

# Scope Inversion under the Rise-Fall Contour in German

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This article<sup>1</sup> deals with a well-known but still ill-explained fact about German, namely scope inversion under a particular accent contour, as illustrated with the following examples, where “/” and “\” stand for rising and falling accent: (a) *Mindestens ein Student hat jeden Roman gelesen*, lit. ‘at least one student has every novel read’, with the reading “For at least one student  $x$ :  $x$  read every book”, and (b) *Mindestens /EIN Student hat \JEDen Roman gelesen*, with the additional reading “For every novel  $y$ : at least one student read  $y$ ”. I will derive the scope inversion in this reading from general principles of scope assignment and focus marking in German. In particular, I will argue that focus is assigned to constituents that precede the verbal predicate, which leads to syntactic configurations that in turn result in ambiguous interpretations. This explanation must be couched in a framework of derivational economy that favors shorter derivations. It is argued that the relevant comparison class is defined with respect to phonological form, not, as has been suggested for English, with respect to identity of semantic interpretation, and that this may be a general property of “free” word order languages.

## 1 Operator Scope in German

Theories of operator scope within generative grammar can be classified into those that derive possible scopal relationships from logical form (LF), a syntactic representation distinct from surface structure (SS), and those that derive them directly from syntactic configurations of S-structure itself. While there are proponents for each of these views for languages with relatively strict word order like English, the second view has been defended in particular for languages with a relatively free word order, such as Hungarian (most recently Kiss 1994), Japa-

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<sup>1</sup>The theory developed in this paper was presented at the LSA Annual Meeting, January 1994, Boston, at the Department of Linguistics, University of Texas at Austin, April 1994, at the conference *Focus and Natural Language Processing*, Schloß Wolfsbrunnen, June 1994, at the Department of Linguistics, University of Indiana at Bloomington, October 1994, and at the Department of Linguistics, Stanford University, October 1995. A preliminary report was made available as Krifka (1994). I am very grateful for valuable comments on content and presentation of this article by these audiences, in particular by Lee Baker, Christine Bartels, Daniel Büring, Cleo Condoravdi, Lisa Green, Irene Heim, Joachim Jacobs, Kai Lebeth, Gil Rappaport, Mats Rooth, Graziella Saccon, Carlota Smith, Arnim von Stechow and Steve Wechsler. In particular, the content of this article and its presentation profited from the detailed comments of an anonymous reviewer of *Linguistic Inquiry*, and of Jacobs (1996), which is a reaction to Krifka (1994). This paper was conceived during my stay as a guest scientist at the IBM Germany Scientific Center, Heidelberg, and completed during my residency at the Center for Advanced Study in the Behavioral Sciences, Stanford. I am grateful for the financial support provided by the National Science Foundation, #SES-9022192, and by the University Research Institute, University of Texas at Austin.

nese (Hoji 1985, 1986 based on earlier work by Kuroda 1970<sup>2</sup>), Korean (Joo 1989) and German (Kefer 1989, Frey 1993); see also the overview of Pafel (1993).

Frey (1993), adopting and developing views of Reinhart (1983), argues for the following scope assignment principle (here somewhat simplified<sup>3</sup>):

- (1) If  $\alpha$ ,  $\beta$  are operators occurring in a sentence S, then S has a reading in which  $\alpha$  has scope over  $\beta$  if and only if:
- a)  $\alpha$  c-commands  $\beta$ , or
  - b)  $\alpha$  c-commands a trace of  $\beta$ .

Condition (1.a) predicts that when no movement is involved the possible scopal orderings can be directly read off the syntactic position of the operators in question, as in (2.a). Condition (1.b) says that movement leads to scope ambiguities if an operator  $\alpha$  c-commands the trace of an operator  $\beta$ , and is itself c-commanded by  $\beta$ , as illustrated in (2.b).<sup>4</sup>

- (2) a. [...  $\alpha$  ... [...  $\beta$  ...]]: reading  $\alpha(\beta)$   
 b. [...  $\beta_1$  ... [...  $\alpha$  ... [...  $t_1$  ...]]]: readings  $\beta(\alpha)$  and  $\alpha(\beta)$

Frey adduces ample evidence in support of the scope principle. He works within the standard assumption about the structure of main clauses in German that posits a sentence-final position of the finite verb in D-structure, and movement of the finite verb to the complementizer position  $C^0$  and of some other constituent to a precomplementizer position Spec-CP. The postulated structures are exemplified in (3), which gives the essential aspects of the derivation<sup>5</sup>. Notice that any XP that is an argument or an adjunct to the verb can occupy the Spec-CP position, not just the subject. Spec-CP movement is called “topicalization”, a movement into what is traditionally known as the “initial field”, and the part of IP up to V is traditionally called the “middle field”. Dependent clauses lack  $C^0$  movement and Spec-CP movement.

- (3) D-Structure:                     $[_{CP} e [_{C^0} e [_{IP} \text{Maria} [\text{einen Roman} [\text{gelesen}]] \text{hat}]]]$   
 $C^0$  movement:                     $[_{CP} e [_{C^0} \text{hat}_{t_1} [_{IP} \text{Maria} [\text{einen Roman} [\text{gelesen}]] t_1]]]$

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<sup>2</sup>Hoji does assume a level of logical form, but the scopal relationships there simply reflect c-command on surface structure.

<sup>3</sup>In addition, Frey has a special condition for cases of dative NPs c-commanding nominative NPs on D-structure, that is, psych verbs, which allow for either scope. A similar rule for the computation of scope has been proposed by Aoun & Li (1993), but the domain of application of this rule is different there: It applies on LF, not on S-Structure.

<sup>4</sup>The two interpretations of (2.b) follow if we assume that traces are systematically ambiguous in their type (cf. the proposals of von Stechow 1993, Strigin 1993). Assume that the operators are quantificational NPs, hence of type  $\langle\langle e,t \rangle, t \rangle$ . Then the reading  $\beta(\alpha)$  will be generated if the trace  $t_1$  of  $\beta$  is a variable of type  $e$  that is bound by  $\beta$ , and the reading  $\alpha\beta$  will be generated if  $t_1$  is a variable of type  $\langle\langle e,t \rangle, t \rangle$ , which results in  $\beta$  being reconstructed in the position of  $t_1$ .

<sup>5</sup>The representation indicated here leaves open certain aspects that are controversial and irrelevant for the points to be made in this article, like the categorial status of the expressions within the constituent marked as IP, and the initial position of the auxiliary *hat*, which may well originate as a sister to the main verb *gelesen*. Also, it should be mentioned that Frey, following Haider (1993), assumes that IP and CP identify the same category in German, and introduces a separate category  $V^{\max}$  for what is taken to be IP here.

Spec-CP movement:  $[_{CP} \text{Maria}_2 [_{C'} \text{hat}_1 [_{IP} \text{t}_2 [\text{einen Roman} [\text{gelesen}]] \text{t}_1]]]$   
 (“topicalization”) Maria has a-ACC novel read  
 ‘Maria has read a novel’

Frey tries to exclude certain effects that may interfere with the basic principles of scope assignment. In particular, he works with NPs like *mindestens einen Roman* ‘at least one novel’ that are unquestionably quantificational. NPs like *einen Roman* ‘a-ACC novel’ may get a specific or referential reading that presumably does not scopally interact with other quantifiers, resulting in an apparent wide-scope reading.<sup>6</sup> Furthermore, Frey tries to exclude the effect of focus by putting the main accent on the constituent in  $C^0$ . This focusses on the truth polarity of the sentence (cf. Höhle 1992 on “verum focus”), which presumably suppresses any interaction of focus with scope assignment. Frey observes contrasts like the following ones:

- (4) a.  $[_{CP} \text{jeder Student}_1 [_{C'} \text{HAT} [\text{t}_1 [\text{mindestens einen Roman} [\text{gelesen}]]]]] \forall(\exists)$   
 every-NOM student has at least one-ACC novel read
- b.  $[_{CP} \text{mindestens ein Student}_1 [_{C'} \text{HAT} [\text{t}_1 [\text{jeden Roman} [\text{gelesen}]]]]] \exists(\forall)$   
 at least one-NOM student has every-ACC novel read
- (5) a.  $[_{CP} \text{mindestens einen Roman}_1 [_{C'} \text{HAT} [\text{jeder Student} [\text{t}_1 [\text{gelesen}]]]]] \exists(\forall),$   
 $\forall(\exists)$   
 at least one-ACC novel has every-NOM student read
- b.  $[_{CP} \text{jeden Roman}_1 [_{C'} \text{HAT} [\text{mindestens ein Student} [\text{t}_1 [\text{gelesen}]]]]] \exists(\forall),$   
 $\forall(\exists)$   
 every-ACC novel has at least one-NOM student read

These examples give evidence for the scope principle with one type of movement, topicalization. But it can also be illustrated with reordering of constituents within the middle field, so-called “scrambling”, which presumably involves movement as well. This is shown in the following dependent clauses, where  $C^0$  is filled by the complementizer *weil* ‘because’:

- (6) a.  $[_{C'} \text{WEIL} [\text{mindestens ein Student} [\text{jeden Roman} [\text{gelesen}]] \text{hat}]] (\exists\forall)$   
 only  
 because at least one-NOM student every-ACC novel read has
- b.  $[_{C'} \text{WEIL} [\text{jeden Roman}_1 [\text{mindestens ein Student} [\text{t}_1 \text{gelesen}]] \text{hat}]] (\exists\forall,$   
 $\forall\exists)$   
 because every-ACC novel at least one-NOM student read has

The scope principle can be illustrated with other types of examples. Take the relative scope of dative and accusative objects. For most ditransitive verbs, including *vorlesen* ‘to read (something to someone)’, the underlying order is [DAT [ACC V]]. But there are a few verbs, like *unterziehen* ‘to subject (someone/thing to some procedure)’, which have [ACC [DAT V]] as underlying order. This is a well-known fact about German syntax and can be illustrated in a variety of ways. Let me discuss two pieces of evidence for that.

First, we may use one of the traditional constituent tests for German, namely, that only *bona fide* constituents can be topicalized. It turns out that if the underlying order is

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<sup>6</sup> Frey even suspects that an NP like *jeder Student* ‘every student’ may be read collectively, and he works with NPs like *fast jeder Student* ‘every student’ instead.

[NP<sub>1</sub> [NP<sub>2</sub> [VERB]]], then [NP<sub>2</sub> VERB] can be topicalized, whereas topicalization of [NP<sub>1</sub> VERB] leads to a questionable result, especially with verbs like *unterziehen*:

- (7) *vorlesen* ‘to read something to someone’: [DAT [ACC V]]
- a. [Den Roman vorgelesen] hat er dem Studenten.  
the-ACC novel read has he the-DAT student-DAT
- b. ?[Dem Studenten vorgelesen] hat er den Roman.  
the-DAT student-DAT read has he the-ACC novel
- (8) *unterziehen* ‘to subject something/someone to some procedure’: [ACC [DAT V]]
- a. [Dem Sehtest unterzogen] hat er den Studenten.  
the-DAT eye-exam subjected has he the-ACC student
- b. \*[Den Studenten unterzogen] hat er dem Sehtest.  
the-ACC student subjected has he the-DAT eye exam

The fact that we find a decrease in acceptability in the (b) sentences can be explained by the reasonable assumption that topicalization affects constituents in their basic word order more easily than constituents in a derived word order. In order to arrive at the structures exemplified by the (b) sentences, we have to assume that NP<sub>2</sub> is first moved, and then the resulting constituent is topicalized, so-called “remnant topicalization”:

- (9) Basic structure: [NP<sub>1</sub> [NP<sub>2</sub> [VERB]]]  
Movement of NP<sub>2</sub>: [NP<sub>2</sub> [NP<sub>1</sub> [t<sub>2</sub> [VERB]]]]  
Topicalization of remnant: [NP<sub>1</sub> [t<sub>2</sub> [VERB]]]<sub>3</sub> [NP<sub>2</sub> [t<sub>3</sub>]]

While remnant topicalization does not necessarily mean ungrammaticality, it leads to a delicate structure in which a trace (t<sub>2</sub>) c-commands its antecedent (NP<sub>2</sub>), and therefore is disfavored (see further comments in footnote 16). The difference in acceptability between (7.b) and (8.b) can be related to the fact that the intermediate structure stipulated in (9) is already ungrammatical for *unterziehen*<sup>7</sup> (cf. the contrast in (10)). This is presumably due to the fact that the dative, while a structural case for the majority class of ditransitive verbs, is a lexically governed case for verbs like *unterziehen*.

- (10) a. weil er den Roman dem Studenten vorgelesen hat  
because he the-ACC novel the-DAT student-DAT read has
- b. \*weil er dem Sehtest den Studenten unterzogen hat  
because he the-DAT eye-exam the-ACC student subjected has

Second, it has been observed that bare plural NPs or bare mass noun NPs in their non-generic, existential reading cannot leave their position within the middle field (cf. de Hoop 1992, who assumes that they get “weak” case, which can only be assigned if they stay in their base position). We find the following acceptability contrasts:

- (11) a. weil er Studenten Romane vorgelesen hat.  
because he students novels read has
- b. ??weil er Romane Studenten vorgelesen hat.

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<sup>7</sup> This was pointed out by the anonymous LI reviewer.

- (12) a. weil er Studenten Sehtests unterzogen hat.  
 because he students eye-exams subjected has  
 b. \*weil er Sehtests Studenten unterzogen hat.

These contrasts are to be expected if we assume that the basic order is [DAT [ACC V]] for *vorlesen* and [ACC [DAT V]] for *unterziehen*.

Having established the basic word order for *vorlesen* and *unterziehen*, we expect, and indeed observe, the readings illustrated in (13) and (14):

- (13) a. [Mindestens einem Studenten]<sub>1</sub> HAT er t<sub>1</sub> jeden Roman vorgelesen.  $\exists(\forall)$   
 at least one-DAT student has he every-ACC novel read  
 b. [jeden Roman]<sub>1</sub> HAT er mindestens einem Studenten t<sub>1</sub> vorgelesen.  $\forall(\exists)$ ,  $\exists(\forall)$   
 every-ACC novel has he at least one-DAT student read
- (14) a. [Mindestens einen Studenten]<sub>1</sub> HAT er t<sub>1</sub> jedem Test unterzogen.  $\exists(\forall)$   
 at least one-ACC student has he every-DAT test subjected  
 b. [jedem Test]<sub>1</sub> HAT er mindestens einen Studenten t<sub>1</sub> unterzogen.  $\forall(\exists)$ ,  $\exists(\forall)$   
 every-DAT test has he at least one-ACC student subjected

Similar observations can be made for other scope-bearing expressions, like locative and temporal adverbials, negation, and modal operators (see Frey 1993).

Another type of evidence for the scope principle is discussed by Kefer (1989). Kefer does not argue explicitly for the scope principle; he rather presupposes it and uses it as a test for the c-command relationship. His test concerns distributive interpretations; he assumes that a phrase  $\alpha$  can distribute over a phrase  $\beta$  iff  $\alpha$  c-commands  $\beta$  or a trace of  $\beta$ :

- (15) a. Ein Kind hat fünf Museen besucht. 1CHILD(5MUS)  
 a child has five museums visited  
 b. Ein Museum<sub>i</sub> haben fünf Kinder t<sub>i</sub> besucht 1MUS(5CHILD, 5CHILD(1MUS))  
 a museum have five children visited

In (15.a), the object cannot distribute over the subject (we talk about one child only), whereas in (15.b) both readings are possible; in particular, there may be up to five different museums involved.<sup>8</sup>

## 2 Scope Inversion under Focus

As already mentioned, Frey tries to factor out any possible influence of focus, being aware of the fact that special stress patterns may lead to additional readings. One well-known exception to his scope principle are sentences that contain two operators, one in initial position (Spec-CP) and one in the middle field (IP), where the first operator gets rising stress, and the second operator gets falling stress. If we take the relevant examples used so far and assign them the indicated rise-fall contour (where rise is marked by “/” and fall by “\”), we find that

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<sup>8</sup>Kitagawa (1994) discusses a similar phenomenon in Japanese.

formerly unambiguous sentences become ambiguous.<sup>9</sup> Each of the following sentences have both the  $\forall(\exists)$  and the  $\exists(\forall)$  reading, in contrast to (4.a,b), (13.a), and (14.a).

- (16) a. /JEDer Student hat mindestens \EINen Roman gelesen.  $\exists(\forall), \forall(\exists)$   
 every-NOM student has at least one-ACC novel read
- b. Mindestens /EIN Student hat \JEDen Roman gelesen.  $\exists(\forall), \forall(\exists)$   
 at least one-NOM student has every-ACC novel read
- (17) a. Mindestens /EINem Studenten hat er \JEDen Roman vorgelesen.  $\exists(\forall), \forall(\exists)$   
 at least one-DAT student has he every-ACC novel read
- b. Mindestens /EINen Studenten hat er \JEDem Test unterzogen.  $\exists(\forall), \forall(\exists)$   
 at least one-ACC student has he every-DAT test subjected

Take (16.b) as an example. The inverted scope reading is facilitated in a context like the following: Mary gives a seminar on the more than 60 novels of the popular writer Karl May. She can state the fact that every novel was read by at least one student in the seminar by (16.b). Of course, there are other ways to express this, perhaps in a less ambiguous and therefore preferred way, as in *jeder Roman wurde von mindestens einem Studenten gelesen*, ‘nearly every novel was read by at least one student’. What is relevant here is that we get the inverted scope reading with (16.b).

We find similar scope inversion phenomena with examples that yield a distributive readings of indefinites.

- (18) ein /KIND hat \FÜNF Museen besucht. 1CHILD(5MUS), 5MUS(1CHILD)  
 a child has five museums visited

The scope inversion of sentences under the rise-fall intonation contour is a well-known phenomenon of German. It was observed by Jacobs (1982, 1983, 1984), Lötscher (1984), Löbner (1990), Féry (1993), Höhle (1992) and Buring (1994, 1995).<sup>10</sup> The construction that is expressed by this contour has been called “I-topicalization” (I for “intonational”) by Jacobs, but one also finds the terms “bridge contour” and “hat pattern”. The data discussed typically involves negation as one operator, which is a bit unfortunate because the deep structure position of negation in German is not fixed (cf. Jacobs 1982), which in turn may create ambiguities even in the absence of special intonation patterns. The reason for this choice may be that scope inversion is particularly easy to detect in cases with a universal quantifier and negation (more about that in section 3.3). However, scope inversion under the rise-fall contour is a fairly solid phenomenon in instances not involving negation as well.<sup>11</sup>

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<sup>9</sup>Jacobs (1995), in a reaction to Krifka (1994), points out that the intonational contour involved should better be described as a slight fall followed by a rise on the first accent, and a fall on the second. He symbolizes these two accents by  $\surd$  and  $\backslash$ , and calls it “root contour”. This seems to be indeed the intonational target, although the first accent can be realized by /, especially in allegro speech. However, I will keep the symbols / and  $\backslash$  except when discussing the differences between a simple rise and a slight fall followed by a rise in section 3.4.

<sup>10</sup>Also, Kefer (1989: 96) noticed that stress on *Kind* in examples like (18) leads to scope ambiguity for many speakers, but he does not identify the rise–fall pattern for these cases.

<sup>11</sup>I found, however, that a minority of German speakers do not get the inverted scope readings, even the ones that are reported in the literature. Some of them accept these readings after first considering cases that involve universal quantifiers and negation.

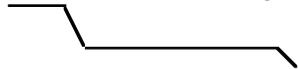
### 3 Previous Solutions and their Problems

The discussion of the scope inversion under the rise-fall contour have mostly been of a purely descriptive nature; only few authors have tried to derive it from more general principles. In this section I will discuss the approaches that have been proposed previously.

#### 3.1 *The Discussion of Fall-Rise in English*

Scope inversion due to the rise-fall contour in German is reminiscent of certain cases of scope inversion in English that are associated to a fall-rise contour. This was observed by Jackendoff (1972) with the following examples:

(19) a. ALL the men didn't go.  $\forall(\neg)$



b. ALL the men didn't go.  $\neg(\forall)$



Jackendoff derives the scope reversal in (19.b) by assuming that *all* is a contrastive topic which introduces a presupposition involving alternative topics, and that negation states that the contrastive topic itself does not have the property expressed by the comment:

(19' b. Presupposed: There is some quantity *q* such that *q men went* is true.

Asserted: *all the men went* is false.

That is, it is presupposed that for some alternative *q* to *all* (e.g., *some*, or *three*, or *most*) it holds that *q men went*, but it is explicitly denied that all men went. In the assertion the negation has scope over the element marked by stress, *all*, and hence we get the  $\neg(\forall)$  reading.

Lieberman and Sag (1974), Ladd (1980) and Ward and Hirschberg (1985) have proposed slightly different explanations. But for all of these explanations it is crucial that the second scopal element is negation. If we try to transfer these analyses to the German case we face the problem that they depend on a specific semantic or pragmatic property of negation. It is unclear how this explanation can be generalized to cases like the ones discussed above that involve two quantifiers. It seems that scope inversion in English illustrated in (19.b) is more restricted and of a different nature than scope inversion in German.

#### 3.2 *Höhle (1991)*

Höhle (1991), in an article that is mainly concerned with coordination effects, discusses various ways for accounting for scope inversion under the rise-fall contour, without arriving at a final conclusion. First, he discards any analysis of a sentence like (20) that explains the wide scope negation by raising of the negation on logical form:

(20) /ALle Politiker haben \NICHT zugehört.  $\neg(\forall)$   
 all politicians have not listened

The reason is that raising of negation would assign the wrong reading to the following sentence, which has the  $\exists(\neg(\forall))$  reading, not the  $\neg(\forall(\exists))$  reading.

- (21) /Alle Politiker hat so mancher \NICHT verstanden.  
 all politicians have many a person not understood  
 ‘there are several people y such that it is not the case that for all politicians x, y understood x’

Höhle discusses various ways in which the  $\neg(\forall)$  reading could be derived. The most promising account is that (20) may have the structure (22.a), whereas the same sentence without the rise-fall contour, which has the  $\forall(\neg)$  reading, has the structure (22.b).

- (22) a. [alle Politiker]<sub>1</sub> haben [nicht [t<sub>1</sub> zugehört]]  
 all politicians have not listened  
 b. [alle Politiker]<sub>1</sub> haben t<sub>1</sub> [nicht [zugehört]]

In (a), negation c-commands the trace of *alle Politiker* and hence has scope over it, whereas the trace c-commands negation in (b), which leads to the opposite scopal order. The two structures are well motivated, as we find them in dependent clauses, which presumably represent the underlying word order.

- (23) a. weil nicht alle Politiker zugehört haben  $\neg(\forall)$   
 because not all politicians listened have  
 b. weil alle Politiker nicht zugehört haben  $\forall(\neg)$

Höhle’s account of scope inversion has the advantage that it does not depend on the specific semantics of negation and may be extended to cases involving two quantifiers. However, it also has to face at least two serious problems: First, it remains unclear why (22.a) must be spelled out by the rise-fall contour, and why the rise-fall contour is possible only for this structure. Second, in order to have Höhle’s explanation work for examples like (16) we would have to assume that the object NP c-commands the trace of the subject NP, and for examples like (17) we would have to assume that the accusative object c-commands the trace of the dative object. But this is not the way how these structures are ordinarily analyzed.

### 3.3 Büring (1994, 1995)

Büring (1994, 1995) is not so much concerned with the origin of scope inversion under the rise-fall contour, but rather in how certain readings are filtered out by pragmatic principles. The relevant examples involve cases with a universal quantifier and negation, as in (20). Büring assumes that a sentence like (20) without the rise-fall contour has both scopal readings  $\forall(\neg)$  and  $\neg(\forall)$  due to a structural ambiguity on LF, essentially similar to Höhle’s S-structures (22.a,b). But the pragmatics of the rise-fall contour blocks the  $\forall(\neg)$  reading.

Let me show how the relevant pragmatic principles work in a somewhat simplified version. Büring assumes that the rise accent marks a contrastive topic, and the fall accent marks a focus. There are certain pragmatic conditions that must be satisfied for a sentence to be felicitous at a particular point in a conversation. In particular, a sentence with a contrastive topic can be asserted only if there is at least one variant of this sentence with an alternative topic that is still *disputable*, that is, is neither established nor excluded in the current common ground. This can be made precise with the following example:

(24) A: What novels by Karl May did Hans and Maria read?

B: /MaRIa hat den *Schatz im SILbersee* gelesen.  
Maria has the *Treasure in the Silver Lake* read

In B's answer, *Maria* is a contrastive topic, and the only alternative topic in this context is *Hans*. Furthermore, *Schatz im Silbersee* is in focus, and the alternatives to that are other novels by Karl May. The condition of disputability says that there must be at least one alternative topic *T* and a novel by Karl May *X* such that *T has read X* is neither established nor excluded at the present common ground. This is satisfied for (24.B), as it leaves open which novels Hans read.

Now, in the case of (20), the  $\forall(\neg)$  reading is filtered out by this condition. Assume that *alle* has alternatives like *viele* 'many' and *einige* 'some', and that the negation has as its alternative the confirmation (that is, the identity function on propositions). Then we have propositions like the following ones as alternatives:

(25) /ALle Politiker haben \NICHT zugehört:  
Alternatives:  
all politicians did not listen, all politicians did listen,  
many politicians did not listen, many politicians did listen,  
some politicians did not listen, some politicians did listen,  
...

Under the  $\forall(\neg)$  reading, the listening behavior of every politician is fully determined: None of them listened. Hence the truth or falsity of every alternative proposition is fully determined. Consequently, this reading is blocked, as it violates the condition of disputability. Things are different under the  $\neg(\forall)$  reading. For example, it is not established yet under this reading whether *many* politicians listened: If not *every* politician listened, it may or may not be the case that *many* politicians listened. And therefore this reading survives. Büring shows that with other operators than the universal quantifier and negation, both readings survive, as some of the alternative propositions remain disputable. Examples:

(26) a. Zwei /DRITtel der Politiker sind \NICHT korrupt. 2/3( $\neg$ )  $\neg$ (2/3)  
two thirds of.the politicians are not corrupt  
b. /ALle Politiker sind \SELten betrunken.  $\forall$ (RARELY), RARELY( $\forall$ )  
all politicians are rarely drunk

Büring's blocking condition for the case of universal quantifier and negation explains why in this case scope inversion is particularly striking, which certainly is the reason why scope inversion has mostly been discussed with this type of example. However, notice that Büring has to assume that the sentences in question are ambiguous because of some independent reason. This position could be defended in the case of an argument NP, like the subject, and an adverbial operator like negation, as either one can c-command the other at D-structure (cf. (22)). However, this would predict that a sentence like (20) has two readings in the neutral intonation, a position that Büring himself defends, but which is not commonly assumed in the literature (and even Büring admits that the  $\forall(\neg)$  reading is preferred under neutral intonation). This position is even more questionable in the case of two argument NPs with fixed order on D-structure, as sentences like (4), (13), or (14) are generally judged as unambiguous, in contrast to their counterparts with the rise-fall contour.

### 3.4 Jacobs (1996)

Jacobs (1996), in a reaction to Buring (1994, 1995) and Krifka (1994), makes several new observations about the intonational pattern under discussion. First of all, he argues that the first accent is not a simple rise, but actually a slight fall, followed by a rise; he marks it with the symbol  $\surd$  and calls the pattern “root contour”. Although the first accent can be pronounced as a simple rise, especially in rapid speech, the phonological target is clearly a fall followed by a pronounced rise.<sup>12</sup> This is an important observation because there exists another pattern, a simple rise on the first accent, followed by a simple fall on the second accent. This distinction was not recognized in the previous phonological literature (see e.g. Féry 1993). The two patterns are used in slightly different circumstances, which can be illustrated with the following examples:

- (27) A: What about Maria and Hans? What did they read?
- a. B: Ma/RIa hat den *Schatz im \SILbersee* gelesen und /HANS den \WINnetou.  
Maria has the *Treasure in the Silver Lake* read and Hans the *Winnetou*
- b. B: <sup>??</sup>Ma\surdRIa hat den *Schatz im \SILbersee* gelesen und \surdHANS den \WINnetou.

(27.a) should be read as containing a simple rise. This pattern is possible even though the answer is complete — it gives the required information for both Maria and Hans. The intonational pattern we are interested in is illustrated in (27.b). This sentence is bad, presumably because it does not satisfy Buring’s criterion — that there must be alternatives to the contrastive topic for which the truth value of the sentence is still disputable. It seems, then, that it is not the simple rise, but a fall-rise, that expresses a contrastive topic in the sense of Buring.

Jacobs also shows that true contrastive topics (that is,  $\surd$ -marked phrases) are more restricted in their distribution than the initial part of complex foci. In particular, contrastive topics can occur only in clauses that express illocutionary acts, and not, for example, in relative clauses. They are furthermore restricted to assertive and directive sentences. Jacobs proposes that the fall-rise pattern marks specific illocutionary operators,  $\text{ASSERT}^{\text{IT}}$  and  $\text{DIR}^{\text{IT}}$  (IT for “I-topicalization”), which relate a topic to a predicate, such as in  $\text{ASSERT}^{\text{IT}}(\text{TOP})(\text{PRED})$ . Both the topic and the predicate come with alternatives marked by focus. The interpretation of these operators consists in the application of the predicate to the topic,  $\text{PRED}(\text{TOP})$ , modulo the specific illocutionary force involved. The alternatives to topic and predicate yield a well-formedness condition that effectively amounts to Buring’s filtering condition discussed in the previous section.

Notice that Jacobs’ theory does not directly predict scope inversion under the rise-fall pattern. The topic constituent is extracted from a propositional phrase, leaving a trace, and this phrase in turn is interpreted as a functional abstraction. This predicts that we get the scopal order indicated by the underlying position. For example, we get only the  $\exists(\forall)$  analysis for (16.b) if we assume the regular order of arguments in the underlying structure. Scope inversion arises only if the underlying order already allows for the inverted scope reading. For a case like (16.b) Jacobs would assume that, in addition to the standard structure illustrated in (28.a), the structure in (28.b), which illustrates object-subject order, is available as well. The  $\forall(\exists)$  interpretation of (16.b) then results from this underlying order.

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<sup>12</sup>In the notation of Pierrehumbert and Hirschberg (1990), this contour should be represented by HL+H\*.

- (28) a. (weil) mindestens ein Student jeden Roman gelesen hat  $\exists(\forall)$   
 b. (weil) jeden Roman mindestens ein Student gelesen hat  $\forall(\exists)$

The main difference between this position and the one developed in Krifka (1994) and in the following sections of the present article is that Jacobs does not assume that the rise-fall pattern itself is a driving force behind the creation of constituent order variation in the underlying structure. Jacobs mentions the partitivity of quantified noun phrases as one factor that leads to multiple underlying orders, but this does not explain why scope inversion is not triggered just by partitivity of the quantified noun phrases. I will come back to this issue in section 8.3.

## 4 A New Solution for Scope Inversion

It seems that previous accounts of scope inversion under the rise-fall contour have failed to provide a solution to the problem of why inverted scope is made available by this pattern in the first place. In this article I want to propose a solution that derives inverted scope possibilities as a consequence of scoping rules, namely, the scope principle, and rules of focussation that are independently motivated. In particular, I will assume the following rules of focus assignment:

- (i) Focus (on a constituent that does not include the verb) is preferably assigned to a constituent that immediately precedes the verbal predicate.
- (ii) Focus assignment may occur prior to syntactic movement. That is, focus is not uniformly assigned on S-structure constituents.
- (iii) Contrastive topic constructions involve a focus within the topic that is realized by a rise accent (or more precisely, by a slight fall followed by a rise).

Given the assumptions (i), (ii) and (iii), as well as the scope principle, we are able to derive the readings of example (16.a) as follows:

- (29) a.  $[_{CP} e [_{C'} e [\text{mindestens ein Student} [_{\text{jeden Roman}} [\text{gelesen}]] \text{ hat}]]]$   
 b.  $[_{CP} e [_{C'} \text{ hat}_1 [\text{mindestens ein Student} [_{\text{jeden Roman}} [\text{gelesen}]]] t_1]]]$   
 c.  $[_{CP} e [_{C'} \text{ hat}_1 [_{\text{jeden Roman}_2} [\text{mindestens ein Student} [t_2 [\text{gelesen}]]]]] t_1]]]$   
 d.  $[_{CP} e [_{C'} \text{ hat}_1 [_{\text{jeden Roman}_2} [[\text{mindestens ein Student}]_F [t_2 [\text{gelesen}]]]]] t_1]]]$   
 e.  $[_{CP} [\text{mindestens ein Student}]_{F,3} [_{C'} \text{ hat}_1 [_{\text{jeden Roman}_2} [t_3 [t_2 [\text{gelesen}]]]]] t_1]]]$   
 f.  $[_{CP} [\text{mindestens ein Student}]_{F,3} [_{C'} \text{ hat}_1 [[\text{jeden Roman}]_{2,F} [t_3 [t_2 [\text{gelesen}]]]]] t_1]]]$   
 g.  $[_{CP} \text{mindestens /EIN Student} [_{C'} \text{ hat} [\backslash \text{JEDen Roman} [\text{gelesen}]]]]]$   
     at least           one-NOM student   has every-ACC novel   read

(29.a) represents the underlying D-structure, and (b) represents the structure after head movement of the verb to  $C^0$  (which may happen at any point in the derivation). (c) shows scrambling of the object NP *jeden Roman* (similar to scrambling in (6.b)). This results in a structure in which *mindestens ein Student* ends up in a preverbal position in which it can receive focus according to assumption (i), as marked in (d). The focused NP can be moved to the Spec-CP position according to assumption (ii), as illustrated in (e). This movement has a specific discourse pragmatic function, contrastive topicalization. Notice that it creates a con-

figuration in which *jeden Roman* is in a preverbal position. It may receive focus here according to assumption (i), as indicated in (f). Alternatively, it may have already received focus on representation (a) or (b); nothing of importance follows from this choice. Level (f), is the input to semantic interpretation and hence can be identified with S-structure. The scope principle predicts that (f) is ambiguous: First, *mindestens ein Student* c-commands *jeden Roman* and hence may have scope over it; second, *jeden Roman* c-commands the trace of *mindestens ein Student* and hence may have scope over IT. (g) represents a structure closer to phonological interpretation where, in particular, the two foci are spelled out by a rising pitch and a falling pitch, according to assumption (iii).

If this account of scope inversion is right we should find evidence for it in more complex cases involving three scope-bearing elements as well. We expect that only those constituents that go through a preverbal stage exhibit variant scope, and that the scopal orderings of other expressions are not affected. This is borne out by examples like Höhle's (21), which does not have a reading in which negation has scope over the existential quantifier, and also in the following example:

- (30) Mindestens /EINem Studenten hat so mancher \JEDen Roman vorgelesen.  
 at least one-DAT student have many a person every-ACC novel read
- Available Readings:  $\exists$ STUDENT( $\exists$ PERSON( $\forall$ NOVEL))  
 $\exists$ PERSON( $\exists$ STUDENT( $\forall$ NOVEL))  
 $\exists$ PERSON( $\forall$ NOVEL( $\exists$ STUDENT))
- Not available:  $\forall$ NOVEL(... $\exists$ PERSON...)

We find that all scopal orderings are available, with the exception of those in which *jeden Roman* has scope over *so mancher*. This is exactly what our theory predicts: *so mancher* c-commands *jeden Roman*, and there is no trace of *so mancher* that could be c-commanded by *jeden Roman*. We have the structure indicated in (31):

- (31) [mindestens /EINem Studenten]<sub>1</sub> hat [so mancher [[\JEDen Roman]<sub>2</sub> [t<sub>1</sub> [t<sub>2</sub> vorgelesen]]]]

In the following three sections, I will discuss assumptions (i), (ii) and (iii) in turn and show that they all are independently motivated.

## 5 Focus Assignment to Preverbal Constituents

Assumption (i) claims that focus cannot be assigned freely, but rather is assigned to constituents in a particular position, namely to constituents that precede the verbal predicate. This assumption has not been made for German so far. Typically German is considered as a language that assigns focus freely, like English. But there is ample evidence that supports the view of preverbal focus assignment, at least under certain important qualifications.

### 5.1 Typological and Descriptive Aspects

Focus assignment to preverbal constituents is not uncommon for languages that are typologically close to German, and the affinity between focusation and preverbality has been observed frequently in empirical work on German word order. As for the typological observation, no-

tice that preverbal focus assignment is generally accepted for Hungarian (Szabolcsi 1981, Kiss 1981, 1994) and Basque (de Rijk 1978), which show SOV characteristics, like German. It also has been claimed for SOV-type languages in general (Kim 1988). The way I make use of SOV characteristics leads to an interesting prediction, namely that we should expect scope inversion of the type under investigation in SOV-type languages.<sup>13</sup> The empirical observations about preverbality and focus in German are abundant, although often expressed in inconspicuous ways. For example, Behaghel (1930) observed that pragmatically more “important” parts are realized later in the sentence. In these earlier studies, no differentiation between the middle field and extraposed material was made. But a more recent influential study, Lenerz (1977), observed as one of the principles that govern constituent order in the middle field that rhematic expressions typically occur at its end, as illustrated in the following examples:

- (32) A: What did Hans read to Maria?  
 B: Hans hat der Maria [den RoMAN]<sub>F</sub> vorgelesen.  
 Hans has the-DAT Maria the-ACC novel read
- (33) A: Who did Hans read the novel to?  
 B: Hans hat den Roman [der MaRIa]<sub>F</sub> vorgelesen.  
 Hans has the-ACC novel the-DAT Maria read

Preverbality is also an important condition for the rise-fall intonation contour discussed here. Höhle (1991), citing unpublished work by Jürgen Pafel, observes a tendency that the constituent bearing the falling accent should occur immediately at the end of the middle field (cf. the contrast between (34.a) and (b)), although the corresponding order to (b) can occur at D-structure, as illustrated in the dependent clause order (c).

- (34) a. /VIEle Schwestern haben den Arzt \NICHT bewundert.  
 many nurses have the-ACC doctor not admired
- b. ? /VIEle Schwestern haben \NICHT den Arzt bewundert.
- c. weil nicht viele Schwestern den Arzt bewundert haben  
 because not many nurses the-ACC doctor admired have

## 5.2 Theoretical Options

There are various theoretical options to implement the idea that focus tends to be assigned preverbally, which I will discuss in this section.

First, we may assume that the verb and its arguments and adjuncts form a “flat”, non-configurational syntactic structure, and that expressions in focus are generated preverbally. There are certain empirical problems with this approach for German, and the general consen-

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<sup>13</sup>A similar phenomenon is reported in Hungarian (Szabolcsi 1981, Kiss 1994) in cases with two operators, one in focus position, the other one postverbal but stressed:

[KÉT tárgy-ból]<sub>Foc</sub> bukott meg MINDenki.  
 two subject-from failed PREFIX everybody  
 ‘Everybody failed in two (potentially different) subjects’

Kiss (1994: 74) proposes that *mindenki* is postposed from a position before the focus (a typical position for quantifiers) in which it would c-command *két tárgy-ból*.

sus is that this option is presumably on the wrong track (cf. e.g., Webelhuth 1989 for discussion).

Second, we may assume a configurational syntactic structure and movement rules that bring it about that the focus expression ends up in a preverbal position. Versions of this have been proposed for languages like Hungarian and Basque. One option is to assume that the expression to be focused is directly moved into a preverbal position, either by adjunction or by movement into a dedicated focus position:

- (35) a. Adjunction to V:  $[\alpha [\beta [{}_V \gamma]]] \implies [t_1 [\beta [[\alpha_i]_F [{}_V \gamma]]]]$   
 b. Movement to focus position:  $[\alpha [\beta [[e]_F [{}_V \gamma]]]] \implies [t_1 [\beta [[\alpha_i]_F [{}_V \gamma]]]]$

One problem of either version is that the resulting configuration violates binding theoretic principles, as a trace c-commands its antecedent. Horvath (1985) proposes such a lowering or “downgrading” movement in Hungarian, arguing that the trace need not be c-commanded on S-structure, as the focus item is raised again at logical form and would c-command the trace there. However, there are various theoretical and empirical arguments against this lowering analysis, as discussed in Farkas (1986).

Scherpenisse (1986) has suggested a similar lowering operation to account for the position of focus elements in German and Dutch. He proposes that an item in focus can be “incorporated” in the verb:

- (35) c. Incorporation into the verb:  $[\alpha [\beta [{}_V \gamma]]] \implies [\beta [{}_V \alpha_F \gamma]]$

Scherpenisse assumes that this happens in the lexicon and hence no trace is created. Seen in this way, the two structures in (35.c) are not related by movement at all; they are two alternative base structures. One problem with this analysis is that the focus constituent  $\alpha$  can be a maximal phrase, and maximal phrases are not subject to incorporation. We may entertain a variant of Scherpenisse’s analysis and assume that the lexical component provides for different alternative basic orders of arguments. However, this move must face the fact that  $\alpha_F$  in (35.c) may be an adjunct, like a temporal adverbial, that is not subcategorized by the verb and hence cannot be subject to such lexical variation.

Another option for focus movement that has been proposed in various versions for Hungarian (cf. Kiss 1994) is that the item in focus moves to a position that is c-commanding the verbal complex. In Hungarian, for which it is standardly assumed that the verb complex is verb initial, this results in a preverbal position of the element in focus (cf. (36.a) But this solution obviously does not work for German, with its clear evidence for underlying verb-final order. Brody (1990) has proposed that both the verb and the focus constituent move, to the specifier and the head of a focus phrase, respectively (cf. (36.b)). Again, this cannot be reconciled with verb-final German word order.<sup>14</sup>

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<sup>14</sup>Focus movement in Hungarian should rather be compared to focus movement in cleft constructions in English and German, as it always comes with an exhaustive interpretation. The preverbal focus position of German seems to correspond to the VP-final position in Hungarian. This is illustrated in the following example due to Katalin É. Kiss (personal communication):

- A: Where did you put books?  
 B: Tetten  $[_{VP} \text{könyveket} [a \text{ POLcra}]_F]$ .  
 put-I books the shelf-on ‘I put books on the shelf (among other places)’

- (36) a. Movement to Spec-VP:  $[_{VP} e [_{V'} [_{V} \gamma] \alpha \beta]] \implies [_{VP} [\alpha_1]_F [_{V'} [_{V} \gamma] t_1 \beta]]$   
 b. Movement to Spec-FP:  $[_{FP} e [[_{F0} e] [\alpha \beta [_{V} \gamma]]]] \implies [_{FP} [\alpha_1]_F [[_{F0} \gamma_2] [t_1 \beta t_2]]]$

A third option is to assume that the expression to be focused is not moved into any position, but rather that expressions that intervene between this expression and the verb are moved out of the way, or *displaced*. This position has not been systematically defended in print so far<sup>15</sup>, but it seems to be the natural option for German.

- (37) Displacement hypothesis:  $[\alpha[\beta[_{V} \gamma]]] \implies [\beta_1[\alpha[t_1[_{V} \gamma]]]] \implies [\beta_1[\alpha_F[t_1[_{V} \gamma]]]]$

The type of movement that could be involved in this displacement of intervening constituents is scrambling, which is responsible for non-basic word order in the middle field.<sup>16</sup>

The nature of scrambling in German is still not settled (see von Stechow and Sternefeld 1988, section 12.6, Grewendorf and Sternefeld 1989 and Corver and van Riemsdijk 1994 for discussion). Scrambling is certainly not, as originally assumed, just a stylistic reordering after S-structure. If this were the case, then it could not have any effect on semantic scope, contrary to what we have seen with examples like (6.b). It has been argued that scrambling consists of alternative base generation of argument sequences. However, certain data such as focus projection and Spec-CP movement show that one sequence usually must be considered the basic one from which others are derived, even if this derivation is handled in the lexicon (cf. Haider 1993: chapter 8, who suggests a lexical process that does involve chain formation). The majority view is that scrambling actually is an instance of syntactic movement, although

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One may speculate that the underlying structure of this sentence is  $[_{VP} \textit{könyveket} [a \textit{ polcra} [tetten]]]$ , and that one crucial difference between Hungarian and German is that the verb has to move from its final position in Hungarian.

<sup>15</sup>It has been suggested in passing by Rosengren (1993, p. 290), who observes that scrambling, by moving constituents out of the “nuclear domain”, has the effect of shifting the nuclear domain to the right and to highlight it in this way. Also, the LI reviewer pointed out that Zubizarreta (1994) and Reinhart (1995) explore the idea that scrambling removes certain constituents so that focus can be assigned to other constituents.

<sup>16</sup>A potential problem for the displacement hypothesis (37) is that the constituent  $[\alpha_F[t_1[\gamma]]]$  can be topicalized, which results in a structure in which the trace  $t_1$  c-commands its antecedent,  $\beta_1$ :

- (a)  $[\textit{Meinen Eltern } t_1 \textit{ vorgestellt}]_2 \textit{ habe ich meine Freundin}_1 \textit{ noch nicht } t_2$   
 my.DAT parents.DAT introduced have I my.ACC girlfriend still not

This problematic configuration (“remnant topicalization”, as mentioned with example (9)) was the main reason why Scherpenisse (1986) proposed his incorporation analysis, (35.c), in the first place. However, it has been proposed by various authors that binding of the trace  $t_1$  should be possible by feature inheritance over the trace  $t_2$ , similar to binding of the anapher in cases like  $[\textit{Content with himself}]_2 \textit{ we don't believe John}_1 \textit{ will ever be } t_2$  (cf. von Stechow & Sternefeld 1988: 459). We have discussed similar cases above, with examples like (7.b). The acceptability difference between (a) and (7.b) is very likely related to the fact that (a) obligatorily has a clear focus on the last constituent, *nicht*. When we change the example minimally, to

- (b)  $^2 \textit{Meinen Eltern vorgestellt habe ich meine Freundin}$ .

we get the same degree of acceptability as for (7.b). This set of facts can be explained in the spirit of the current work as follows: Remnant topicalization always leads to a structure that results in lowered grammaticality, presumably because of the trace that is not c-commanded by its antecedent. However, if this structure is motivated by other needs, the result may be fully acceptable. In (a), this structure is motivated by the intention of the speaker to focus on *nicht*, which should happen in a preverbal position. This requires the integration of *meinen Eltern* and *vorgestellt* into a simple predicate (cf. section 5.3 for the notion of integration), which then can be topicalized. No such motivation exists for (b) or (7.b).

it is unclear whether it is NP-movement (A movement) (cf. Fanselow 1989) or *wh*-movement (A-bar movement), and in particular, adjunction to IP (cf. Webelhuth 1989). This is not the place to go into a detailed discussion of the nature of scrambling. What is essential for the point to be made here is that most recent accounts involve the presence of an empty element in the basic position of the scrambled element that is visible for grammatical processes, such as the additional scope in example (6.b).

### 5.3 The Notion of “Verbal Predicate”

The hypothesis that focus is assigned to a preverbal constituent has to be clarified as to what exactly counts as verbal predicate. So far we have assumed that the verbal predicate is a lexical element. However, it turns out that we must allow for the possibility of complex verbal predicates. Reconsider examples (32) and (33): Although the indicated answers are certainly the unmarked ones, the answer (33') is possible for (33) as well, and the answer (32') is by no means completely ungrammatical for (32).

- (33') Hans hat [der MaRIa]<sub>F</sub> den RoMAN vorgelesen.  
 Hans has the-DAT Maria the-ACC novel read
- (32') <sup>?</sup>Hans hat [den RoMAN]<sub>F</sub> der Maria vorgelesen.

A possible explanation for this phenomenon is that *das Buch vorgelesen* and, to a lesser degree, *der Maria vorgelesen*, can function as complex verbal predicates. Focus can be assigned to the constituent that immediately precedes and c-commands this complex predicate.

The formation of complex verbal predicates can be related to the notion of “integration” of arguments and adjuncts into informational units, as discussed by Jacobs (1991, 1993). Jacobs developed this notion in order to describe the formation of constituents that are marked by a single main accent (so-called “focus domains” in Uhlmann 1991). For example, (38.B) illustrates the integration of a direct object, *einen Roman*, into a verb, *vorgelesen*. The result is that the focus on the VP *einen Roman vorgelesen* is marked by a single main accent, *einen Roman*.<sup>17</sup> This is clearly preferred to a realization in which both the object and the verb receive an accent (38.B')

- (38) A: What did Maria do with Hans?  
 B: Sie hat ihm [[einen RoMAN vorgelesen]<sub>int</sub>]<sub>F</sub>  
 she has him-DAT a-ACC novel read  
 B': <sup>??</sup>Sie hat ihm [einen RoMAN VORgelesen]<sub>F</sub>

Jacobs mentions a variety of factors that facilitate or impede the integration of constituents into informational units. For example, arguments are integrated more easily than adjuncts. Also, arguments in their canonical position integrate somewhat more easily; compare (38) with (39), where the non-integrated version (B') is slightly preferred.

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<sup>17</sup>This phenomenon has been described as “focus projection” by Höhle (1982); see also Selkirk (1984) and Gussenhoven (1984). Focus assignment to a constituent that INCLUDES the verb, as in (38.B, B'), is at odds with the claim that focus is assigned to a PREVERBAL constituent; see section 5.5 for discussion.

- (39) A: What did Maria do with the novel?  
 B: <sup>?</sup>Sie hat das Buch [[dem HANS vorgelesen]<sub>int</sub>]<sub>F</sub>  
 she has the-ACC book the-DAT Hans read  
 B': Sie hat das Buch [dem HANS VORgelesen]<sub>F</sub>

Now I would like to propose that integration has still another effect besides governing the formation of focus domains: It defines the verbal predicate and hence the preverbal constituent that can receive focus. This is illustrated in (40). In the first step, the verbal argument  $\beta$  and the verb  $\alpha$  are integrated into one verbal complex,  $[_V \beta \alpha]_{int}$ . This brings  $\alpha$  into a position immediately preceding the verbal predicate, in which it can receive focus.

- (40)  $[\alpha [\beta [_V \gamma]]] \Rightarrow \text{integration} \Rightarrow [\alpha [\beta \gamma]_{int}] \Rightarrow \text{focus assignment} \Rightarrow [\alpha_F [\beta \gamma]_{int}]$

The data in (32'), (33') now can be explained as follows: (33') is fine because integration of *das Buch* and *vorgelesen* is easy; it is slightly dispreferred to (28) because (28) does not involve any integration at all. (32') is slightly disfavored because it requires integration of *der Maria*, an object not in its canonical position, and *vorgelesen*.

We can test this hypothesis — that integration is equally relevant for both focus domain formation and focussation of preceding constituents — with a variety of other examples. Take [ACC [DAT V]]-verbs like *unterziehen*. First, data concerning focus domain formation shows that for *unterziehen* integration of the dative argument is possible, but integration of the accusative argument is awkward:

- (41) A: What did Maria do to Hans??  
 B: Sie hat den Hans [[dem SEHtest unterzogen]<sub>int</sub>]<sub>F</sub>.  
 she has the-ACC Hans the-DAT eye exam subjected  
 B': <sup>???</sup>Sie hat den Hans [dem SEHtest unterZOgen]<sub>F</sub>.  
 (42) A: What did Maria do with respect to the eye exam?  
 B: <sup>?</sup>Sie hat dem Sehtest [[den HANS unterzogen]<sub>int</sub>]<sub>F</sub>.  
 she has the-DAT eye exam the-ACC Hans subjected  
 B': <sup>?</sup>Sie hat dem Sehtest [den HANS unterZOgen]<sub>F</sub>.

(42.B') is less than perfect; the version in which the de-accented direct object *dem Sehtest* intervenes between *den Hans* and *unterzogen* is clearly better (*sie hat den HANS dem Sehtest unterzogen*). This may be due to the collocational character of the combination of an NP denoting an exam and *unterziehen*, or, in other words, it may reflect the fact that the dative is a lexically governed case for verbs like *unterziehen*. What is important here is that focus assignment works in a similar fashion, witness the following examples:

- (43) A: To which test did Maria subject Hans?  
 B: Sie hat den Hans [dem SEHtest] unterzogen.  
 she has the-ACC Hans the-DAT eye exam subjected  
 B': <sup>???</sup>Sie hat [dem SEHtest] den Hans unterzogen.

- (44) A: Whom did Maria subject to the eye exam?  
 B: <sup>?</sup>Sie hat dem Sehtest [den HANS]<sub>F</sub> unterzogen.  
 she has the-DAT eye exam the-ACC Hans subjected  
 B': Sie hat [den HANS]<sub>F</sub> dem Sehtest unterzogen.

The grammaticality judgements are more extreme in this case: For one thing, (43.B') is worse than (32'), and furthermore the integrated version (44.B') seems slightly better than the non-integrated version (44.B), whereas (33.B) and (33') were about equally good. It seems that innermost dative objects show a stronger tendency towards integration than innermost accusative objects, which would again be a consequence of the fact that verbs like *unterziehen* assign dative case lexically, whereas accusative is arguably a structural case in German.

Another area that allows us to test our hypothesis are prepositional objects and complements of light verbs, which always are semantically closest to the verb. We should expect, then, that such complements are integrated most easily. This is indeed the case and can be illustrated both by focus domain formation and focus assignment. The first set of examples concerns a light verb construction:

- (45) A: What did Maria do to Hans?  
 B: Sie hat dem Hans [[eine OHRfeige gegeben]<sub>int</sub>]<sub>F</sub>.  
 she has the-DAT Hans a slap in the face given  
 'She gave him a slap in the face.'  
 B': <sup>???</sup>Sie hat dem Hans [eine OHRfeige geGEBen].
- (46) A: Whom did Maria give a slap in the face?  
 B: Sie hat [dem \HANS]<sub>F</sub> eine Ohrfeige gegeben.  
 B': <sup>???</sup>She hat eine Ohrfeige [dem \HANS]<sub>F</sub> gegeben.

We find a similar distribution of acceptability for prepositional complements, again for both focus domain formation and focus assignment:

- (47) A: What did Maria do with the newspaper?  
 B: Maria hat die Zeitung [[in den OFen gesteckt]<sub>int</sub>]<sub>F</sub>.  
 Maria has the-ACC newspaper in the-ACC stove inserted  
 'Maria put the newspaper into the stove.'  
 B': <sup>???</sup>Maria hat die Zeitung [in den OFen geSTECKT]<sub>F</sub>
- (48) A: What did Maria put into the oven?  
 B: Maria hat [die ZEitung]<sub>F</sub> in den Ofen gesteckt.  
 B': <sup>???</sup>Maria hat in den Ofen [die ZEitung]<sub>F</sub> gesteckt.

To summarize, there is evidence for a process of integration of arguments into a verb that results in a complex verbal predicate. This process is important not only for the formation of focus domains but also for the assignment of focus to arguments and adjuncts to the left of verbal predicates.

This latter function of integration allows us to state another pragmatic condition for this process: In an example like (33'), the integrated constituent, *das Buch vorgelesen* 'read

the book (to someone)' was mentioned in the preceding question, *Wem hat Hans das Buch vorgelesen?*, 'Who did Hans read the book to?', and this is certainly a strong reason why this constituent is integrated, that is, why its parts fail to be informationally autonomous. Being mentioned in the immediately preceding context may even override other factors that militate against integration, like the non-standard word order in (32').

#### 5.4 Focus on Subconstituents

An important question is what happens in cases where only part of an argument or adjunct of the verb appears to be in focus. In these cases the argument and adjunct that *contains* the focus has to be brought into a preverbal position:

- (49) A: Which towel did you use?  
B: Ich habe [das BLAUe Handtuch] benützt.  
I have the blue towel used  
'I have used the blue towel.'

In fact, many of the examples of the rise-fall contour we have considered so far were of this type. For example, in the derivation (29) the preverbal phrases are *JEDen Roman* and *mindestens ein Student*, in which the determiners, *jeden* and *ein*, are in focus, not the whole NP. It should also be noted that languages for which a focus position is generally assumed, such as Hungarian, behave in a similar way: it is always the maximal argument or adjunct that contains the focus that is moved into that position (cf. Kenesei 1993).

There are at least two ways to modify the assumptions of pre-verbal focus assignment that will achieve descriptive adequacy in this case. One is to assume that focus is freely assigned to the embedded phrase (e.g. *blaue* in (49)), but that this feature has to be checked at a preverbal position. The focus constituent itself cannot move to this position as this would violate syntactic island restrictions. The smallest constituent that actually can end up in this position is the immediate argument or adjunct of the verb (in our case, *das blaue Handtuch*), and hence we find the constellation illustrated in (49).<sup>18</sup>

Another option is to distinguish between the focus constituent proper and what I may call *focus phrase*. In (49), the focus phrase is *das blaue Handtuch*, and it is this phrase that has to end up in a position preceding the verbal predicate. Every focus phrase must contain a focus constituent; in example (49), the focus phrase contains the focus constituent *blaue*. The focus constituent helps to generate the alternative meanings for the focus phrase; in example (49), the alternatives are 'the red towel', 'the green towel', etc. This distinction between focus constituent and focus phrase was suggested by Drubig (1994) in an effort to show that the association of focus-sensitive particles with a focus abides by syntactic island constraints, contrary to common assumptions dating back to Anderson (1972) and Jackendoff (1972). The type of evidence that Drubig adduces can be illustrated with the following example:

- (50) Sam only talked to [<sub>X</sub> the woman who read SUE's book]

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<sup>18</sup> This process is reminiscent of pied-piping constructions, in which an embedded *wh*-element enables *wh*-movement of a complex phrase. However, it is different from pied piping because the focus may be arbitrarily deeply embedded within the phrase that undergoes movement.

It is commonly assumed that the focus of (50) is *Sue*, hence association with the focus-sensitive particle *only* is syntactically unbounded. Drubig argues that the focus is actually X, citing evidence from languages with focus movement, *it*-clefts, and correlative phrases. For example, (50) could not be continued by *not BILL's*, or *not who read BILL's book*, but can be continued by *not the woman who read BILL's book*, which Drubig takes as showing that the corresponding constituent X is the focus phrase.

Evidence for focus phrases comes also from semantic interpretation of sentences with focus-sensitive operators (cf. Krifka 1996). Previous accounts of the semantics of *only* (e.g., Rooth 1985, Krifka 1992), in which *only* in (50) associates with the focus *Sue's*, would arrive at a reading that can be paraphrased as: Sue is the only x such that Sam talked to the woman who read x's book. But this is not what (50) means; (50) does not exclude that the woman in question read books by other authors as well. What (50) means can rather be paraphrased as: The woman who read Sue's book is the only x such that Sam talked to x, where x satisfies the description 'woman who read y's book', where y ranges over authors. That is, among the women who read someone's book, the woman who read Sue's book is the only one Sam talked to. Notice that the capitalized phrase corresponds to the phrase X in (50), that is, to the focus phrase. Hence what has been described as association with focus should be rephrased as association with focus phrase. One consequence for the theory to be developed here is that in the derivation (29) we should not speak of *focus* assignment in steps (d) and (f), but rather, more precisely, of *focus phrase* assignment. But I will keep talking about *focus* assignment in this paper.

### 5.5 Other Ways of Assigning Focus

One obvious question at this point is whether focus can *only* be assigned to constituents that precede the verbal predicate. This is not the case. For one thing, the verbal predicate itself may be in focus, or part of a focus, as in the following example:<sup>19</sup>

- (51) A: What did Maria do next?  
 B: Sie hat [die ZEitung in den Ofen gesteckt]<sub>F</sub>.  
 she has the newspaper in the oven inserted

But notice that focus assignment as in (51.b) and preverbal focus assignment have one thing in common, namely, that *focus is realized as late as possible* in the clause. In the case of preverbal focus assignment this is overruled by the requirement that the non-finite verb complex occur in the clause-final position, and in this case late assignment of focus will mean assignment of focus to a preverbal constituent. This calls for a treatment within Optimality Theory (Prince & Smolensky 1993): We may assume two rules, FOCUSLAST and VERBLAST, where VERBLAST wins out in case of a conflict. So-called extraposition, in which heavy constituents are moved after the final verb complex, can be seen as evidence for FOCUSLAST to win out over VERBLAST. Also, it seems that Early New High German went through a stage in which FOCUSLAST was stronger than VERBLAST, leading to a situation in which focus expressions that did not contain the verb occurred immediately *after* the verb (cf. Bies 1994).

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<sup>19</sup> Incidentally, the focus marking pattern illustrated in (51.B) contradicts a claim about focus projection made in Cinque (1993), namely, that focus projects from the most embedded constituent. In this example, *in den Ofen* is more deeply embedded than *die Zeitung*, and we should expect accent on *Ofen* in Cinque's theory.

One consequence of this explanation of preverbal focus assignment as “late” assignment is that we predict that traces that intervene between the focus constituent and the verb should not impede focus assignment. If focus assignment were due to some process of government by the verb (an option that has been proposed for languages like Hungarian), then a derivation like (29) would indeed be problematic, as the preverbal constituents in (c) and (e) are not the full NPs *mindestens ein Student* and *jeden Roman*, but rather the trace  $t_2$ . But if focus assignment is a consequence of a linearization rule, traces are predicted to be invisible for this process. If focus is preferably assigned to the last element (modulo stronger rules like VERBLAST), and if movement is the only way to achieve variation in linear order, we must assume that traces are irrelevant for focus assignment.

A further type of example that may create a problem is focus on more than one constituent, as in the following case:

- (52) A: What did Maria read to whom?  
 B: Maria hat [dem HANS]<sub>F</sub> [einen RoMAN]<sub>F</sub> vorgelesen.  
 Maria has the-DAT Hans a-ACC novel read

We may assume for such cases that focus assignment to preverbal position is recursive, that is, focus is first assigned to the immediate preverbal constituent *einen Roman*, and then to *dem Hans*. One piece of evidence for this is that it is dispreferred to have expressions (here an adverb *mit großer Freude* ‘with great joy’) intervene between the two foci:

- (52’) a. B: Maria hat mit großer Freude [dem HANS]<sub>F</sub> [einen RoMAN]<sub>F</sub> vorgelesen.  
 Maria has with great pleasure the-DAT Hans a-ACC novel read  
 ‘Maria read a novel to Hans with great pleasure’  
 b. B’: ?Maria hat [dem HANS]<sub>F</sub> mit großer Freude [einen RoMAN]<sub>F</sub> vorgelesen.

Another case that seems difficult to reconcile with preverbal focus assignment is focus on the constituent in  $C^0$  position. This type of stress can highlight the lexical content of this expression (53.a), the tense (53.b), or the truth polarity in the case of verum focus (53.c) (cf. Höhle 1992):

- (53) a. Maria rezenSIERte den Roman, sie hat ihn nicht geSCHRIEben.  
 ‘Maria reviewed the novel, she didn’t write it.’  
 b. Maria HAT den Roman bereits rezensiert.  
 ‘Maria has already reviewed the novel’  
 c. Maria HAT den Roman rezensiert. / Maria rezenSIERte den Roman.  
 ‘Maria DID review the the novel’

Cases like (53.a) and (53.b) can be explained as instances of focusation of the verb or the auxiliary. If we assume that focus can be assigned to verbal elements in one of the ways contemplated with example (51), we only have to make the additional assumption that this focus assignment can happen before  $C^0$ -movement, for which I will present evidence in section (6). The accent pattern in cases of verum focus, as in (53.c), has been explained by Höhle (1992) as a default accent in which, essentially, accent falls on the lexically least conspicuous constituent, which is typically the constituent in  $C^0$ .

Finally, there are cases in which the focused constituent obviously does not occur preverbally but in a topicalized position, as in the following examples:

- (54) [MaRIa]<sub>F</sub> hat den Roman gelesen.  
 ‘Maria has read the novel’

I would like to argue that in these cases the expression in focus originated in a preverbal position, where it got assigned focus. I will turn to such cases in the next section.

## 6 Focus Assignment Before Movement

Assumption (ii) of section (4) concerns the possibility of focus assignment prior to movement. This point needs some clarification, as it is often assumed that focus is assigned on S-structure. Indeed, focus was used by Chomsky (1971) to motivate the distinction between D-structure and S-structure. Chomsky argued that expressions that are constituents on S-structure, but not on D-structure, can be in focus.

However, there are problems with any simple-minded implementation of the idea of focus assignment on S-structure constituents, which was pointed out already by Bierwisch (1968). There are convincing data from German that show that focus assignment may *precede* syntactic movement. This is illustrated in example (55), which involves focus on a constituent that is discontinuous on S-structure, a verb with separable prefix *an-fing* ‘began’. Notice that we cannot assume focus on the prefix *an-* only, as this does not carry any meaning on its own<sup>20</sup>. Under standard assumptions this predicate originates as a continuous expression in D-structure. We can retain the theoretically attractive view that focus is assigned to constituents by assuming that it may be assigned prior to movement:

- (55) Maria fing sofort AN. ‘Maria started immediately’
- D-structure: [CP e [C' e [IP Maria [sofort [an [fing]]]]]]
- Focus assignment: [CP e [C' e [IP Maria [sofort [an [fing]]<sub>F</sub>]]]]<sup>21</sup>
- C<sup>0</sup> movement: [CP e [C' fing<sub>1</sub> [IP Maria [sofort [an [t<sub>1</sub>]]<sub>F</sub>]]]]
- Spec-CP movement: [CP Maria<sub>2</sub> [C' fing<sub>1</sub> [IP t<sub>2</sub> [sofort [an [t<sub>1</sub>]]<sub>F</sub>]]]]

Another piece of evidence for focus assignment before movement may be derived from examples like the following, where in B’s answer the semantic content of *einen Roman gelesen* ‘read a novel’ should be in focus, although it does not form a constituent on S-structure.<sup>22</sup>

<sup>20</sup>The stem part *fing-* is only historically related to *fingen*, past tense of *fangen* ‘catch’. *An* has a directional meaning *to*, but again this is not transparent in *an-fing*.

<sup>21</sup>For simplicity, I assume here focus assignment according to the second option discussed with respect to example (51).

<sup>22</sup>Uhmann (1991) has argued that this accent pattern is fully acceptable only if the verb is “predictable” with respect to the object, as ‘read’ is for ‘novel’. For example, when we change (56.B) to <sup>3</sup>*Einen RoMAN hat sie verbrannt* ‘she has burnt a novel’, we get a less acceptable result. But notice that we already find a difference between these two cases when we consider the underlying order, *Sie hat [einen RoMAN gelesen]<sub>F</sub>* ‘she has read a novel’ vs. <sup>3</sup>*Sie hat [einen RoMAN verbrannt]<sub>F</sub>* ‘she has burnt a novel’. The latter sentence improves when the complex predicate is not integrated, cf. *Sie hat [einen RoMAN verBRANNT]<sub>F</sub>*, and this pattern leads to a good result when the object is topicalized, [*Einen RoMAN*]<sub>1</sub> *hat sie [t<sub>1</sub> verBRANNT]<sub>F</sub>*. Hence “unpredictable” predicates seem to impede integration, but not movement of a constituent after focus assignment.

- (56) A: What did Maria do next?  
 B: Einen RoMAN hat sie gelesen.  
 ‘She read a novel’.

So it seems that, in general, focus may be assigned *before* movement. The second assumption we made for the derivation of (29) is independently motivated.

Movement of expressions that are in focus (and that leave a trace) has to be distinguished from focus assignment to traces, which is presumably impossible, as they are phonologically empty.<sup>23</sup> This has interesting theoretical consequences: In a purely representational account, we cannot tell these two cases apart (focus assignment before or after movement). If focus can only be assigned at a specific position within a category X, and if the focused constituent  $\alpha$  is outside of X in surface structure, then we would have to assume that focus assignment is to the trace of  $\alpha$ , which then is interpreted as a focus on  $\alpha$  itself:

- (57) Representational account:  
 $[\alpha_i [X \dots [t_i]_{F \dots}]]$ , interpreted as  $[[[\alpha_i]_F [X \dots t_i \dots]]]$

But this would violate the restriction for focus assignment to traces. On the other hand, a derivational account can generate the intended structure without focus assignment to a trace:

- (58) Derivational account:  
 $[X \dots \alpha \dots] \text{ ==focus assignment==> } [X \dots [\alpha]_{F \dots}] \text{ ==movement==> } [[[\alpha]_F]_i [X \dots t_i \dots]]$

So it appears that the present account of scope inversion under the rise-fall contour requires a derivational framework.

## 7 Contrastive Topics and the Rise-Fall Contour

Assumption (iii) of section (4) stated that the contrastive topic construction involves a focus within the topic constituent that is realized by a rise accent, or rather by a slight fall followed by a strong rise (cf. section 3.4). As with other topics, contrastive topics preferably are real-

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<sup>23</sup> <sup>23</sup> The LI reviewer pointed out one example attributed to Irene Heim that seems to show that PRO, a phonologically empty category, can be focused:

- (a) Maria möchte [PRO auch eingeladen werden]  
 Maria wants PRO as.well invited PASSIVE

Focus is apparently on the subject PRO of the lower clause; the example means ‘Maria wants that SHE as well gets invited’, not ‘MARIA as well wants that she gets invited’. But notice that *auch* (like English *as well, too*) is a rather special focus-sensitive operator when it follows its focus: It carries the main stress of the sentence, and the constituent that is normally called its focus may be identified by some other way than accent. In example (a), *auch* must carry the main accent, just as in the following example, where *sie*, normally called the focus of *auch*, may be completely deaccented:

- (b) Sie wurde AUCH eingeladen.  
 she was too invited  
 ‘She was invited, too’

But if, for whatever reason, *auch* can identify its “focus” constituent by other means than by regular focus marked by accent, we should not be surprised that its “focus” may be an empty constituent, like PRO. With operators that have to make use of a regular focus marked by accent, such as *nur* ‘only’ or *even* ‘sogar’, examples like (a) do not arise.

ized within Spec-CP, which involves movement. The second accent is a regular focus accent that marks the focus within the comment.

Contrastive topics in this sense must be distinguished from various other constructions. First, they are not just corrective statements which require that the rest of the utterance is treated as contextually present and hence do not need a focus at all. In this case the focus is marked by falling accent, and the rest of the sentence is destressed. Under this pattern the following sentence is not ambiguous, but only has the  $\exists(\forall)$  reading.

- (59) Mindestens \EIN Student hat jeden Roman gelesen (nicht mindestens DREI)  
at least one-NOM student has every-ACC novel read (not at least three)

Second, contrastive topics are distinct from the first part of complex foci, which consist of a simple rise (or a series of rises) followed by a fall. Previous studies (cf. Wunderlich 1991, Féry 1993, Krifka 1994) have not distinguished this pattern from the rise-fall pattern that is under discussion here (see Jacobs 1996). Complex focus is illustrated by example (27.a), if it is taken as an answer to a question like ‘Who read which novel?’.

Furthermore, contrastive topics are distinct from regular topics, even if they contain an accent for some reason (cf. example (27)). Regular topics have a simple rise accent if they contain a focus. A simple rise tone / as a topic marker in English has been suggested at various places (e.g. Pierrehumbert and Hirschberg 1990 and Steedman 1991 on L+H\* pitch tones). It is tempting to see the slight fall in the contour of contrastive topics as evidence of focusation, which is marked by a fall, that then is combined with a topic accent.<sup>24</sup>

One interesting issue is whether contrastive topics have to move to Spec-CP (which is a frequent position for topical constituents). Büring (1995) mentions contrastive topics in another position, namely in  $C^0$ ; the following example is due to Löbner (1990). Notice that the finite verb cannot be moved to Spec-CP for independent reasons, which may be a motivation why we can have a contrastive topic here.

- (60) Du /MUSST \NICHT so viel rauchen.  
you must not so much smoke  
‘You don’t have to smoke that much.’

Contrastive topics are rather marginal within the middle field. Note that contrastive topics in the middle field, according to the theory contemplated here, would involve *scrambling* of a focused phrase from a preverbal position, and scrambling is known not to affect expressions in focus (cf. von Stechow and Sternefeld 1988). Jacobs (1996) assumes an optional topic node in the middle field to accommodate contrastive topics in that position. Movement into that position then would not be scrambling, but a minor variant of topicalization.

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<sup>24</sup>Jacobs (1995) mentions another case from which contrastive topics must be distinguished, which he calls “I-Specification”. It applies to NPs with indefinite articles, in which a rising accent /, or even a fall-rise  $\checkmark$ , on the determiner can lead to a specific interpretation. This interpretation is not available for NPs like *mindestens ein Roman* ‘at least one novel’, which exclude the specific reading.

## 8 Further Issues

In this section I will discuss certain consequences and additional data that may bear on the issues discussed so far, in particular the rise-fall pattern in split NP constructions, certain binding-theoretic effects, and principles that block the inverted scope reading.

### 8.1 *Split NP Constructions*

A treatment of the fall-rise pattern would be incomplete without mentioning cases of so-called split NP constructions (cf. van Riemsdijk 1987, Fanselow 1988, 1993). One fact about these constructions that often goes unmentioned in the literature is that they necessarily involve the rise-fall contour (rise on the initial constituent, fall on the quantifier).

- (61) Ro/MANe hat Hans \VIEle gelesen.  
 novels has Hans many read  
 ‘As for novels, Hans has read many.’

One important fact about split NP constructions is that the constituent appearing in Spec-CP must have the form of a full NP — for example, a plural noun or a mass noun, but not a singular count noun (cf. (62)). Also, the stranded determiner must be of the form of a full NP (cf. (63)).

- (62) \*Ro/MAN hat Hans \EInen gelesen.  
 novel has Hans one read

- (63) a. Maria hat  $[_{NP} \{kein \mid *keines\} Wasser]$  getrunken.  
 Maria has  $\{no \mid *none\}$  water drunk  
 b. /Wasser hat Maria  $\{\backslash KEInes \mid * \backslash KEIN\}$  getrunken.  
 water has Maria  $\{none \mid *no\}$  drunk

Following Fanselow (1988, 1993) and van Geenhoven (1995, 1996), who give additional arguments for this position, I assume that the noun and the “stranded” determiner are base-generated as maximal constituents. That is, in addition to structures like (64.a), we also have structures like (64.b).

- (64) a.  $[_{NP} [_{DET} \alpha] [_N \beta]] [_V \gamma]$   
 b.  $[_{NP} \alpha'] [_{NP} \beta'] [_V \gamma]$

We find structures like (64.b) if the content of the noun  $\beta$  should have the pragmatic function of a contrastive topic, and the content of the determiner  $\alpha$  should be the focus of the comment. Then both  $\alpha$  and  $\beta$  should receive their focus independently, and  $\beta$  should undergo Spec-CP movement to receive the contrastive topic interpretation. This is impossible with a structure like (64.a); the rule of preverbal focus assignment could assign a focus just to the whole NP, not two separate foci to its constituents. But we may assume that there is an alternative structure (64.b) with essentially the same meaning in which we have a quantificational NP  $\alpha'$  and a bare NP  $\beta'$  that have similar semantic content as  $\alpha$  and  $\beta$  up to type-theoretic differences, and similar morphological form up to the requirement that both  $\alpha'$  and  $\beta'$  must have the shape of full NPs. In this configuration, focus assignment on  $\beta'$ , Spec-CP movement of  $\beta'$ , and focus assignment on  $\alpha'$  is possible. Hence the D-structure of (61) is:

- (65)  $[_{CP} e [_{C'} e [_{IP} Hans [_{NP} viele] [_{NP} Romane] [_V gelesen]]]] hat]$

The interpretation for  $\alpha'$  and  $\beta'$  should guarantee that the meanings of (64.a) and (b) come out the same. This poses a compositionality problem, as it is unclear how *viele* can access the meaning of *Romane* when operating on the meaning of *Romane gelesen*. Van Geenhoven (1995, 1996) proposes a complex type-shifting analysis that would allow for *Romane gelesen* to be applied to *viele*. There is another option: In split NP constructions, the topicalized NP  $\alpha'$  always is predicative and is related to a new discourse referent.<sup>25</sup> We can assume that the modifier  $\beta'$  can identify this discourse referent, and is applied to it. In a model of dynamic interpretation (e.g., Rooth 1987), this can be implemented in the following way:

- (66) a. *Romane gelesen*:  $\{\langle g, x, h \rangle \mid g < h \wedge \text{NOVELS}(h(h-g)) \wedge \text{READ}(x, h(h-g))\}$   
 b. *viele*:  $\lambda P \{\langle g, x, h \rangle \mid \langle g, x, h \rangle \in P \wedge \text{MANY}(h(h-g))\}$   
 c. *viele Romane gelesen*:  $\{\langle g, x, h \rangle \mid g < h \wedge \text{NOVELS}(h(h-g)) \wedge \text{READ}(x, h(h-g)) \wedge \text{MANY}(h(h-g))\}$

Here, one-place predicates are interpreted as relations between an input assignment  $g$ , an argument  $x$ , and an output assignment  $h$ . The term  $g < h$  says that  $h$  extends  $g$  insofar as  $h$ 's domain contains exactly one additional discourse referent,  $h-g$  is the discourse referent in which  $h$  and  $g$  differ,  $h(h-g)$  is the value of  $h$  when applied to this discourse referent, and  $\text{MANY}(h(h-g))$  says that the sum individual this discourse referent is anchored to contains many atoms.

Additional evidence for this analysis comes from the following type of NP split, in which  $[\beta' \gamma]$  is topicalized, showing that it indeed forms a constituent. In this case the NP split is motivated by the need to assign separate foci to *viele* and to *Romane gelesen*.

- (67) [RoMAne gelesen] hat Hans \VIEle.  
 novels read has Hans many

Furthermore, it has been noted that the constituent that carries falling accent tends to occur at the end of the middle field (cf. Haider 1989, footnote 2), which is predicted by the analysis presented here. In fact, this is one of the properties that distinguishes split NP constructions from quantifier floating, which neither requires special intonation contours nor final position of the quantifier in the middle field; for example *die Studenten<sub>1</sub> sind alle<sub>1</sub> gestern zum \BERGsteigen gegangen* ‘the students all went mountain climbing yesterday’.

One problem of the suggested theory is that it predicts that the underlying forms of sentences like (63.b) are well-formed, that is, expressions like *\*[keines [Wasser [getrunken]]]* ‘none water drunk’. But it may very well be that the structural change from (63.a) to (63.b) and the deferred interpretation that goes with it is costly and must be motivated — for example, by the need to focus on the determiner and the noun independently. Hence considerations of economy, to be taken up in section (9) below, take care of the lack of such forms.

## 8.2 Binding Phenomena

In deriving scope inversion for examples like (29) I have assumed syntactic movements of scope-bearing operators that are not directly visible in the surface order of constituents. One

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<sup>25</sup> Van Geenhoven (1996) assumes that this discourse referent is introduced by the verb. This is probably the right option, although irrelevant for the point to be made here.

interesting question at this point is whether there is evidence from binding-theoretic data for these movements. Now, Frey's theory does not predict any binding-theoretic differences between examples like (4.b) and (16.b). According to Frey (1993, p. 95) it is always the position of the head of a chain that determines the binding potential within a local domain, and the movements under discussion do not transgress the local domain. However, it seems that speakers do feel certain effects of the rise-fall contour on the binding possibilities. For example, the ten speakers I have interviewed tend to see a difference between examples like (68.a) and (b):

- (68) a. \*Es \STIMMT, dass ich [seiner<sub>1</sub> künftigen Lehrerin  
EXPL is.true that I his-DAT future teacher (female)  
[[jeden Schüler]<sub>1</sub> vorgestellt habe]]  
every-ACC pupil introduced have  
b. <sup>(?)</sup>[Seiner<sub>1</sub> künftigen /LEhrerin]<sub>2</sub> habe ich [\JEDen Schüler]<sub>1</sub> [t<sub>2</sub> [t<sub>1</sub> vorgestellt]]

In. (68.a) the antecedent *seiner künftigen Lehrerin* 'his future teacher (DAT)' cannot bind the possessive pronoun *seiner*, as it does not c-command it. In (68.b), however, *jeden Schüler* 'every pupil (ACC)' does c-command the trace of *seiner künftigen Lehrerin*, and this allows for the indicated binding. Without the rise-fall contour the binding exhibited in (68.b) is judged ungrammatical (cf. Frey 1993, p. 83, ex. 14.b).

### 8.3 Lack of Inverted Scope Readings

There are cases of contrastive topics in which the inverted scope reading does not appear, although all the structural conditions for it seem to be met. One example is the following:

- (69) Mindestens /EIN Student hat ziemlich \VIEle Romane gelesen.  $\exists$ (MANY)  
at least one student has considerably many novels read  
'At least one student read quite a few novels.'

If the derivation in the style of (29) were possible here, we should also expect the MANY( $\exists$ ) reading for (69). But this reading seems to be absent.

It appears that one requirement for scope inversion with quantifiers is that the quantified NP that ends up with wide scope is *partitive*, that is, refers to some quantity of elements of a contextually given set (cf. Jacobs 1996 for this observation). The NP *ziemlich viele Romane* 'quite a few novels' is hard to interpret as partitive<sup>26</sup>. When we change it minimally to a quantifier that enforces a partitive interpretation, *ziemlich viele von den Romanen* 'quite a few of the novels', we get scope inversion again:

- (70) Mindestens /EIN Student hat ziemlich \VIEle von den Romanen gelesen.  
at least one student has quite a few of the novels read  
 $\exists$ (MANY), MANY( $\exists$ )

We can explain this restriction by assuming that scrambling of the constituent that is adjacent to the verb in the underlying structure, that is, step (c) in the derivation (29), is impos-

<sup>26</sup> The partitive interpretation is, however, not completely excluded, which may account for the fact that the scope-inverted reading may occur marginally in (69), and sentences like (71.b) can "switch" to an acceptable interpretation.

sible for non-proportional quantifiers. Evidence for that is that there is an acceptability difference between (71.a) and (b), which shows the effect of scrambling of partitive and non-partitive quantifiers in the middle field:

- (71) a. weil [ziemlich viele von den Romanen]<sub>i</sub> Hans t<sub>i</sub> gelesen hat.  
 because considerably many of the novels Hans read has
- b. ??weil [ziemlich viele Romane]<sub>i</sub> Hans t<sub>i</sub> gelesen hat.  
 because considerably many novels Hans read has

If (71.b) is accepted at all, a partitive interpretation of *ziemlich viele Romane* ‘quite a few novels’ is enforced. Partitivity of quantifiers is an instance of specificity or discourse-linking of a noun phrase, and it has been observed frequently that scrambling does not affect non-specific NPs (cf. Diesing 1992, de Hoop 1992, among others). Hence the additional restriction on step (c) in (29), that the moved quantifier must be partitive, is well motivated.

Jacobs (1996) suggests that partitivity of quantifiers may be the *only* reason for scope inversion. He observes that whenever we find scope inversion, an underlying structure is available in which the wide-scope quantifier c-commands the narrow-scope quantifier (as in (71.a)). So we may assume that partitivity of quantified NPs leads to a non-normal underlying structure (either by base generation, as Jacobs assumes, or by scrambling), which in turn explains the scope inversion phenomenon. Scope inversion for (16.a) would then not be explained by a derivation as in (29), but rather along the following lines:

- (72) a. Basic structure (or structure after scrambling), due to partitivity of *jeden Roman*:  
 [<sub>CP</sub> e [<sub>C'</sub> e [jeden Roman [mindestens ein Student [gelesen]] hat]]
- b. Structure after Spec-CP movement and C<sup>0</sup>-movement:  
 [<sub>CP</sub> mindestens ein Student<sub>1</sub> [<sub>C'</sub> hat<sub>2</sub> [jeden Roman [t<sub>1</sub> [gelesen]] t<sub>2</sub>]]  
 at least one student has every novel read

The specifics of the rise-fall contour do not play any role in this derivation. Hence we should expect that a sentence like (72.b) has a wide scope reading of *jeden Roman*, irrespective of the fall-rise contour. But this is not the case, as we have seen with examples like (4.b). So it seems that we cannot do without the effects of the rise-fall contour to explain scope inversion. Partitivity of the wide-scope quantifier is a necessary but not a sufficient condition to achieve scope inversion.

If we assume that (69) does not show scope inversion because the quantified NP *ziemlich viele Romane* is not partitive and therefore cannot be scrambled from its base position, we have to explain how the rise-fall contour comes about in cases like this. Assuming preverbal focus as a basic condition for focus assignment we may assume that focus is first assigned to the closest preverbal constituent, *ziemlich viele Romane*, and then again to the next closest preverbal constituent, *mindestens ein Student*, following the considerations discussed with example (52) in section 5.5. The NP *mindestens ein Student* then undergoes topicalization.

Another interesting class of examples are those that involve the negative determiner, *kein*. An NP like *keinen Roman* ‘no-ACC novel’ can be interpreted as partitive or non-

partitive.<sup>27</sup> If we concentrate on the non-partitive reading, we find the following interpretation:

- (73) a. /JEDer Student hat \KEInen Roman gelesen.  $\neg(\forall(\exists))$   
 every student has no novel read  
 ‘Not every student read a novel’  
 b. /JEDer Student hat \NICHT einen Roman gelesen.

If we treated *keinen Roman* as a quantifier and apply the derivation illustrated in (29), we would arrive at the  $\forall(\neg(\exists))$  reading (which then would be filtered out according to Büring’s theory, cf. section 3.3), or the  $\neg(\exists(\forall))$  reading. In fact, we only get the  $\neg(\forall(\exists))$  reading. This shows that the determiner *kein* cannot be interpreted as a lexical unit here, but has to be analyzed as an amalgamated form consisting of a negation and an indefinite article that can have distinct scopes (cf. Jacobs 1980 and Kratzer 1995 for additional evidence that this option is available). Example (73) then can be derived as follows:

- (73') a.  $[_{CP} e [_{C'} \text{hat} [_{NEG} [\text{jeder Student} [\text{einen Roman} [\text{gelesen}]]_{int}]]]]]$   
 b.  $[_{CP} e [_{C'} \text{hat} [_{NEG} [[\text{jeder Student}]_F [\text{einen Roman} [\text{gelesen}]]_{int}]]]]]$   
 c.  $[_{CP} [\text{jeder Student}]_{F,1} [_{C'} \text{hat} [_{NEG} [t_1 [\text{einen Roman} [\text{gelesen}]]_{int}]]]]]$   
 d.  $[_{CP} [\text{jeder Student}]_{F,1} [_{C'} \text{hat} [[_{NEG}]_F [t_1 \text{ einen Roman} [\text{gelesen}]]_{int}]]]]]$   
 e.  $[_{CP} [/\text{JEDer Student}]_{F,1} [_{C'} \text{hat} [[\backslash\text{KEInen Roman}] \text{ gelesen}]]]$   
 e'  $[_{CP} [/\text{JEDer Student}]_{F,1} [_{C'} \text{hat} [\backslash\text{NICHT} [\text{einen Roman} \text{ gelesen}]]]]]$

Here, NEG is a negation operator that can either be spelled out by *nicht* (cf. e'), or by amalgamating with an indefinite article (cf. e). A form like *keinen Roman* does not exist as an interpretable constituent in this derivation, and hence the corresponding reading  $\neg(\exists(\forall))$  does not arise.

There are other quantifiers that have special properties that override the general rules that explain scope inversion under the rise-fall contour. One example is *die meisten* ‘most’. NPs formed with this determiner always have wide scope. This contrasts with the truth-conditionally near-equivalent *mehr als die Hälfte* ‘more than half’.

- (74) a. Die /MEISten Studenten haben \JEDen Roman gelesen.  $\text{MOST}(\forall)$   
 most students have every novel read  
 b. Mehr als die /HÄLFte der Studenten hat \JEDen Roman gelesen.  $\text{MOST}(\forall), \forall(\text{MOST})$   
 more than the half of the students has every novel read

This difference is presumably due to an inherent topic property of NPs formed by *die meisten*. Similar differences between ‘most’ and ‘more than half’ have been discussed in Szabolcsi (1995) for Hungarian and English. For example, we find that NPs based on *most* do not occur in locative *there*-sentences (cf. *\*There will be most boys in the yard*), whereas NPs

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<sup>27</sup> The partitive interpretation is enforced by the NP *keinen der Romane* ‘non of the novels’. With this form, an example like (73) behaves as expected, that is, has the  $(\neg\exists\forall)$  reading. The plural NP *keine Romane* has only the non-partitive interpretation. See Kratzer (1995) for the difference in interpretation between phrases like *keinen Roman* and *keine Romane*.

based on *more than 50%* do (cf. *There were more than 50% of the boys in the yard*). If topical quantifiers have inherently wide scope, the difference between (74.a) and (b) is explained.

## 9 Considerations of Economy

### 9.1 Economy in the Rise-Fall Contour

One important aspect of the theory proposed here is that it has to be couched in a general framework that favors simple derivations or representations over complex ones, as suggested by Chomsky (1991, 1992). To see this, have another look at the derivation (29). Notice that if we eliminate the steps in which focus is assigned (namely d and f), we would get the same result as in (g) but without the rise-fall contour. We would end up with a sentence like (4.b), but due to its derivational history this sentence should then exhibit scope ambiguity according to the scope principle. However, we do not observe scope ambiguity in the absence of focussation. Hence we must assume that this hypothetical derivation is not available for (4.b). The obvious reason is that there is a shorter and more economical derivation available that consists just of two movements, namely, Spec-C<sup>0</sup> movement (b) and Spec-CP movement (e). On the other hand, the shortest and most economical way to create the phonological logical form of (16.b), which differs from (4.b) by the presence of the rise-fall contour, is (29).

Economy considerations can also explain why we do not get scope inversion easily when only the subject of our standard example (29) is in focus:

(75) Mindestens \EIN Student hat jeden Roman gelesen.  $\exists(\forall)$ ,  $??\forall(\exists)$

Notice that the  $\forall(\exists)$  interpretation should follow from a derivation like the one in (29) minus step (f), in which *jeden Roman* is assigned a focus. I suggest that (75) tends to have only one, the  $\exists(\forall)$ , interpretation, because it can be derived in a shorter way, which does not lead to a structure to which case (b) of the scope principle can be applied. This way involves integration of the direct object and the verb, and focus assignment to the preceding constituent, the subject NP:

- (76) a.  $[_{CP} e [_{C'} e [_{\text{mindestens ein Student}} [_{\text{jeden Roman}} [_{\text{gelesen}}]] \text{hat}]]]$   
 b.  $[_{CP} e [_{C'} \text{hat}_1 [_{\text{mindestens ein Student}} [_{\text{jeden Roman}} [_{\text{gelesen}}]] \text{t}_1]]]$   
 c.  $[_{CP} e [_{C'} \text{hat}_1 [_{\text{mindestens ein Student}} [_{\text{jeden Roman}} [_{\text{gelesen}}]]_{\text{int}} \text{t}_1]]]$   
 d.  $[_{CP} e [_{C'} \text{hat}_1 [[_{\text{mindestens ein Student}}]_{\text{F}} [_{\text{jeden Roman}} [_{\text{gelesen}}]]_{\text{int}} \text{t}_1]]]$   
 e.  $[_{CP} [_{\text{mindestens ein Student}}]_{\text{F},2} [_{C'} \text{hat}_1 [\text{t}_2 [_{\text{jeden Roman}} [_{\text{gelesen}}]]_{\text{int}} \text{t}_1]]]$   
 f.  $[_{CP} \text{mindestens \EIN Student} [_{C'} \text{hat} [_{\text{jeden Roman}} [_{\text{gelesen}}]]]]]$

We find integration in (c), and focus assignment in (d). Derivation (76) is somewhat simpler than (29) not only because fewer steps are involved, but also insofar a step like integration (c) is presumably less complex and costly than an instance of movement.

One important aspect in which the derivation (29) differs from standard accounts of derivational economy such as Chomsky (1993, 1995) is that the displacement movement of *jeden Roman* is not locally motivated — its sole purpose is to allow for *mindestens ein Stu-*

*dent* to end up in a preverbal position. Hence it violates the principle of GREED.<sup>28</sup> However, notice that GREED was originally proposed for a different kind of phenomenon, namely, the checking of morphological properties. There is in fact independent evidence that GREED is not a general principle when it comes to word order variations in languages with “free” word order. Various accounts of constituent order in the German middle field, such as Lenerz (1977), Uszkoreit (1986) Reis (1987), Jacobs (1988) and Kefer (1989), have argued for rules that are affected by the *relative* value of expressions in dimensions like definiteness or givenness, hence by *global* evaluations of all arguments and adjuncts instead of just *local* evaluations of the properties of a single constituent. In a theoretical setting in which word order variation involves scrambling movements this would suggest that one constituent may scramble to the left because another constituent has to end up farther to the right.

Scrambling triggered by extraneous needs can be illustrated with the following examples, an observation due to Rosengren (1993):

- (77) a. [Ein Außenseiter gewonnen] hat das Derby dieses Jahr noch nie.  
           an outsider-NOM won has the derby this year still never  
           ‘So far, there was no outsider who has won the derby this year’  
       b. \*[Ein Außenseiter gewonnen] hat dieses Jahr noch nie das Derby

In (77.a), a constituent consisting of a subject and a transitive verb has been topicalized. A necessary condition for this is that the topicalized phrase is in focus; also, the final constituent, *nie*, should be in focus. Now, (77.b) is bad even when these conditions are met. The crucial difference, after Rosengren, is that in (77.a) the object NP, *das Derby*, is evidently scrambled (it occurs left of the adverbial, *dieses Jahr*), whereas there is no evidence for scrambling in (77.b).<sup>29</sup> But there does not seem any other reason for scrambling of *das Derby* in (77a) except for allowing for focus domain formation of *ein Außenseiter gewonnen*. Hence there is evidence for violation of GREED by scrambling.

## 9.2 Comparison Classes for Derivational Economy

It is interesting to compare the role of derivational economy suggested here with the way how it is put to work in Fox (1995) to account for the absence of certain scopal orders in English. The most central set of data in Fox (1995) is the contrast in readings between (78.a) and (b), noted by Sag (1976):

- (78) a. Some student admires every professor.  $\exists(\forall), \forall(\exists)$   
       b. Some student admires every professor, and Mary does too.  $\exists(\forall)$

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<sup>28</sup>In section (8.3) we have discussed a local condition for moving, partitivity. However, partitive NPs need not scramble. For example, partitive NPs may occur after adverbials and particles, which is normally seen as indicating that they occur in their base position (cf. Diesing 1992). Example:

*weil der Student bis heute ja doch noch nicht die meisten von den Roman gelesen hat*  
 because the student till today [particles] not yet the most of the novels read has

<sup>29</sup>The anonymous LI reviewer points out that a definite NP MUST scramble in the framework of Diesing (1992). However, notice that definite NPs often occur in positions where there is no indication that they are scrambled, for example, in *Ein Außenseiter hat dieses Jahr ja doch noch nie das Derby gewonnen* ‘an outsider hasn’t won the Derby this year’, where *das Derby* occurs left of the adverbials and particles.

The presence of two readings for (78.a) is accounted for quantifier raising, which can result in one of the two following logical forms:

- (79) a. [some student<sub>1</sub> [every professor<sub>2</sub> [t<sub>1</sub> admires t<sub>2</sub>]]]  $\exists(\forall)$   
 b. [every professor<sub>2</sub> [some student<sub>1</sub> [t<sub>1</sub> admires t<sub>2</sub>]]]  $\forall(\exists)$

The derivation of (79.a) is considered simpler than the derivation of (79.b) for reasons irrelevant here, and hence to be preferred by considerations of economy. However, (79.b) is still an option, as it leads to a distinct interpretation that could not be achieved with a simpler derivation. Hence economy considerations are irrelevant in this case.

Fox accounts for the absence of the  $\forall(\exists)$  reading in (78.b) as follows: The conjunct *Mary does too* has to be spelled out, by general rules of VP ellipsis, as *Mary admires every professor*. Again this sentence has two possible logical forms:

- (80) a. [Mary<sub>1</sub> [every professor<sub>2</sub> [t<sub>1</sub> admires t<sub>2</sub>]]] MARY( $\forall$ )  
 b. [every professor<sub>2</sub> [Mary<sub>1</sub> [t<sub>1</sub> admires t<sub>2</sub>]]]  $\forall$ (MARY)

As the proper name *Mary* is not a scope-bearing expression, both logical forms end up having the same semantic interpretation. (80.a) is the more economical one among them, hence (80.b) is blocked, and only (80.a) survives. Now, there is a general rule for VP ellipsis that enforces parallel logical forms between the conjuncts. For (78.b) this means that the first conjunct will only exhibit the logical form (79.a) that is parallel to (80.a).

The general assumption behind this type of explanation, which Fox attributes to Golan (1993) and Reinhart (1994), is that considerations of economy are applied only to expressions that have *the same semantic interpretation*. Only logical forms that are interpretationally equivalent belong to the same comparison class for the principle of economy. In other words, longer derivations are admissible if they lead to specific semantic effects.

It is obvious that this theory is in conflict with what has been proposed in this paper. If only those derivations that result in the same interpretation were subject to economy considerations, then a sentence like (4.b) would end up with two readings: A straightforward derivation would yield the  $\exists(\forall)$  interpretation, and the more costly derivation contemplated in section (9.1) that is identical to (29) up to focus assignment would yield the  $\forall(\exists)$  interpretation. As these interpretations are different, considerations of economy would not apply to them.

However, there is independent evidence against the assumption that the comparison classes for derivational economy are defined by identity of interpretation in German. It is generally assumed that scopal orders in intonationally neutral sentences in German are less flexible than in English. For example, the equivalent of sentence (78.a) in German is not generally judged to be scopally ambiguous in neutral intonation, as we have seen in section (1).

This opens up the possibility for a parametrization of comparison classes for derivational economy: In English-type languages, comparison classes are determined by *identity of interpretation*, whereas in German-type languages, they are determined by *identity of phonological form*, which includes surface constituent order and prosodic properties. One can speculate that this difference is related to the distinction between languages with “fixed” word order, for which word order serves syntactical purposes like theta-role assignment, and languages with “free” word order. The latter ones are free to exploit word order differences to

express properties like the discourse-pragmatic status of constituents (givenness, focus etc.) and their semantic scope with respect to each other. It would not be “economical” not to make use of this feature.

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