linguisten, (/) die haben rote Haare.
          I   know many / three linguists   that have red hair.

      b. * Ich kenne die meisten / wenige / die Linguisten, (/) die haben rote
            I   know most   / few   / the linguists   that have red
            Haare.
            hair.
            'I know … linguists, who are redheaded.'

This restriction falls out of the information structural analysis if we combine it with the treatment of topical quantifiers of Ebert and Endriss (2004). First, recall that Herburger's (2000) observation excludes strong quantifiers such as *die meisten (most)* due to their insensitivity to information structure. These quantifiers take their arguments syntactically and hence will be 'saturated' by the material of the

first clause alone. Therefore the IV2 clause cannot be integrated any more. A similar explanation holds for definites[13].

Second, according to the topical status of the entire CP_1 clause, the involved quantifier must be of topical status also. Ebert and Endriss (2004) give a characterization of quantifiers which can be topical, based on their lexical semantics. Their analysis rules out the remaining quantifers in question such as *wenige (few)*[14] (see Endriss and Gärtner (to appear) for details).

In the preceding section we showed that a compositional analysis along the syntactic structure can in principle be sustained for the phenomena at hand, which at first sight seemed to be problematic in this respect. In this section it turned out that an information structural approach can much more naturally account for the data.

4 Conclusion

In this paper we have presented an analysis of German IV2 constructions on the basis of information structure, which extends to restrictive relative clauses. Such an analysis derives distinct readings of the three sentences in (30)–(32). despite their common syntactic structure. Whether this approach can be called compositional depends on the exact implementation of the meaning composition, on which we have not elaborated here. For instance, in Herburger's analysis the determiner is *Q-raised* and then the information structural parts are mapped correspondingly by *focal mapping.* Therefore Herburger arrives at the following LF for (27b).

(34) [[Many won the Nobel Prize in literature][ScandiNAvians won the Nobel Prize in literature]]

Then, obviously, this restructured configuration can be interpreted compositionally. However, due to the necessary restructuring of the syntactic parts prior to interpretation, we would not want to call such an approach fully compositional. Other approaches such as Krifka (1991) use structured meanings to more directly account for the contribution of information structure to semantics. However, the meaning composition still goes along the syntactic structure alone. We would like to think of information structure as a separate level on a par with syntax in an

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[13]A Russellian construal of definites is ruled out on the same grounds. An individual type construal leads also to a 'saturation' of the first clause already, without the possibility of further integration of more information. A different explanation is mentioned in Gärtner (2001) and elaborated in Endriss and Gärtner (to appear), where it is argued that a definite containing a familiarity presupposition is incompatible with the proto-assertional character of IV2.

[14]Note that the topical status of *viele (many)* is not entirely clear. Reinhart (1997) regards *many* as a *wide scope indefinite*, i.e. an indefinite that can take scope out of syntactic islands. As Ebert and Endriss (2004) argue, the class of wide scope quantifiers coincides with the class of topical quantifiers, although their approach cannot account for the topical status of *many*. Kamp and Reyle (1993) also see *many* as an indefinite introducing a discourse referent (which eventually classifies *many* as wide scope indefinite).

extended definition of compositionality. For instance, the mapping of topic and focus into the restrictor/nuclear scope could be defined as a compositional operation, because the interpretation of the sentence is determined by the interpretations of its *information structural* parts. This is a rephrased version of the principle of compositionality which is usually assumed to talk about *syntactic* parts. Therefore meaning composition could go along syntactic structure as well as information structure. In fact, following a strand of research exemplified by Pierrehumbert and Hirschberg (1990), we could make more of intonation, i.e. the formal counterpart of information structure, in defining the notion 'part' in an extended compositional framework capable of dealing with the facts discussed here. This would be in line with the discussion in (Janssen, 1997), who repeatedly stresses the point that 'part is a technical notion.' Taking intonation into account, we could derive that, strictly speaking, CP1 cannot stand alone. Also one would be justified in postulating an asymmetry between CP1 and CP2. The latter point is in line with research on *clause combining* such as pursued in the framework of SDRT (Asher and Lascarides, 2003).

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