

QUANTIFIED STRUCTURES AS BARRIERS
FOR LF MOVEMENT*

In this paper I argue for a restriction on certain types of LF movement, which I call 'wh-related LF movement'. Evidence comes from a number of *wh*-in-situ constructions in German, such as the scope-marking construction and multiple questions. For semantic reasons, the in situ element in those constructions has to move at LF to either a position reserved for *wh*-phrases, or even higher up in the structure. The restriction (the *Minimal Quantified Structure Constraint*, *MQSC*) is that an intervening quantified expression blocks this movement. In the case of *every*, the MQSC leads to an unambiguously distributive interpretation of the question. In the case of all other intervening operators, including negation, it leads to ungrammaticality.

1. INTRODUCTION

In this paper, I will derive a restriction that correctly rules out ungrammatical sentences like the ones in (1):

- (1) a.* Was glaubt Hans nicht, wer da war?
 what believes Hans not who there was
 'Who does Hans not believe was there?'
- b.* Wen hat niemand wo gesehen?
 whom has nobody where seen
 'Where did nobody see whom?'

I claim that the sentences are ruled out by a restriction on LF movement, which might be informally expressed as in (2).

- (2) * [. . . X_i . . . [Q . . . [. . . t_i^{LF} . . .]]]

That is, an intervening quantifier blocks LF movement. The discussion is based on data from German.

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In section 2, I will give the paradigm of constructions that are the main issue of this paper and show that LF movement is the relevant notion, the constructions being otherwise inhomogeneous. That we do indeed have LF movement in each case is argued for on the basis of the interpretations the respective constructions have. A preliminary version of (2) is derived which deals with negation and negative quantifiers only. Finally, I relate my proposal to some of the recent literature on negative islands.

I will extend the empirical scope of the generalization in section 3, showing that some regularities concerning the so-called pair-list or distributive reading of questions with *every* follow from (an extended version of) the generalization.

In section 4, the question is raised what exactly the class of expressions is that block LF movement. I will look at quantifiers and indefinites and suggest that the expressions with a blocking effect are the inherently quantified expressions. A formalization on (2) is suggested, the Minimal Quantified Structure Constraint (MQSC). I conclude this section with some speculation concerning the status of the MQSC.

Section 5 is devoted to the German *was für*-construction, which has been discussed in the context of intervention effects by de Swart (1992). I will show that the situation is actually more complicated than has been assumed so far, and that one has to be very careful when considering the *was für*-construction in the context of intervention effects.

Finally, in section 6 I will give a summary of the main results, trying to establish the position of these results in a wider framework, as well as compare them to related work. I conclude with some remarks on the role of LF as the syntax-semantics interface.

2. INTERVENTION EFFECTS I: NEGATION

In this section, I will introduce the *wh*-constructions that are the empirical basis of this paper, and look at the effect that interaction with negation has in those constructions (sec. 2.1).¹ I will come up with the empirical generalization that each of the constructions involves LF movement of an expression that is left in situ at S-Structure. This movement seems to be blocked by an intervening negation (sec. 2.2). In section 2.3 I suggest a restriction on the binding of LF traces, the Minimal Negative Structure Constraint (MNSC). The MNSC captures the facts described in this section. Finally, in section 2.4 I relate my suggestion to some of the recent litera-

¹ In this section, I will refer to *nicht* 'not', *niemand* 'nobody', *nie* 'never', *kein* 'no' as negation, for simplicity.

ture on intervention effects by negation. My proposal differs from other suggestions in that it affects exclusively LF movement rather than S-Structural movement. I will briefly demonstrate that this is based on crucial empirical differences between the two.

It should be kept in mind that while this section (for expository reasons) deals with intervening negation only, and the MNSC is a restriction imposed by negation, the analysis will be extended to cover other types of interveners as well. It will turn out that the effects discussed in this section are not really negation specific.

2.1. Data

Example (3) is due to Rizzi (1991), and is meant to show that negation as an intervening A'-specifier blocks antecedent movement:

- (3) *Was glaubst du nicht mit wem Hans gesprochen
 what believe you not with whom Hans spoken
 hat?
 has
 'Who don't you believe that Hans has spoken to?'

While disagreeing with Rizzi on several points (see below), I will indeed regard (3) as a case of intervening negation; in fact, I will look at the extended paradigm in (4).²

- (4) a. ^{??}Was glaubt niemand **wen** Karl gesehen hat?
 what believes nobody whom Karl seen has
 'Who does nobody believe that Karl saw?'
- b. ^{??}Wen hat niemand **wo** gesehen?³
 whom has nobody where seen
 'Where did nobody see whom?'

² The judgments for sentences like those in (4) are somewhat subtle. Although I will generally use unembedded interrogatives for simplicity, it is best to test the sentences under matrix predicates like *fragen* 'ask', *sagen* 'tell', *wissen* 'know', or *wissen wollen* 'want to know'. The '^{??}' means that the data are incomprehensible (uninterpretable) rather than simply ungrammatical. I would accordingly ask native speakers to try and interpret the sentences, not simply judge whether they "sound bad."

³ The judgments for the multiple questions only refer to the reading in which the *wh*-phrase in situ is read as an interrogative phrase, of course. (Sometimes it could alternatively be read as an indefinite.)

- c.^{??}Wen hat niemand **alles** gesehen?
 whom has nobody all seen
 'Who-all did nobody see?'
- d.^{??}Wen hat keine Studentin **von den Musikern**
 whom has no student of the musicians
 getroffen?
 met
 'Which of the musicians did no student meet?'

I will refer to the boldface expression as the *in situ* expression (which, I claim, has to be moved at LF).⁴

Sentence (4a) is a scope-marking construction (see, e.g., von Stechow and Sternefeld 1988 and McDaniel 1989), (4b) a multiple question. (4c) is a *w-alles*-construction (see Reis 1992). The *in situ* part of (4d) belongs to the restriction of the *wh*-phrase. Sentences (5a–d) are grammatical examples for the respective constructions:

- (5) a. Was glaubt Luise **wen** Karl gesehen hat?
 what believes Luise whom Karl seen has
 'Who does Luise believe that Karl saw?'
- b. Wen hat Luise **wo** gesehen?
 whom has Luise where seen
 'Where did Luise see whom?'
- c. Wen hat Luise **alles** gesehen?
 whom has Luise all seen
 'Who-all did Luise see?'
- d. Wen hat Luise **von den Musikern** getroffen?
 whom has Luise of the musicians met
 'Which of the musicians did Luise meet?'

The interpretation of a scope-marking construction is the same as that of the corresponding long extraction. (5a), for example, means the same as (6) (for those speakers who accept long extractions):

⁴ In the case of the scope-marking construction, the *wh*-phrase in the embedded SpecCP is not strictly speaking 'in situ', of course. I will still refer to it as an *in situ* expression, for convenience.

- (6) Wen glaubt Luise daß Karl gesehen hat?
 whom believes Luise that Karl seen has
 'Who does Luise believe that Karl saw?'

Invariant *alles* in (5c) indicates the speaker is not satisfied with an example for an answer, but wants the complete list of people that Luise saw. *Alles* can be stranded (as in (5c)) or move to the Spec of CP with the *wh*-phrase, as in (7). There is no interpretation difference.

- (7) Wen alles hat Luise gesehen?
 whom all has Luise seen
 'Who-all did Luise see?'

Similarly, a restriction to the *wh*-phrase like the PP in (5d) can be split off, as in (4d) and (5d), or move with the *wh*-phrase, as in (8). (8) is interpreted just like (5d).

- (8) Wen von den Musikern hat Luise getroffen?
 whom of the musicians has Luise met
 'Which of the musicians did Luise meet?'

The sentences in (4) are out because of the presence of the negative quantifier; the examples in (5), where we have a harmless proper name instead, are perfectly grammatical.

It is not the presence of the negation per se that is problematic, but rather the structural relation between the negation and the in situ expression. When the in situ part in (4) is moved across negation at S-Structure, as in (9), the result is well-formed:

- (9) a. Wen glaubt niemand daß Karl gesehen hat?
 whom believes nobody that Karl seen has
 'Who does nobody believe that Karl saw?'
 b. Wo hat niemand Karl gesehen?
 where has nobody Karl seen
 'Where did nobody see Karl?'
 c. Wen alles hat niemand gesehen?
 whom all has nobody seen
 'Who-all did nobody see?'
 d. Wen von den Musikern hat keine Studentin getroffen?
 whom of the musicians has no student met
 'Which of the musicians did no student meet?'

In the case of multiple questions, minimal pairs like (10) and (11) can be found:

- (10) a. ^{??}Wer hat niemanden wo angetroffen?
 who has nobody where met
 ‘Who didn’t meet anybody where?’
- b. Wer hat wo niemandem angetroffen?
 who has where nobody met
 ‘Who didn’t meet anybody where?’
- (11) a. ^{??}Welche Kinder haben niemanden welche Bilder
 which children have nobody which pictures
 zeigen wollen?
 show wanted
 ‘Which children wanted to show nobody which pictures?’
- b. Welche Kinder haben welche Bilder niemandem
 which children have which pictures nobody
 zeigen wollen?
 show wanted
 ‘Which children wanted to show which pictures to nobody?’

(10b) needs a good context (e.g., a conversation about deliveries in a pizza service). If a good context is provided, the sentence is fine. (10a), on the other hand, is ungrammatical, no matter how good a context is provided. Similarly for (11). (11a) also demonstrates that the ungrammaticality of (4b), for instance, has nothing to do with the status of *wo* as an adjunct. (12) is another example with *wen* ‘whom’ in situ:

- (12) ^{??}Wann hat niemand wen eingeladen?
 when has nobody whom invited
 ‘When did nobody invite whom?’

The contrast in (13) shows that invariant *alles* can be stranded in the presence of a negative quantifier, as long as it precedes the quantifier. (13c) and (13d) are included to make sure that *alles* can in principle be left behind in both positions (if anything, (13c) is a bit better than (13d)).

- (13) a. ^{??}Was hat Karl niemandem alles gezeigt?
 what has Karl nobody (DAT) all shown
 ‘What-all did Karl not show to anybody?’

- b. Was hat Karl alles niemandem gezeigt?
 what has Karl all nobody (DAT) shown
 ‘What-all did Karl not show to anybody?’
- c. Was hat Karl dem Kind alles gezeigt?
 what has Karl the child (DAT) all shown
 ‘What-all did Karl show to the child?’
- d. Was hat Karl alles dem Kind gezeigt?
 what has Karl all the child (DAT) shown
 ‘What-all did Karl show to the child?’

The generalization across the data seems to be the following: If the *in situ* expression is preceded and thereby (as I will assume) c-commanded by negation at S-Structure, the sentence is ungrammatical. If, on the other hand, it occurs structurally above the negation at S-Structure, the sentence is OK.

I conclude that (4a–d) require a uniform treatment. This will be confirmed in sections 3 and 4. My suggestion will be that for semantic reasons the *in situ* expressions have to be moved at LF to a position outside the scope of negation. Negation seems to block that movement. I will motivate the assumption of LF movement in the next subsection.

Experts will miss the *was für*-construction in the list of intervention effects. As has been observed for instance by de Swart (1992), a split *wat voor*-construction in Dutch is sensitive to negative interveners. The same holds for the German equivalent:

- (14) a. Was für Bücher hat niemand gelesen?
 what for books has nobody read
 ‘What kind of books did nobody read?’
- b.*Was hat niemand für Bücher gelesen?
 what has nobody for books read
 ‘What kind of books did nobody read?’

I will argue that for semantic reasons, the intervention effect in *was für*-constructions cannot receive the same explanation as the cases discussed so far. Since the discussion is somewhat lengthy, it is postponed to section 5.

2.2. Interpretations

Rizzi’s (1991) explanation for the ungrammaticality of (3) is that negation as an intervening A’-specifier on LF prevents antecedent government

between *was* and the *wh*-phrase in the embedded Spec of Comp, thus preventing chain formation. He suggests an LF approximately like (15):

- (15) [_{CP} was_i [_{IP} du [_{NegP} nicht [_{VP} glaubst [_{CP} mit wem_i [_{IP} Hans gesprochen hat]]]]]]]

Now, the interpretation of the scope-marking construction (16a), for instance, is the same as that of the corresponding long extraction, (16b):

- (16) a. Was glaubt Luise, wen Karl gesehen hat?
 what believes Luise whom Karl seen has
 ‘Who does Luise believe that Karl saw?’
- b. Wen glaubt Luise daß Karl gesehen hat?
 whom believes Luise that Karl seen has
 ‘Who does Luise believe that Karl saw?’

I will assume throughout the paper that LF is the level that is compositionally interpreted. An LF like (15) is not as such suited for interpretation. I suggest that the *wh*-phrase that is in the embedded SpecCP at S-Structure has to move to the matrix SpecCP, while *was* as an expletive element is probably deleted. The LF of (16a) should be (17):⁵

- (17) [_{CP} wen_i [_{IP} Luise glaubt [_{CP} t_i^{LF} Karl t_i gesehen hat]]]

I suggest that negation interferes not with the relation between *was* and the embedded *wh*-phrase, but with the relation between the *wh*-phrase and its LF trace. It will now be argued that this explanation is actually general enough to apply to all the cases in (4).

I will assume a Hamblin/Karttunen semantics⁶ for questions (compare

⁵ I had already developed this analysis when Dayal's 1994 proposal concerning the compositional interpretation of scope-marking constructions came to my attention. I am sticking to my own proposal here. See also Müller and Sternefeld 1995 for some arguments that an analysis different from Dayal's might be preferable for the German scope-marking construction. However, as an anonymous reviewer points out, Dayal's proposal could be reconciled with my suggestions under certain reasonable assumptions. These are that finite complement clauses in German occur in a fairly low position at S-Structure, and that in the case of the scope-marking construction they have to move at LF to a CP-adjoined position (which is needed for Dayal's interpretation procedure to work). It would then be this movement that is blocked by an intervening negation, rather than movement of the *wh*-phrase in the embedded SpecCP.

⁶ The semantics I assume is as in Karttunen 1977, except that I don't require the propositions in the set to be true.

Hamblin 1973, Karttunen 1977). In this framework, (18a–d) represent the interpretations that (4a–d) should have if they were well-formed:⁷

- (18) a. $\lambda p \exists x [\text{person}_w(x) \ \& \ p = \lambda w' \neg \exists y [\text{person}_w(y) \ \& \ \text{believes}_w(y, \lambda w'' [\text{saw}_w(\text{karl}, x)]]]$
 b. $\lambda p \exists x [\text{person}_w(x) \ \& \ \exists z [\text{place}_w(z) \ \& \ p = \lambda w' \neg \exists y [\text{person}_w(y) \ \& \ \text{saw}_{w',z}(y, x)]]]$
 c. *alles'*($\lambda p \exists x [\text{person}_w(x) \ \& \ p = \lambda w' \neg \exists y [\text{person}_w(y) \ \& \ \text{saw}_w(y, x)]]]$)
 d. $\lambda p \exists x [\text{person}_w(x) \ \& \ x \in \text{the_musicians}'_w \ \& \ p = \lambda w' \neg \exists y [\text{student}_w(y) \ \& \ \text{met}_w(y, x)]]]$

(18b) is the normal denotation for multiple questions. (18a) is the denotation for long extraction, synonymous with the scope-marking construction. An expression like the *in situ* PP in (18d) is understood as a restriction of the *wh*-phrase just like the *N'* in the case of *which*-questions. (18d) is the meaning that (9d) actually has, just as (18c) is the meaning of (9c). I assume that *alles* in (18c) forces the exhaustive reading of the question. For example, in (19b) it turns the normal question denotation (19c) of (19a) into a set of propositions like (19d).

- (19) a. Wer ist gegangen?
 who has left
 'Who left?'
 b. Wer ist alles gegangen?
 who has all left
 'Who-all left?'
 c. {Sarah left, Jenny left, Hans left}
 d. {Sarah left and Jenny left and nobody else left,
 Sarah left and nobody else left,
 Jenny left and nobody else left, . . . }
 (where Jenny, Sarah, and Hans are the persons in the context)

That is, *alles* turns a Hamblin-set of answers (what I assume is the normal question denotation) into a set of mutually exclusive, exhaustive alternatives. This is achieved by the following semantics of *alles* (due to Irene Heim, pers. comm.):

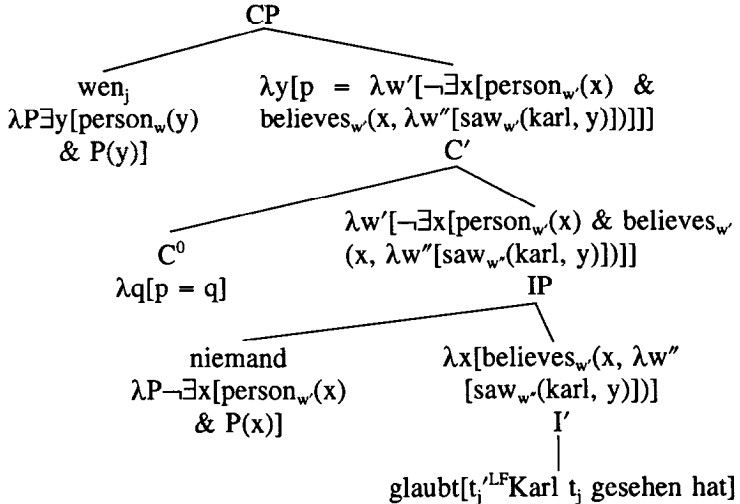
⁷ I am using an ordinary extensional language like Ty2 (Gallin 1975). Implicit arguments are notated as subscripts.

$$(20) \quad \text{alles}'(Q) = \{\bigcap (X \cup \{\lambda w \neg \exists q [q \notin X \ \& \ q \in Q \ \& \ q(w)]\}) : X \subseteq Q\}$$

Thus, *alles* operates on a question denotation, and its scope is the entire question.⁸

In order to derive the interpretations in (18), the sentences in (4) should have the (simplified) LFs given in (21). The interrogative LFs in this paper are based on suggestions in von Stechow 1993a, b. In particular, the interrogative operator ' $\lambda q[p = q]$ ' is the translation of the interrogative C^0 position. (Many of the LFs in this paper will be annotated with their interpretations. In (21a), the translation of each node in the tree is provided. In the other examples below, I will just give the translations of the leaves in the tree and its root.)

$$(21) \text{ a. } \lambda p \exists y [\text{person}_w(y) \ \& \ p = \lambda w' [\neg \exists x [\text{person}_w(x) \ \& \ \text{believes}_w(x, \lambda w'' [\text{saw}_w(\text{karl}, y))]]]]]$$

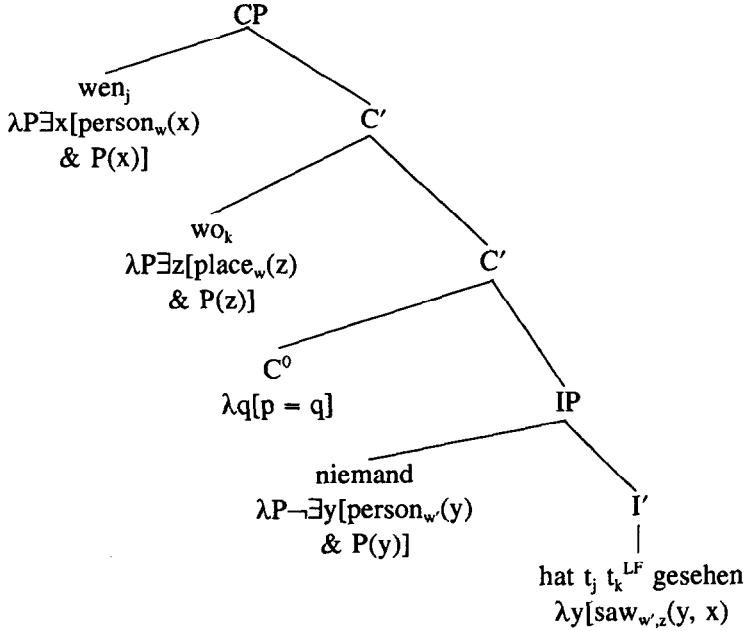


??Was glaubt niemand wen Karl gesehen hat?
 what believes nobody whom Karl seen has

⁸ Syntactically, *alles* is associated with a *wh*-phrase. The suggested semantics, however, is independent of a particular *wh*-phrase. Application of *alles* always results in an exhaustive interpretation for the entire question. This predicts that there is no semantic difference between (i) and (ii) below, which is indeed the case:

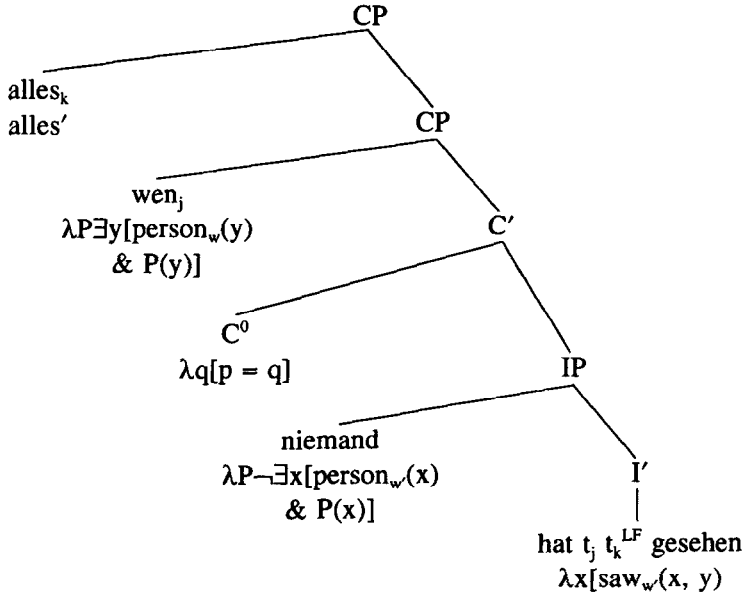
- (i) Wer hat wen alles gesehen?
 who has whom all seen
 'Who saw who-all?'
 (ii) Wer alles hat wen alles gesehen?
 who all has whom all seen
 'Who-all saw who-all?'

- b. $\lambda p \exists x [\text{person}_w(x) \ \& \ \exists z [\text{place}_w(z) \ \& \ p = \lambda w' [-\exists y [\text{person}_w(y) \ \& \ \text{saw}_{w,z}(y, x)]]]]$



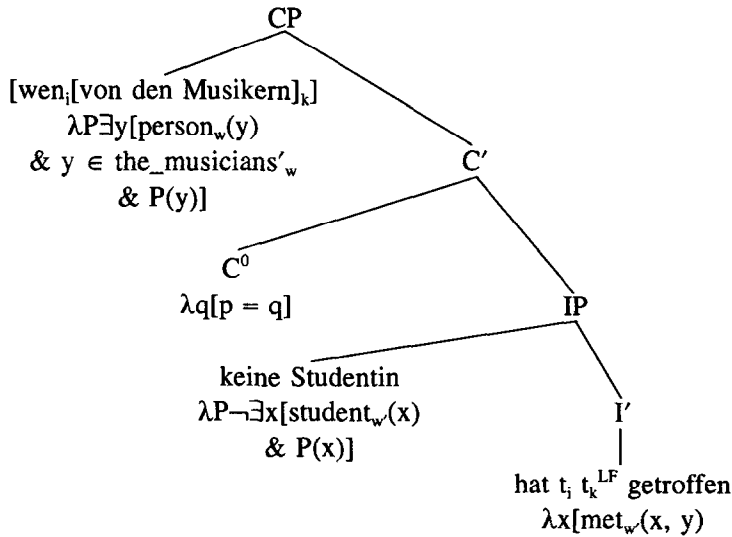
?Wen hat niemand wo gesehen?
 whom has nobody where seen

- c. $\text{alles}' (\lambda p \exists y [\text{person}_w(y) \ \& \ p = \lambda w' [-\exists x [\text{person}_w(x) \ \& \ \text{saw}_w(x, y)]]])$



??Wen hat niemand **alles** gesehen?
 whom has nobody all seen

- d. $\lambda p \exists y [\text{person}_w(y) \ \& \ y \in \text{the_musicians}'_w \ \& \ p =$
 $\lambda w' \neg \exists x [\text{student}_w(x) \ \& \ \text{met}_w(x, y)]]$



??Wen hat keine Studentin **von den Musikern**
 whom has no student of the musicians
 getroffen?
 met

Note that in each of (21a–d), the in situ expression has to occur structurally above the interrogative C⁰ position, leaving an LF trace within the scope of negation.

My explanation for the ungrammaticality of (4a–d) is as follows: The in situ expression, in each case, has to be interpreted outside the scope of negation. It ought to be moved from its S-Structure position (structurally below the negation) at the level of LF. It's just this movement that seems to be blocked in (4), thus ruling out (21a–d) as the LFs for (4a–d), rendering the sentences ungrammatical. I thus propose the following preliminary generalization:

- (22) An intervening negation blocks LF movement.

Note that (in contrast to Rizzi's approach) I don't suggest that the generalization apply to (some kinds of) S-Structural traces as well. Thus, (9a–d) are correctly predicted to be grammatical.

Example (4b) argues particularly convincingly for LF movement being

the relevant notion. In the other cases, negation might interfere with a syntactic (S-Structural) relation between the phrase in SpecCP and the expression in situ. The problem would be to find a *uniform* syntactic explanation, as that relation is hardly the same in (4a, c, d). Furthermore, a syntactic explanation of this kind is highly implausible for two independent *wh*-phrases in multiple questions, as at S-Structure there is probably no structural relationship between the two at all. Thus, (22) constitutes a uniform explanation which would otherwise be hard to come by.⁹ Another case in point will be distributive movement, to be discussed in section 3.2. Note further that, as each of the *wh*-phrases in (4b) can singly be moved across negation at S-Structure, what seems to be problematic is indeed an LF relation.

There are some more data that exhibit the same intervention effect as (4) and that I assume to fall into the scope of (22) (and its formalization). I will simply list them here, without providing a proper semantic analysis. Thus, there are some other types of restrictions to the *wh*-element (*an Aufgaben*, *außer Fritz*, and *Schönes* in the sentences below) that can be split off the *wh*-phrase at S-Structure.

- (23) a. Was hat Luise an Aufgaben gelöst?
 what has Luise of problems solved
 ‘Which problems did Luise solve?’
- b. Was **an Aufgaben** hat niemand gelöst?
 what of problems has nobody solved
 ‘Which problems did nobody solve?’
- c.^{??} Was hat niemand **an Aufgaben** gelöst?
 what has nobody of problems solved
 ‘Which problems did nobody solve?’
- d. Wen hat Luise außer Fritz getroffen?
 whom has Luise except for Fritz met
 ‘Who but Fritz did Luise meet?’

⁹ There is a recent proposal by Reinhart (1994) which allows one to interpret *wh*-phrases in situ. LF movement in the case of multiple questions is thus superfluous. If one adopts her solution, the multiple-question data just don’t fall within the scope of my proposal. Obviously, one would miss out on their similarity to the other data discussed, not all of which can be submitted to Reinhart’s kind of treatment. Rather than specifically argue against such alternative proposals, I appeal to the generality of my suggestion.

- e. **Wen außer Fritz** hat niemand getroffen?
whom except for Fritz has nobody met
'Who but Fritz did nobody meet?'
- f.?' **Wen** hat niemand **außer Fritz** getroffen?
whom has nobody except for Fritz met
'Who but Fritz did nobody meet?'
- g. **Was** hat Karl heute **Schönes** gemacht?
what has Karl today nice(nominal) done
'What nice things did Karl do today?'
- h.?' **Was** hat niemand heute **Schönes** gemacht?
what has nobody today nice(nominal) done
'What nice things did nobody do today?'

These data exhibit completely parallel effects to the (d) examples presented in section 2.1. While (23b) is grammatical, (23c) is out. (23e) is fine; (23f) is out on the reading where *außer Fritz* belongs to the *wh*-phrase.¹⁰ (23g) with a harmless proper name is fine, and (23h) with intervening *niemand* is out again. These facts are explained analogously to (4) by assuming that the negation blocks LF movement of *an Aufgaben*, *außer Fritz*, and *Schönes* to the SpecCP position. The LFs are in all relevant aspects identical to (21d).

There are some potential correlates to the exhaustivity-enforcing operator *alles*, namely *zum Beispiel* 'for example', *ungefähr* 'about', *genau* 'exactly', that exhibit a parallel intervention effect to *alles*:

- (24) a. **Wen zum Beispiel** hat niemand getroffen?
whom for example has nobody met
'Whom, for example, did nobody meet?'
- b.***Wen** hat niemand **zum Beispiel** getroffen?
whom has nobody for example met
'Whom, for example, did nobody meet?'

¹⁰ I take (i) to be the meaning of (23e):

(i) $\lambda p \exists x[\text{person}(x) \ \& \ \neg[x = \text{fritz}] \ \& \ p = \lambda w \neg \exists y[\text{person}(y) \ \& \ \text{met}_w(y, x)]]$

So *außer Fritz* indeed belongs to the restriction of the *wh*-phrase.

- c. Wen **genau/ungefähr** hat noch niemand
 whom exactly/approximately has yet nobody
 eingeladen?
 invited
 ‘Whom exactly/approximately has nobody invited yet?’
- d.*Wen hat noch niemand **genau/ungefähr**
 whom has yet nobody exactly/approximately
 eingeladen?
 invited
 ‘Whom exactly/approximately has nobody invited yet?’

I will now turn to the formalization of (22).

2.3. Formalization

The expressions in (25a–d) are again the LFs that I assume for (4a–d).

- (25) a. $[_{CP} \text{wen}_k [_C C^0 [_{IP} \text{niemand glaubt } [t_k^{LF} \text{Karl } t_k \text{gesehen hat}]]]]]$
 b. $[_{CP} \text{wen}_j \text{wo}_k [_C C^0 [_{IP} \text{niemand } t_j t_k^{LF} \text{gesehen hat}]]]]]$
 c. $[_{CP} \text{alles}_k [_{CP} \text{wen}_j [_C C^0 [_{IP} \text{niemand } t_j t_k^{LF} \text{gesehen hat}]]]]]$
 d. $[_{CP} [\text{wen}_j [\text{von den Musikern}]_k] [_C C^0 [_{IP} \text{keine Studentin } t_j t_k^{LF} \text{getroffen hat}]]]]]$

what we need to exclude are structures like (26):

- (26) $[_X_k \dots [\text{Neg } [\dots t_k^{LF} \dots]] \dots]$

The following two definitions jointly do just that.

- (27) *Negation-Induced Barrier (NIB)*:
 The first node that dominates a negative quantifier, its restriction, and its nuclear scope is a Negation-Induced Barrier (NIB).
- (28) *Minimal Negative Structure Constraint (MNSC)*:
 If an LF trace β is dominated by a NIB α , then the binder of β must also be dominated by α .¹¹

The definition of NIB is supposed to cover sentence negation as well. See section 4 for discussion concerning which expressions exactly are supposed to induce barriers.

¹¹ Note that this definition is stated in terms of nodes and domination, rather than categories and inclusion (cf., e.g., Chomsky 1986).

This is how the MNSC works for (25d), for example: The negative quantifier *keine Studentin* induces a NIB, the boldfaced IP. The LF trace t_k of [*von den Musikern*]_k is dominated by this NIB, but the binder of that trace ([*von den Musikern*]_k) is not. Thus, (25d) violates the MNSC. (25a–c) are parallel. In each case, the offending LF trace t_k is not bound within the minimal NIB it is dominated by. Thus, (4a–d) are excluded by a condition on the binding of LF traces.

(27) and (28) obviously work for (25) no matter what the exact LF position of *niemand* is; that is, whether it is QRed or not. I will now discuss a more problematic example, which unfortunately involves fairly subtle judgements.

- (29) a. ^{??}Wann hat Karl niemanden wo angetroffen?
 when has Karl nobody where found
 ‘When did Karl where find nobody (at home)?’
- b. Wann hat Karl wo niemanden angetroffen?
 when has Karl where nobody found
 ‘When did Karl where find nobody (at home)?’

If we have obligatory QR, the most likely assumption is that in (29b) the LF position of *niemand* c-commands the S-Structure position (and hereby the LF trace) of *wo*.¹² The sentence would be predicted to be out in the same way that (29a) is, as *wo* is excluded at LF by the NIB induced by *niemand*. If *niemand* can be interpreted in situ, on the other hand, (29b) will be predicted to have a well-formed LF (namely the one where *niemand* is left in its S-Structure position). Now, I think that (29a) and (29b) have a different quality to them. (29a) is bad and not improved by a good context. (29b) seems pragmatically unlikely due to the presence of the negation, and fairly complex. In a good context, however, I think the sentence is OK (e.g., think again of Karl delivering for a pizza service). (30a) vs. (30b) make the same point:

- (30) a. ^{??}Was hat Karl niemandem alles gezeigt?
 what has Karl nobody-DAT all shown
 ‘What-all did Karl not show to anybody?’

¹² The point of (29) is that under more traditional assumptions about German clause structure, QR would go beyond the subject position. In (29) the subject Karl makes that position visible.

- b. Was hat Karl alles niemandem gezeigt?
 what has Karl all nobody-DAT shown
 ‘What-all did Karl not show to anybody?’

Clearly, what is relevant is S-Structural order. To capture these contrasts, I will assume that QR is optional, and that quantifiers can be interpreted in situ (at least in German). See Büring (in prep.) for one possible technical solution and more arguments in favor of interpreting quantifiers in situ. Compare also section 4.3 below.

There are some further empirical predictions of the MNSC. In the following examples, the NIB is too low to violate the MNSC because the quantifier is embedded in a relative clause. The data are thus correctly predicted to be grammatical.

- (31) a. Was für Leute, die kein BAFöG bekommen, wohnen
 what for people who no grant get live
 alles in Wohnheimen?
 all in student halls
 ‘What people live in student halls who don’t get a grant?’
- b. Wen hat der Mann, den keiner mag, alles getroffen?
 whom has the man who nobody likes all met
 ‘Who-all did the man meet that nobody likes?’

The definitions of NIB and the MNSC make the prediction that a negative structure is a barrier also for elements contained in its restriction. As far as I can see, this is empirically OK:

- (32) a.*Luise hat erzählt, wer kein Buch von welchem Autor
 Luise has told who no book of which author
 gelesen hat
 read has
 ‘Luise told us who read no book by which author.’
- b.*Wen hat kein Pferd, das wer gefüttert hat, gebissen?
 whom has no horse that who fed has bitten
 ‘Whom did no horse that who fed bite?’

The MNSC thus has the desired effects.

2.4. *Intervening Negation in the Literature*

The effect of negation in *wh*-questions has been extensively discussed in the recent literature; compare, e.g., Cinque 1990, Rizzi 1990, Szabolcsi and Zwarts 1991, Szabolcsi and Zwarts 1993, Rullmann 1995. However, the focus of these papers is on different data, mainly so-called negative islands as exemplified by (33)–(35).

- (33) a. How many books did you want to buy?
 b. How many books didn't you want to buy?
- (34) a. Who did nobody see?
 b.*How did nobody behave?
- (35) a. Who don't you think John saw?
 b.*How don't you think John behaved?

What is mostly looked into is the interaction of negation with an overtly moved *wh*-phrase. Different types of *wh*-phrases behave differently in that respect. In particular, "referential" *wh*-phrases like *who* can be extracted across a negation, while "non-referential" *wh*-phrases like *how* are problematic (cf. (34a) vs. (34b), (35a) vs. (35b)). *How many*-phrases, which normally lead to ambiguities ((33a)), can only have a so-called referential reading in negative contexts ((33b)). There are various proposals to capture these contrasts, ranging from primarily syntactic restrictions (Rizzi, Cinque) to entirely semantic explanations (Szabolcsi and Zwarts, Rullmann).

In contrast to this range of papers, my proposal does not deal with *wh*-phrases that occur structurally above a negation at S-Structure. I am only concerned with LF movement. Accordingly, I am looking at a somewhat different set of data. In the constructions that are the empirical basis of my proposals, the "problematic" *wh*-phrases include those that are characterized as (potentially) referential and are unproblematic with respect to S-Structural movement (e.g., *who*, *what*, *which N*, *where*); compare (34a), (35a) with the various data from section 2. So LF movement of any *wh*-phrase – in fact, any item that undergoes "*wh*-related" movement at LF – is affected by an intervening negation, in contrast to S-Structure, where the effects seem more selective. Thus, none of the existing proposals are prepared to deal with my data. The distinction between S-Structural and LF movement is absolutely crucial, and the respective sets of data should not be confused. Consequently, I will not talk about the classical Negative Island data in this paper. It is possible, however, that my analysis does have something to say about them, too. See Beck 1995 for discussion.

Although the empirical focus of this paper as well as the theoretical

implementation differ from the papers mentioned above, it is obvious that I was inspired by the ideas of the various authors. Also, there is one paper on intervention effects that is more closely related to my data and explanation, namely de Swart 1992. I will come back to it in section 5.

3. INTERVENTION EFFECTS II: *JEDER/EVERY*

In this section I will talk about intervening *every*. Unlike intervening negative quantifiers, *every* leads to unambiguity rather than ungrammaticality in the *wh*-constructions introduced in the previous section. This is due to the fact that among the genuine quantifiers, *every* is the only one that can have a pair-list reading in questions, which rescues the example sentences in section 3.1. I will argue that on the pair-list reading, *every* is moved out of the way. This movement will be referred to as *distributive* movement, and can itself be blocked by an intervening negation, as shown in section 3.2.

3.1. *Every* as an Intervener

The data in (36) parallel those in (4) in section 2, except for *jeder* ‘everyone’ or *jede Studentin* ‘every student’ being the intervening element, rather than negation.

- (36) a. Was glaubt jeder wen Karl gesehen hat?
 what believes everyone whom Karl seen has
 ‘Who does everyone believe that Karl saw?’
- b. Wen hat jeder wo gesehen?
 whom has everyone where seen
 ‘Where did everyone see whom?’
- c. Wen hat jeder alles gesehen?
 whom has everyone all seen
 ‘Who-all did everyone see?’
- d. Wen hat jede Studentin von den Musikern getroffen?
 whom has every student of the musicians met
 ‘Which of the musicians did every student meet?’

Unlike (4), (36a–d) are grammatical. The intervention of *jeder* does have an effect, however: as is observed in Pafel 1991a and Pafel 1993, (36a),

(36c), and (36d) only have the so-called pair-list or distributive reading paraphrased in (37).

- (37) a. For each person x: who does x believe that Karl saw?
 b. For each person x: who-all did x see?
 c. For each student x: which of the musicians did x meet?

This reading is exemplified by the potential answer (38a) to (36d). The sentences do not have the normal, single-answer reading that induces answers like (38b).

- (38) a. Luise saw Karl, Marion saw Bernhard, . . .
 b. Karl and Bernhard.

(36b) also has the distributive reading only, which to my knowledge has not been noticed. It is paraphrased in (39).

- (39) For each person x: who did x see where?

An appropriate answer is illustrated in (40):

- (40) Karl saw Luise in the library, Detmar saw Kordula in Arthur's suite, Luise saw Otto at the hairdresser's, . . .

To be certain of the empirical facts, one wants to make sure that (36a–d) have the distributive reading only. Note that a question like (41) on the distributive reading can have an answer like (42), just in case it so happened that everyone saw the same person (and only that person).

- (41) Wen hat jeder gesehen?
 who has everyone seen
 'Who did everyone see?'

- (42) Everyone saw Bill.

In this case (42) is an abbreviated formulation of a list answer. According to my intuition, (43), on the other hand, cannot be an answer to a question on a distributive reading at all.

- (43) Bill.

However, this intuition was not shared by one of the reviewers. Is there a more reliable way to make sure that (36a–d) are unambiguously distributive? Here's a test due to Pafel (1991a): the sequence (44) seems inconsistent.

- (44) #Ich will nicht von jedem wissen, wen er alles
 I want not of everyone know, who he all
 gesehen hat, sondern ich will wissen, wen **jeder**
 seen has but I want know, who everyone
alles gesehen hat.
 all seen has
 ‘I don’t want to know of everyone who-all he met, I want to
 know who-all everyone met.’

With a question that has got a non-distributive reading as well as a distributive one, the same sequence is OK:

- (45) Ich will nicht von jedem wissen, wen er alles
 I want not of everyone know, who he all
 gesehen hat, sondern ich will wissen, wen **alles**
 seen has, but I want know, who all
jeder gesehen hat.
 everyone seen has
 ‘I don’t want to know of everyone who-all he met, I want to
 know who-all everyone met.’

The sentence is most naturally uttered with stress on *jeder*. According to Pafel, stress on *jeder* excludes a distributive reading. When (36a–d) are uttered with stress on *jeder*, they become ungrammatical. So, while the data really are fairly subtle, there are good arguments for (36) having the distributive reading only.¹³

There has been some discussion in the literature as to how to account for the pair-list reading (see, e.g., Groenendijk and Stokhof 1982, Belnap 1982, Engdahl 1986, Higginbotham 1991, Chierchia 1993). I do not want to go into this at any length. It seems to me that there is some consensus in the more recent literature that the pair-list reading is an independent reading, to be distinguished from the so-called functional reading (see Engdahl 1986 for discussion of the latter). Moreover, the pair-list reading

¹³ An anonymous reviewer suggests that (i) below is grammatical under a reading for *every* that is not distributive:

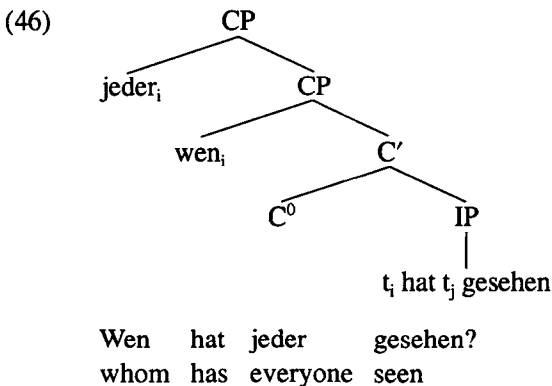
- (i) Which book does professor X advise that every student should buy at which bookstore?

The corresponding German sentence is to my intuition ungrammatical.

is derived by giving the universal quantifier scope over the entire question (see, e.g., Higginbotham 1991, Chierchia 1993).

I will not at this point adopt any one of the abovementioned proposals, for the following reason: all of them postulate a semantics for the pair-list reading of *every* that also predicts a similar reading for other (upward monotonic) quantifiers. However, I think that such a reading is impossible for quantifiers other than the universal quantifier (such as *fast jeder* 'almost everyone', *die meisten* 'most', and others).¹⁴ This is in agreement with the facts observed in Pafel 1991a. For this reason, I have developed my own approach to the semantics of the distributive reading (in Beck 1993), which derives a distributive reading (among the genuine quantifiers) only for universal quantifiers. I will not introduce my proposal here. For the purposes of this paper, only two points are important: (a) the distributive reading of *every* in questions is a reading in which *every* has scope over the entire question; and (b) *every* is the only quantifier that can have such a reading. The importance of the second point will become clearer in section 4. While leaving the issue of the semantic representation of the distributive reading open, I will assume that in this reading, *every* is raised to a CP-adjoined position at LF in order to have scope over the question. This movement leads to a well-formed interpretation in the case of universal quantifiers only.

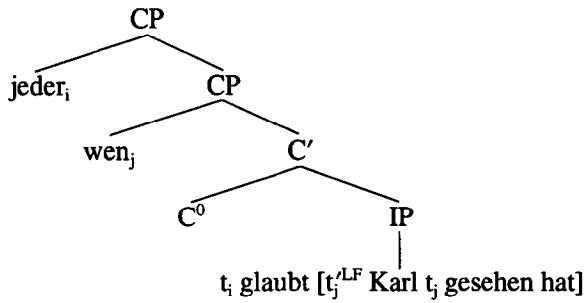
The structure in (46) is the LF that I assume for (41) under the pair-list reading:



Accordingly, (47a–d) are the LFs that yield the pair-list readings of (36a–d), respectively.

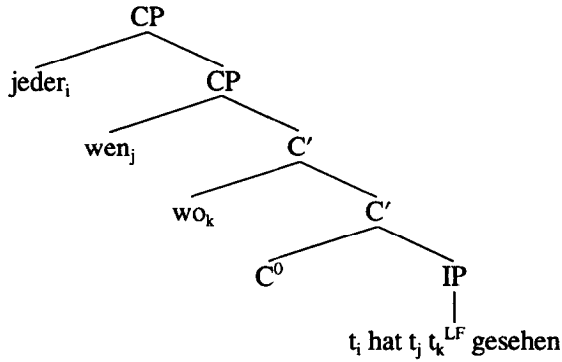
¹⁴ Since I will not regard indefinites as quantifiers, I do not at this point make any claims about wide scope indefinites in questions. My empirical view of indefinites in this context will be discussed in section 4.1.2.

(47) a.



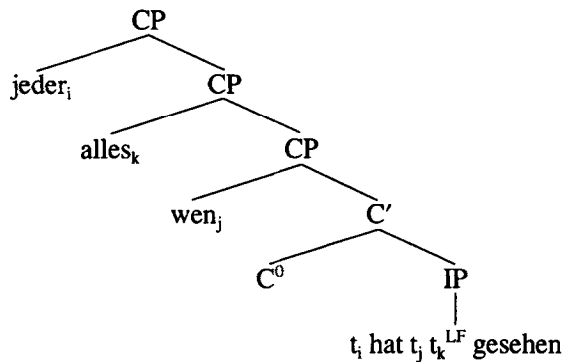
Was glaubt jeder wen Karl gesehen hat?
 what believes everyone whom Karl seen has

b.

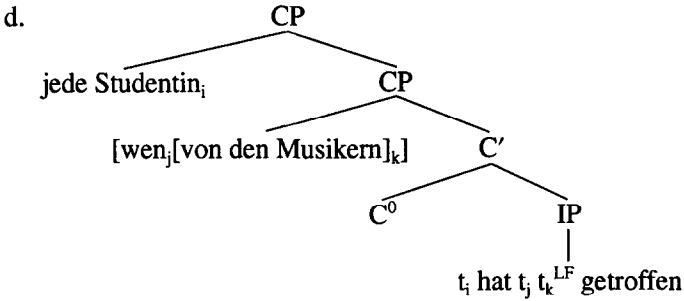


Wen hat jeder wo gesehen?
 whom has everyone where seen

c.



Wen hat jeder alles gesehen?
 whom has everyone all seen



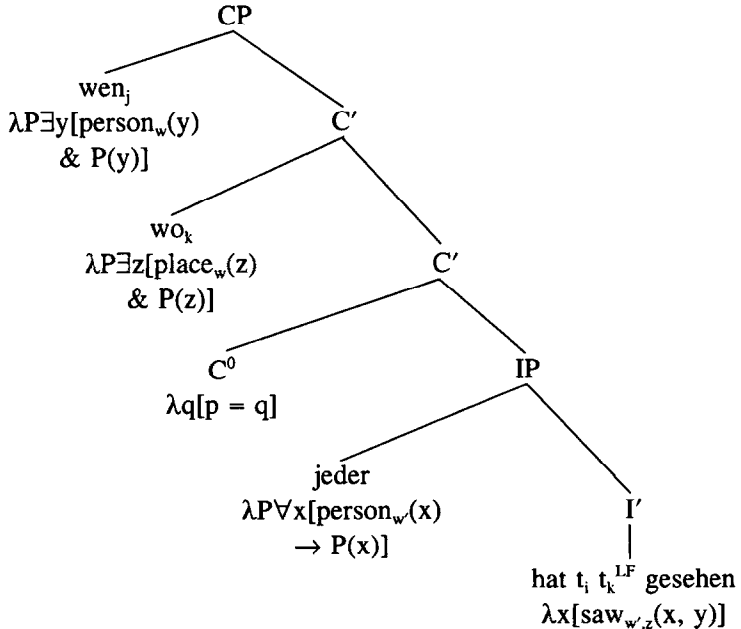
Wen hat jede Studentin von den Musikern getroffen?
 whom has every student of the musicians met

In this reading, *jeder* is moved at LF to a CP-adjoined position. Thus, in this case, there is no intervener for the LF movement of the in situ expressions in (36), as *jeder* has been moved out of the way.

On the other hand, suppose that (36a–d) did actually have a non-distributive reading. For (36b), that would be the denotation in (48a), derived via the LF in (48b).

(48) a. $\lambda p \exists x[\text{person}_w(x) \ \& \ \exists z[\text{place}_w(z) \ \& \ p = \lambda w' \forall y[\text{person}_w(y) \rightarrow \text{saw}_{w',z}(y,x)]]]$

b. $\lambda p \exists y[\text{person}_w(y) \ \& \ \exists z[\text{place}_w(z) \ \& \ p = \lambda w' [\forall x[\text{person}_w(x) \rightarrow \text{saw}_{w',z}(x, y)]]]]]$



#Wen hat jeder wo gesehen?
 whom has everyone where seen

Here, *jeder* does intervene between *wo* and its LF trace, in the same way as *niemand* does in (4b).

From the absence of a non-distributive reading in (36) I conclude that *jeder*, just like negation, does indeed have an intervention effect, that is, blocks LF movement. That the sentences in (36) – unlike those in (4) – are grammatical is due to the fact that *jeder* can induce a pair-list reading. Negative quantifiers, on the other hand, do not permit a corresponding reading. So while there is one grammatical reading (i.e., one reading with a grammatical underlying LF) available for (36), there is no such reading in (4) and the sentences are ruled out. This means that an extended version of the MNSC should be found which applies to *jeder* as a problematic intervener in the same way as to negation. Section 4 is an attempt to find out just how the MNSC should be extended.

The distributive reading for *every* is not possible in every syntactic configuration. In (49), for example, *jede Aufgabe* ‘every problem’ cannot have wide scope:

(49) Wer hat jede Aufgabe gelöst?
 who has every problem solved
 ‘Who solved every problem?’

If the above hypothesis that universal quantifiers are also problematic interveners is correct, then a universal that cannot get out of the way should have an intervention effect just like negation. This leads us to expect (50) to be ungrammatical, which it is.

(50) ??Wer hat jede Aufgabe alles gelöst?
 who has every problem all solved
 ‘Who-all solved every problem?’

Here, *alles* ought to move at LF to a CP-adjoined position. *Jede Aufgabe*, however, intervenes and blocks this movement. Since for independent reasons no other LF is possible (in particular not one in which *jede Aufgabe* can get out of the way), the sentence is ungrammatical.

Example (51) is included to make sure it’s really the presence of the intervener *jede Aufgabe* that is responsible for the ungrammaticality of (50).

(51) Wer hat diese Aufgabe alles gelöst?
 who has this problem all solved
 ‘Who-all solved this problem?’

Example (52) makes the same point:

- (52) a. Wer hat wann jede Aufgabe gelöst?
 who has when every problem solved
 ‘Who solved every problem when?’
- b.⁷⁹ Wer hat jede Aufgabe wann gelöst?
 who has every problem when solved
 ‘Who solved every problem when?’

3.2. *Distributive Movement Blocked*

In the previous subsection, I have argued that *every* on the distributive reading is moved to a CP-adjoined position. If the MNSC introduced in section 2 is of a general nature, we would expect it to affect LF movement not only in the *wh*-constructions looked at so far, but quite generally. In this subsection I will argue that movement of *every*, which I will call distributive movement, can also be blocked by an intervening negation. For the most part, I will not discuss distributive *every* itself, but another type of expression that can induce a distributive reading in a question, namely *jeweils*.¹⁵ The reason is that I find the data easier to judge with *jeweils* than with *every*. An example is given in (53):

- (53) Welches Buch hat Karl jeweils mitgenommen?
 which book has Karl each (time) taken
 ‘Which book did Karl take each time?’

(53) is unambiguously understood as (54):

- (54) For each occasion: which book did Karl take on that occasion?

When the question contains a definite plural NP as well as *jeweils* (as in (55)), it is ambiguous.

- (55) a. Was hat Karl Uli und Susanne jeweils geschenkt?
 what has Karl Uli and Susanne each (time) given
 ‘What did Karl give to Uli and Susanne each (time)?’

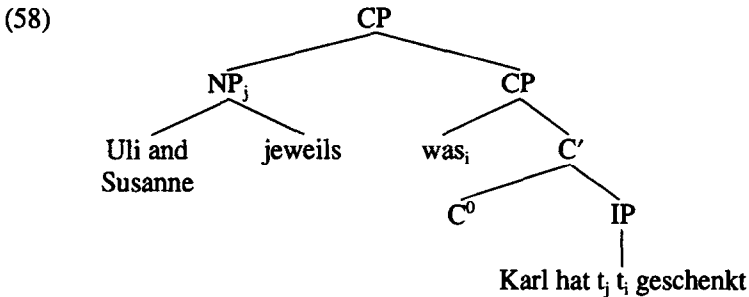
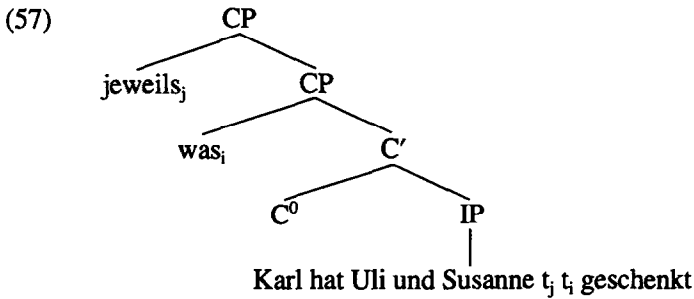
¹⁵ I will gloss *jeweils* as ‘each (time)’, because it can mean both.

- b. Was haben die Kinder *jeweils* geschenkt
 what have the children each (time) given
 bekommen?
 got
 ‘What did the children get each (time)?’

In (55a), we can get a reading distributing over occasions as well as one distributing over *Uli und Susanne*, as illustrated in (56). Similarly for (55b).

- (56) a. For each occasion: what did Karl give to Uli and Susanne on that occasion?
 b. For each *x*, *x* is one of Uli and Susanne: what did Karl give to *x*?

I will assume (57) and (58) (approximately) as the LFs of readings (56a) and (56b) of (55a):



So, *jeweils* and *jeweils* + NP, like *jeder*, on the distributive reading are raised at LF to a CP-adjoined position. I will refer to this movement of *jeweils* as distributive movement, too.

Distributive movement can be prohibited by the presence of an intervening element:

- (59) a. Wen hat Karl jeweils getroffen?
 whom has Karl each (time) met
 ‘Who did Karl meet each time?’
- b.*Wen hat niemand jeweils getroffen?
 whom has nobody each (time) met
 ‘Who did nobody meet each time?’
- c. Wen hat jeweils niemand getroffen?
 whom has each (time) nobody met
 ‘Who did nobody meet each time?’
- d.*Was hat niemand Uli und Susanne jeweils
 what has nobody Uli and Susanne each (time)
 geschenkt?
 given
 ‘What did nobody give to Uli and Susanne each (time)?’

(59a) can (in fact, must) be read as a distributive question where the distribution is over salient points in time. (59b) is ungrammatical; that means the points-in-time reading is impossible here. From a semantic point of view this is inexplicable, since the minimally different (59c) does have that reading. The fact is explained by the assumption that, again, the LF movement of *jeweils* is blocked by the intervening quantifier. (59d), finally, is ungrammatical. That means that both potential readings are out, the reading quantifying over points in time as well as the one distributing over *Uli und Susanne*.

A similar effect of an intervening negative quantifier can be observed with *jeder*, but because of the number of possible readings judgments are more difficult. (60a) vs. (60b) provide an example:

- (60) a. Wen hat jeder noch nie gesehen?
 whom has everyone never seen
 ‘Who has everyone never seen before?’
- b. Wen hat noch nie jeder gesehen?
 whom has never everyone seen
 ‘Who was never seen by everyone?’

While (60a) has a distributive as well as a non-distributive reading, (60b) has only a non-distributive reading. The non-distributive readings are different in the two cases, however, presumably due to general facts about

scope interaction: while in the non-distributive reading of (60a) *jeder* has scope over *noch nie*, in (60b) *noch nie* has scope over *jeder*.

Distributive movement is thus a further case of movement at LF being blocked by an intervening negation.¹⁶ It is quite an interesting case since, as in multiple questions, there is unlikely to be any S-Structural relationship between the expression to be moved at LF and any S-Structurally moved phrase.

4. A MORE GENERAL PICTURE OF INTERVENTION

In this section, I will come up with a generalization as to which elements are problematic interveners (sec. 4.1) and revise the formalization from section 2 accordingly (sec. 4.2). The result will be that not only negative expressions, but quantified expressions in general induce barriers for LF movement. I conclude with some speculative remarks on scope interaction in non-interrogative contexts (sec. 4.3).

4.1. *What Is an Intervener?*

4.1.1. *Quantifiers*

In contrast to *jeder* 'everyone', *fast jeder* 'almost everyone' in questions cannot have a distributive reading. Intervening *fast jeder* in the now familiar *wh*-constructions leads to ungrammaticality:¹⁷

¹⁶ If *jeder* also blocks LF movement, as argued for in section 3.1, I make the prediction that (i) is OK only in the reading paraphrased in (ii):

- (i) Wen hat jeder jeweils gesehen?
 who has everyone each (time) seen?
 'Who did everyone see each time?'

- (ii) For each occasion: for each person x: who did x see at that occasion?

The question in (iii), on the other hand, is predicted to have reading (iv) in addition to (ii):

- (iii) Wen hat jeweils jeder gesehen?
 who has each (time) everyone seen?
 'Who did everyone see each time?'

- (iv) For each occasion: who has the property of having been seen by everyone at that occasion?

It seems reasonably clear to me that (i) does not have reading (iv). Moreover, similar to sentences (36a–d), stress on *jeder* renders (i) ungrammatical. However, these data are really too complicated to base any arguments upon.

¹⁷ If a distributive reading were at all possible with *almost everyone* etc., one would expect

- (61) a. ?Was glaubt fast jeder wen Karl gesehen hat?
 what believes almost everyone whom Karl seen has
 'Who does almost everyone believe that Karl saw?'
- b. ?Wen hat fast jeder wo getroffen?
 whom has almost everyone where met
 'Where did almost everyone see whom?'
- c. ?Wen hat fast jeder alles gesehen?
 whom has almost everyone all seen
 'Who-all did almost everyone see?'
- d. ?Wen hat fast jeder Student von den Musikern
 whom has almost every student of the musicians
 kennengelernt?
 met
 'Which of the musicians did almost every student meet?'

Monotone decreasing quantifiers generally have an effect similar to negation:

- (62) a. ?Was glauben höchstens drei Bibliothekarinnen welche
 what believe at most three librarians which
 Bücher Otilie gefressen hat?
 books Otilie eaten has
 'Which books do at most three librarians believe that Otilie has eaten?'
- b. ?Wen haben wenige wo getroffen?
 whom have few (people) where met
 'Who did few people meet where?'
- c. ?Wen hat Karl selten alles gefüttert?
 whom has Karl rarely all fed
 'Who-all did Karl rarely feed?'

this reading to be enforced under the same circumstances that enforce such a reading with *every*, namely the constructions in (61). The fact that these data are ungrammatical is, I think, further confirmation of my claim that *almost every* etc. don't permit such a reading.

- d. ??Wen haben weniger als vier Studentinnen von den
 whom have less than four students of the
 Musikern getroffen?
 musicians met
 ‘Which of the musicians did fewer than four students meet?’

Some other elements that can be characterized as “negative” in some sense are similarly problematic interveners:

- (63) a. ??Wen hat nur Karl wo getroffen?
 whom has only Karl where met
 ‘Who did only Karl meet where?’
 b. ??Wen haben weder Karl noch Luise alles eingeladen?
 whom have neither Karl nor Luise all invited
 ‘Who-all did neither Karl nor Luise invite?’

Focusing negation (see Jacobs 1982, 1991) leads to ungrammaticality when not directly conjoined with a *sondern* ‘but’ phrase:¹⁸

- (64) ??Wen hat nicht HANS wo getroffen, sondern Luise?
 whom has not Hans where met but Luise
 ‘Who didn’t HANS meet where, but Luise?’

This will prove useful for the generalization in section 4.2.

I will now turn to a problematic case, namely NPs containing *die meisten* ‘most’. They seem to have a considerably less disruptive effect than other quantifiers (e.g., *fast jeder*).

¹⁸ Without the *sondern*-phrase, a question containing a focusing negation becomes virtually uninterpretable:

- (i) a. Wen hat nicht HANS getroffen, sondern Luise?
 whom has not Hans met but Luise
 ‘Whom didn’t Hans meet, but Luise?’
 b. *Wen hat nicht HANS getroffen?
 whom has not Hans met
 ‘Whom didn’t Hans meet?’

So the *sondern*-phrase has to be present somewhere in the question to test intervention effects, although what we’re interested in is only the focusing negation.

- (65) a. Was glauben die meisten Studentinnen wen Otilie
 what believe most students whom Otilie
 gebissen hat?
 bitten has
 'Who do most students believe that Otilie bit?'
- b. ?Wen haben die meisten Studenten alles getroffen?
 whom have most students all met
 'Who-all did most students meet?'
- c. Wen alles haben die meisten Studenten getroffen?
 whom all have most students met
 'Who-all did most students meet?'

I claim that a (narrow scope) quantificational reading for *die meisten* is missing in (65). This becomes clear when we compare the meaning of (65b) with (65c). (65c) can have a reading paraphrased in (66):

- (66) Give me a complete list of all those people who have been met by a (possibly varying) majority of students.

That is, the people mentioned in the complete true answer to (65c) can have been met by different groups of students, as long as each one was met by more than half of the students. The same is not possible in (65b). Here, the group of students is fixed. I take *die meisten Studenten* in this reading to be referential, meaning something like 'There is a group consisting of more than half of the students'. That such a reading exists can be seen in the constructions in (67).

- (67) a. Die meisten Kollegen, denen vertraue ich.
 most colleagues them trust I
 'Most colleagues, I trust.'
- b.*Fast jeder Kollege, dem vertraue ich.
 almost every colleague him trust I
 'I trust almost every colleague.'
- c. Die meisten von uns treffen sich nachher im
 most of us meet REFL later in the
 "Storchen".
 "Storchen"
 'Most people will meet in the "Storchen" later.'

A quantifier cannot participate in a German left dislocation structure ((67b)). However, *die meisten* can occur in that position, as (67a) shows. (67c) illustrates that there has to be a plural variable present in the semantics of *die meisten* in order to account for the possibility of constructing it with a collective predicate like *sich treffen*. I conclude that an NP like *die meisten Studenten* has the possibility of being read like *a majority of the students*. In questions like (65b), it seems to get a “specific” reading like some indefinites, to be discussed in the next section. On this reading, it is not an intervening quantifier, and it is on this reading that the data in (65) are well-formed.

Further potentially relevant data, involving expressions that don’t generally induce an intervention effect, are given in (68).

- (68) a. ?Was glaubt nicht nur Fritz wen Otilie gebissen
 what believes not only Fritz whom Otilie bitten
 hat?
 has
 ‘Who does not only Fritz believe that Otilie bit?’
- b. Wen hat auch Otto von den Musikern kennengelernt?
 whom has also Otto of the musicians met
 ‘Which of the musicians has Otto met, too?’
- c. ?Wen hat nicht Karl, sondern Luise alles getroffen?
 whom has not Karl but Luise all met
 ‘Who-all has not Karl, but Luise met?’

In order to maintain my hypothesis, I would have to claim that here again, we are dealing with referential rather than quantificational expressions. While that is not impossible, I can’t prove it in detail and will leave the matter open for now.

As many of the problematic interveners are “negative” or downward entailing, it might be thought that it is this semantic property that makes bad interveners, rather than their quantificational status. On the other hand, *jeder* and *fast jeder* are not downward monotonic. Neither are some quantificational adverbials that are problematic interveners:¹⁹

¹⁹ These adverbials might be bad with the scope-marking construction for independent reasons:

- (69) a.^{??}Wen hat Karl zweimal/meistens/oft alles getroffen?
 whom has Karl twice/mostly/often all met
 'Who-all did Karl meet twice/mostly/often?'
- b. Wer hat welche Preise mindestens zweimal gewonnen?
 who has which prizes at least twice won
 'Who has won which prizes at least twice?'
- c.^{??}Wer hat mindestens zweimal welche Preise gewonnen?
 who has at least twice which prizes won
 'Who has won which prizes at least twice?'

Because of these data, I will maintain the hypothesis that it is the quantificational nature of the intervener that is problematic, rather than particular semantic properties like downward monotonicity. Downward entailing expressions are always quantificational, so they naturally constitute a large part of those expressions that intervene.

4.1.2. *Indefinites*

I will now turn to indefinite expressions. The picture is more complex here. Although indefinites seem to have some effect on the sentences they

-
- (i) ^{??}Was hat Karl meistens geglaubt, welche Bücher Luise mag?
 what has Karl mostly believed which books Luise likes
 'Which books did Karl mostly believe that Luise likes?'

In multiple questions, they sometimes permit a singular reading (see Higginbotham and May 1981); that is, an answer consists of exactly one pair, as in (ii).

- (ii) Welchen Freund hat Karl oft wo getroffen?
 which friend has Karl often where met
 'Which friend did Karl often meet where?'

When a list reading is forced, as is (apparently) the case with matrix verbs like *vergleichen* 'compare' or *aufzählen* 'list' (see Schwarz 1993 for discussion of these verbs), the sentence is bad:

- (iii) ^{??}Luise vergleicht/zählt auf, welchen Freund Karl oft wo getroffen
 Luise compares/lists which friend Karl often where met
 hat.
 has
 'Luise compares/lists which friend Karl often met where.'

If the list reading is considered the relevant one, the data exhibit the same intervention effect as (36). The singular reading might then be derived via a D-linking analysis as in Pesetsky 1987. This is speculative at present, however.

occur in, this effect is not the same as that of genuinely quantified expressions (throughout the discussion, I will not consider indefinite expressions quantifiers; see, e.g., Heim 1982).²⁰

- (70) a. ?Was glauben vier Linguisten wer ihr Projekt
 what believe four linguists who their project
 finanzieren wird?
 finance will
 'Who do four linguists believe will finance their project?'
- b. Wen alles haben drei Studenten gesehen?
 whom all have three students seen
 'Who-all did three students see?'
- c. ?Wen haben drei Studenten alles gesehen?
 whom have three students all seen
 'Who-all did three students see?'

The examples in (70) are not ungrammatical; however, (70b) and (70c) don't seem to be exactly synonymous. The reading prevalent in (70c) might be characterized as specific. The same holds for (70a). Embedded sentences with these indefinites are easier to judge:

- (71) Otto weiß, wen drei Studenten alles gesehen haben.
 Otto knows whom three students all seen have
 'Otto knows who-all three students saw.'

Sentence (71) is synonymous with (72):

- (72) Of three students, Otto knows "who-all" they saw.

Here, the indefinite has scope in the matrix clause. It seems impossible to get a narrow scope existential reading for the indefinite. This indicates that on the existential reading, the indefinite does have an intervention effect. Since (as I assume) the indefinite itself is not quantificational, this could be due to the default existential quantifier assumed for such cases (Heim 1982). The surviving wide scope existential reading is one in which the default existential quantifier does not intervene.

With a singular indefinite, a generic reading is sometimes possible

²⁰ This includes *wh*-phrases. For simplicity, I have translated *wh*-phrases as existential quantifiers in the LFs I provide, but this should probably really be thought of as default existential quantification.

(depending on the context in the sentence, as usual). On the generic reading, the following sentences are OK:

- (73) a. Wann muß ein Brautpaar welche Formulare ausfüllen?
 when must a couple which forms fill in
 'When does a couple have to fill in which forms?'
- b. Was muß ein Linguist alles beachten?
 what must a linguist all observe
 'What-all does a linguist have to keep in mind?'
- c. Was glaubt ein CDU-Politiker, wie man die
 what believes a conservative politician how one the
 Wirtschaft ankurbeln soll?
 economy boost should?
 'How does a conservative politician believe one should boost the economy?'

Similar for bare plurals:

- (74) a. Was für Krankheiten können Pandabären alles bekommen?
 what for illnesses can Pandas all get
 'What sorts of illnesses can pandas get?'
- b. Was müssen Linguisten alles beachten?
 what must linguists all observe
 'What-all do linguists have to keep in mind?'

It thus appears that whether an indefinite has an intervention effect depends on how it is read.

It has been observed (e.g., Partee 1988, Diesing 1990) that *viele/many* frequently behaves like an indefinite. Accordingly, (75a, b) are not ungrammatical:

- (75) a. Otto hat mir erzählt, was viele Wähler glauben wer
 Otto has me told what many voters believe who
 alles in den Bundestag kommt.
 all in the parliament comes
 'Otto has told me who-all many voters believe will get into parliament.'

- b. ?Wer hat vielen Studenten was erklärt?
 who has many students-DAT what explained
 'Who explained what to many students?'

The unembedded case, (75b), is quite odd, though. In the embedded case, (75a), the indefinite again has wide scope. These data are very difficult to judge, though.

The indefinite *einige* 'some/several' can very easily get wide scope. (76a) and (76b) are impeccable on a wide scope reading. (76c), on the other hand, with the indefinite *lauter* 'some/many' that cannot get wide scope, is clearly out.

- (76) a. Otto hat mir erzählt, wen einige Studentinnen von
 Otto has me told who some students (fem.) of
 den Musikern eingeladen haben.
 the musicians invited have
 'Otto has told me which of the musicians some students invited.'
- b. Otto hat mir erzählt, wen einige seiner Katzen alles
 Otto has me told who some of his cats all
 gebissen haben.
 bitten have
 'Otto has told me who-all some of his cats bit.'
- c.*Otto hat mir erzählt, wen lauter Katzen alles gebissen
 Otto has me told who many cats all bitten
 haben.
 have
 'Otto has told me who-all many cats bit.'

So, in general, it seems that narrow scope, existentially read indefinites are problematic interveners, similar to quantifiers. Many indefinites can get out of the way – that is, take wide scope – so that the sentences they are contained in are not ungrammatical, in particular in the embedded case. Things are a bit unclear in the unembedded case: do the indefinites have wide scope reading here, and if so, are the resulting questions felicitous? How are these readings represented?

The generic reading behaves differently from the existential reading. Generic indefinites are not problematic interveners at all. Under a non-quantificational analysis of generic NPs, this is to be expected (Carlson

1977). Under a quantificational analysis ((e.g., Wilkinson 1991), we might have expected generic NPs to be problematic interveners.

I think that this area needs to be looked into more carefully than I can do here. Clearly, some very interesting and important issues are involved (such as the LF representation of generic NPs and the representation of specific readings for indefinites). The data discussed in this section indicate that existentially read indefinites ought to be counted as problematic interveners, on a par with genuine quantifiers, whereas for generic NPs a non-quantificational, Carlsonian representation of generic NPs might be preferable. However, all this involves decisions regarding the LF representations of indefinites that probably ought not to be made solely on the basis these data, but need much more careful consideration.

For present concerns, there are two other important issues involved here. One is that if *wh*-phrases (being indefinites)²¹ did induce a barrier for LF movement, distributive movement and movement of invariant *alles* would be blocked. Clearly, this is not a desirable effect. *Wh*-phrases have to be distinguished from other existentially interpreted expressions for the purposes of my LF restriction. The other point is the role of indefinites in scope interaction in declaratives. Here indefinites behave differently from genuine quantifiers (see also sec. 4.3). Indefinites thus present a more complex picture than quantifiers. They seem to induce barriers for LF movement only under certain circumstances. For present purposes, I will therefore ignore the blocking effect that indefinites on the existential reading seem to have, and not regard them as quantifiers. I obviously miss something by doing so, but I will leave the matter for another occasion.

Keeping in mind that this issue is not completely clear, I conclude that the class of problematic interveners consists of the inherently quantified expressions (as opposed to indefinites). As none of the quantifiers looked at in this section allows for a distributive reading in questions, that explains the pattern of grammaticality. It follows that a generalization of the type of (22) should cover not only negation, but all quantifiers. I suggest the more general restriction for LF movement (of the types looked at so far) given in (77):

(77) Quantifiers block LF movement.

This leaves only the issue of sentence negation. I will assume that sentence

²¹ *Wh*-phrases are indefinites in the adopted Hamblin/Karttunen semantics. In the Groenendijk and Stokhof (1982) semantics for interrogatives, *wh*-phrases are not indefinites (nor in any other way quantified expressions). Hence, in the Groenendijk/Stokhof semantics the issue would not arise.

negation is also covered by the generalization in (77); that is, that in some sense it forms a natural class with quantifiers. I don't have any suggestions to contribute as to why this should be the case, but the assumption is clearly needed not only for my own generalization, but in various other contexts as well.

Within the framework of situation semantics negation has been argued to have a quantificational structure by Kratzer (1989). The argument hinges on focusing negation, which is considered the prototypical case. "Non-focusing" negation is a special case of focusing negation, with the entire sentence being the focus. Focusing negation has been shown to be a problematic intervener. In a situation theoretic framework, one would thus have an explanation for the fact that negation behaves like a quantifier. As it is, I will simply assume that there is some sense in which negation (focusing and non-focusing) is covered by (77) and its formalization.

4.2. Formalization

The following two definitions are the generalizations from the definitions of NIB (Negation-Induced Barrier) and the MNSC (Minimal Negative Structure Constraint) given in section 2, designed to cover the data discussed in sections 3 and 4.

- (78) *Quantifier-Induced Barrier (QUIB):*
 The first node that dominates a quantifier, its restriction, and its nuclear scope is a Quantifier-Induced Barrier.
- (79) *Minimal Quantified Structure Constraint (MQSC):*
 If an LF trace β is dominated by a QUIB α , then the binder of β must also be dominated by α .

Below are some examples of quantifiers looked at so far; in each case, the boldfaced category is the barrier. The trace violating the MQSC is t_k^{LF} .

- (80) a. [_{CP} wen_k [_C C⁰ [_{IP} fast jeder glaubt [_{t_k^{LF}} Karl t_k gesehen hat]]]]]
 b. [_{CP} wen_j wo_k [_C C⁰ [_{IP} fast jeder t_j t_k^{LF} gesehen hat]]]]]
 c. [_{CP} alles_k [_{CP} wen_j [_C C⁰ [_{IP} wenige t_j t_k^{LF} gesehen haben]]]]]
 d. [_{CP} [wen_j [von den Musikern]_k] [_C C⁰ [_{IP} fast jede Studentin t_j t_k^{LF} getroffen hat]]]]]

The information whether a given expression is a quantifier can be read off its semantic type (a higher-order relation). This kind of information must be accessible at LF, as it is the trigger for certain kinds of LF movement (presumably also the movement of *alles*, for instance). Only at LF is the

information available that the sentence contains a quantified structure, making it plausible that what can be interfered with by the presence of such a structure is indeed an LF relation.

Note that a constraint like the MQSC could not be expressed configurationally if it were possible to delete at LF traces that are irrelevant for interpretation, as would be the case in structures like (80c).

It should be obvious that the LFs of the data discussed in sections 2–4 will correctly be excluded by the MQSC. I will now point out some further empirical consequences. First, it is clear that if all quantifiers are taken to induce barriers, the MQSC cannot apply to S-Structural traces: S-Structure movement across a quantifier is normally unproblematic. Accordingly, (81) for example is well-formed on the non-distributive reading:

- (81) Wie denkt jeder daß Hans sich benommen hat?
 How thinks everyone that Hans REFL behaved has
 ‘How does everyone think that Hans behaved?’

Second, just as in the case of NIBs, QUIBs can be too low to prevent LF movement ((82a)), and they block LF movement out of the restriction of the QUIB-inducing quantifier ((82b)):

- (82) a. Wen hat der Mann, den jeder mag, alles
 whom has the man who everyone likes all
 getroffen?
 met
 ‘Who-all did the man that everyone likes meet?’
- b.*Luise hat mir erzählt, wer fast jedes Buch von
 Luise has me told who almost every book of
 welchem Autor gelesen hat.²²
 which author read has
 ‘Luise has told me who read almost every book by which author.’

The general version MQSC (as opposed to the MNSC) makes it clear that the intended empirical coverage of my proposal differs very much from most accounts referred to in section 2.4 (e.g., Rizzi 1990). Those accounts are intended to cover interaction of (primarily) S-Structural movement with negation. On the one hand, I look exclusively at LF movement; on the other, I am concerned not only with negation, but with quantified expressions in general.

²² This sentence might have a singular reading.

4.3. QR: SOME SPECULATION

What has been looked at so far has been LF movement across an interrogative C⁰ position – what I will call *wh-related LF movement*. The status of the MQSC (stated as a general constraint for LF movement in section 4.2) is as yet quite unclear. What remains to be done is a review of movement types other than movement in interrogatives. In the examples looked at so far, the landing site of LF movement was always either (adjoined to) the specifier of CP or adjoined to C'/CP.

Declaratives and declarative LFs are not the subject of this paper. The MQSC is seriously suggested as a restriction for *wh-related LF movement* only. This section is best thought of as a potential, rather than an actual, application of the constraint. Some speculation may be interesting, though, in order to get a broader empirical perspective. I'm going to speculate that the MQSC is a general restriction – in particular, a restriction also affecting QR. This is indeed mere speculation, and is included only to show that quantifier interaction might be an interesting case for the MQSC, because at first sight it looks as if the MQSC makes untenable predictions for scope interaction. But this might not be the case, as I'm going to argue now. As before, I will only look at German data.

I will suggest that a version of the MQSC might actually be an interesting constraint for quantifier interaction in German. The discussion is very much simplified. I will use the topological terminology for German sentence structure as it is described by Höhle (1986). (83) illustrates that terminology for a verb-second clause, (84) for a verb-final clause.

(83)	Gestern	hat	Otto dem Kind	geholfen
	yesterday	has	Otto the child(DAT)	helped
	<i>Vorfeld</i>	<i>FIN</i>	<i>Mittelfeld</i>	<i>VK</i>

(84)	dass	gestern	Otto dem Kind	geholfen hat
	that	yesterday	Otto the child	helped has
	<i>COMP</i>	<i>Mittelfeld</i>		<i>VK</i>

VK ('Verbkomplex', the verbal complex) normally contains all the verbs except in verb-second clauses the inflected one, which is in FIN. The FIN position is usually associated with a functional head, either I⁰ or C⁰. The Vorfeld position is the specifier position of that category (see for instance von Stechow and Sternefeld 1988).

I share the empirical view of scope interaction in German expressed by Höhle (1991a), Jacobs (1982, 1989), and Pafel (1991b), which I will now very briefly introduce. The relative scope of two quantifiers in the German

Mittelfeld is normally unambiguously determined by their linear order. In (85a), for example, Luise's belief cannot be paraphrased as in (85b); that is, *keinen Semantiker* cannot have scope over *fast jeder Esel*.

- (85) a. Luise glaubt, daß fast jeder Esel keinen
 Luise believes that almost every donkey no
 Semantiker gebissen hat.
 semanticist(ACC) bitten has
 'Luise believes that almost every donkey bit no semanticist.'
- b. For no semanticist y: almost every donkey bit y.

The exceptions to this regularity usually involve indefinites, which, as I have pointed out before, I won't regard as quantifiers. (86) gives an example of a quantifier outscoping a preceding indefinite in the Mittelfeld.

- (86) . . . daß in Sizilien ein Polizist vor jeder
 . . . that in Sicily a policeman in front of every
 Bank steht.
 bank stands
 '. . . that there is a policeman standing in front of every bank
 in Sicily.'

It is possible to get the reasonable reading for (86). (See Pafel 1991b for these generalizations.)

In German, scope ambiguities mostly come about when the Vorfeld position is involved, as in (87).

- (87) a. Jeden Semantiker hat kein Esel gebissen.
 Every semanticist(ACC) has no donkey bitten
 'No donkey bit every semanticist.'
- b. For every semanticist y: there is no donkey x such that x has bitten y.
- c. There is no donkey x, such that for every semanticist y: x has bitten y.

Depending on intonation, (87a) can have both reading (87b) and reading (87c) (see Jacobs 1982, 1989, Höhle 1991a, and Pafel 1991b for discussion).

Since it seems reasonably clear that the Vorfeld position is generally filled via movement, a reconstruction account has been suggested of the scope

phenomena by Jacobs (1989) and Höhle (1991a). I won't go into the details of either of these proposals. What is important here is that the described state of affairs could be explained with the help of the following assumptions:

- (88) a. Material from the Vorfeld can be reconstructed at LF.
- b. QR is optional, quantifiers can be interpreted in situ.
- c. Quantifiers block LF movement (see (78), (79)).
- d. Indefinite expressions are not quantifiers.
- e. Reconstruction is not LF movement for the purposes of (88a); that is, it is not blocked by an intervening quantifier.

This would account for (85), in contrast to (86), being unambiguous. (88) would capture the fact that the Vorfeld position has different properties than the Mittelfeld positions (see (87) vs. (85)), as it's here that reconstruction enters the picture. Note that it is a very natural assumption that reconstruction does not fall into one class with the usual kind of LF movement: it is obvious that however it is technically realized, reconstruction cannot leave a trace in the ordinary sense, as that trace would violate the requirements for the licensing of empty categories.

This system seems far simpler and more natural than having to transfer S-Structure to LF via an isomorphy condition, as in Huang 1982. This is another indication that the assumption of optional QR is empirically and theoretically more adequate for German.

For inverse linking examples, the MQSC leads us to expect that the inverse reading is possible in (89a), but not in (89b).

- (89) a. Ein Abgeordneter aus jeder Stadt hat zugestimmt.
 a representative from every city has agreed
 'A representative from every city agreed.'
- b. Kein Produkt von jedem EG-Land verkauft sich
 no product of every EEC country sells REFL
 gut.
 well
 'No product of every EEC country sells well.'

The indefinite *ein Abgeordneter* in (89a) is not expected to have any blocking effect, while *kein Produkt* in (89b) is. This is confirmed by the data.

The above remarks don't constitute a satisfactory discussion of scope interaction in German, of course. But I hope to have shown that it would

be interesting to look more closely at the consequences the MQSC would have in this context. Together with certain frequently made assumptions, we get the desired empirical predictions. It is obvious that an unconstrained version of QR cannot account for the data. As well-motivated constraints are not easy to find, there would be some benefit in carrying the MQSC over to declarative contexts. I take that to be an indication of the general status of the MQSC; namely, that it should not be thought of as a stipulation conveniently excluding data like (4), but as a more general principle operating on LF.

Concerning indefinites, this section has made clear that LF *wh*-movement has to be dissociated from QR. For QR, existentially read indefinites are unproblematic interveners, while a more sophisticated version of the MQSC should include them in the class of problematic interveners for *wh*-related movement. It does not seem surprising that we have to distinguish different types of movement at LF as well as at S-Structure.

The claim that the MQSC is of a more general nature raises the question of its crosslinguistic status.

German is a language that has scrambling and, accordingly, a relatively free word order. It seems that because scope order *can* be made clear at S-Structure, it has to be, so S-Structural c-command mostly reflects semantic scope. Movement at LF thus has to be severely restricted. The MQSC is one way of formalizing this intuition.

A language like English, by contrast, cannot in the same way S-Structurally mark logical scope, and so we would expect a less constrained level of Logical Form. For QR, this clearly is the case: the MQSC obviously cannot be imposed on QR in English, as that would be far too restrictive.²³

Korean, on the other hand, is another language that does have scrambling. Interestingly, here we get the following contrast:

- (90) a. nuku-lûl amuto po-chi an ha-ôss-ni?
 who-ACC anyone see-NMZ not do-PAST-Q
 ‘Whom didn’t anybody see?’
- b.*amuto nuku-lûl po-chi an ha-ôss-ni?
 anyone who-ACC see-NMZ not do-PAST-Q
 ‘Whom didn’t anybody see?’

²³ Unfortunately, the data for interrogatives seem very murky in English, so that I have been unable to get a clear picture.

While in Korean the subject normally precedes the direct object, in the interrogative in (90) the only grammatical order is with the *wh*-phrase scrambled before the subject. In the multiple question in (91), both *wh*-phrases have to be scrambled to occur at S-Structure before the subject.

- (91) a.* amuto nuku-lûl ôti-esô manna-chi an ha-ôss-ni?
 anyone who-ACC where-LOC meet-NMZ not do-PAST-Q
 ‘Whom didn’t anybody meet where?’
- b.*nuku-lûl amuto ôti-esô manna-chi an ha-ôss-ni?
 who-ACC anyone where-LOC meet-NMZ not do-PAST-Q
 ‘Whom didn’t anybody meet where?’
- c. nuku-lûl ôti-esô amuto manna-chi an ha-ôss-ni?
 who-ACC where-LOC anyone meet-NMZ not do-PAST-Q
 ‘Whom didn’t anybody meet where?’

While I will not work out a proper analysis here, it seems that some version of the MQSC is at work. We would not expect a constraint like the MQSC to be language specific, and if I am correct about the interpretation of (90) and (91), its effects do indeed seem to be detectable in languages other than German. However, I would like to stress that the version of the MQSC introduced in this paper is designed to cover specifically the German facts, and will presumably not apply to other languages without modification.

5. THE *WAS FÜR*-CONSTRUCTION

This section is something of a digression. I will talk about some semantic properties of the *was für*-construction that are relevant for interaction with scope-bearing elements. (*Was für* should be translated with ‘what’ or ‘what kind of’ and will be glossed ‘what for’.) I will look at several interveners, which have different effects on well-formedness and available readings. As I won’t actually be able to explain the behavior of the *was für*-construction entirely, the goal of this section is partly a negative one: I will show that intervention in this construction cannot be a simple subcase of intervention effects as they have been discussed in sections 2, 3, and 4. Many of the data I will look at are also discussed by de Swart (1992). This section gives me an opportunity to introduce her analysis. Although I will criticize her analysis with respect to the *was für*-construction, it will become clear that it is somewhat related to my own proposal.

I suggest that (92a) be analyzed as in (92b); that is, as querying a property.^{24, 25}

(92) a. Was für Bücher hat Luise gekauft?
 what for books has Luise bought
 ‘What books did Luise buy?’

b. For which property: there are some books that have that property and that Luise has bought.

On this analysis, *books* occurs as an indefinite within the proposition. (93) is the formalization corresponding to the paraphrase in (92b).²⁶

(93) $\lambda p \exists P_{\langle e, t \rangle} [R(P) \ \& \ p = \lambda w \exists X [\text{books}(X) \ \& \ P(X) \ \& \ \text{bought}_w(\text{luise}, X)]]$

(93) is a set of propositions of the form ‘Luise has bought some books that have the property P’, for some property P. This is the correct Hamblin/Karttunen denotation for (92a). It is necessary here that the indefinite expression be interpreted within the scope of the interrogative operator, in order for the variable P to occur within the propositions that constitute the question denotation. To obtain (93) the indefinite has to be reconstructed from SpecCP.

Suppose that we didn’t reconstruct the indefinite: we’d then get an interpretation like (94):

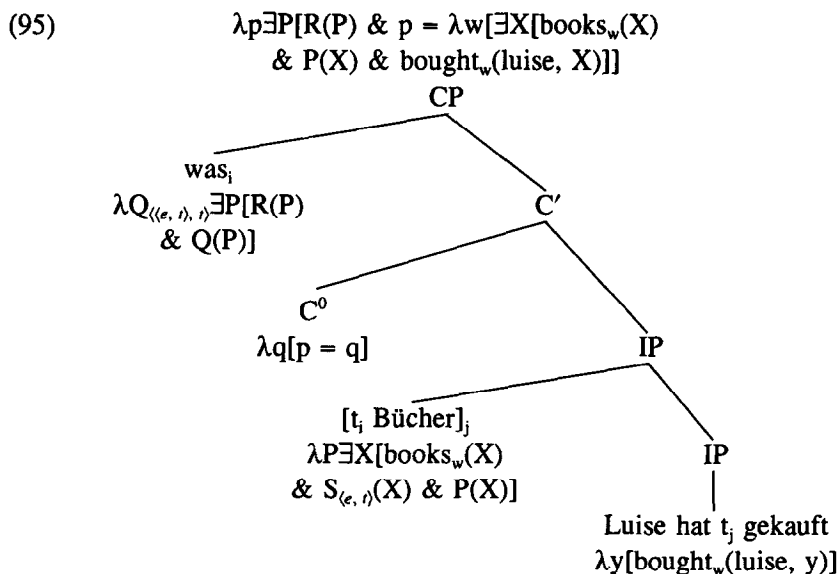
(94) $\lambda p \exists P [R(P) \ \& \ \exists X [\text{books}(X) \ \& \ P(X) \ \& \ p = \lambda w [\text{bought}_w(\text{luise}, X)]]]$

(94) denotes a set of propositions p such that there is a set of books X and a property P that those books have, and p is of the form ‘Luise has bought X’. But this is the Hamblin/Karttunen denotation of ‘Which books (that have some property P) has Luise bought?’, and not the correct interpretation for (92a). Thus, I suggest an LF for (92a) approximately like (95):

²⁴ This suggestion is due to Arnim von Stechow (pers. comm.).

²⁵ An analysis in terms of properties is not the only conceivable semantics for *was für*. I will stick to it here without discussion, though.

²⁶ In (93) and the following formalizations of *was für*-constructions, I don’t take the plural seriously, simply indicating a plural variable by spelling it with a capital letter. R is supposed to be some sort of restriction for the variable P. Intensionality is ignored.



Note that on this analysis, a *was für*-phrase actually contains two scope-bearing elements: the semantically interrogative part, which occurs in the above LF as *was*²⁷ in the SpecCP position, and the indefinite, in this case [t_i Bücher]_j, which has to be reconstructed.

In (96), there is another scope-bearing element in the question, the modal *muß* ‘must’:

- (96) Was für ein Papier muß Susanne abgeben?
 what for a paper must Susanne hand in
 ‘What kind of paper does Susanne have to hand in?’

The question is actually ambiguous; it can mean either (97a) or (97b):²⁸

- (97) a. For which property: there is a paper that Susanne has to hand in and that has that property.
 b. For which property: Susanne has to hand in a paper that has that property.

The reconstructed indefinite can have either wide or narrow scope with respect to the modal. This is very similar to the ‘referential’ vs. ‘non-

²⁷ On this analysis, *für* does not play any semantic role whatsoever, and is therefore left out in the LF (95). *Was für Bücher* is regarded as parallel to English *what books*.

²⁸ I will disregard a third possible use of *was für*-questions, in which they are interpreted like *which*-questions. This section is only concerned with the property or kind readings. Thus, to say that (96) is ambiguous is to say that it has two “property” readings.

referential' reading of *how many*-phrases. The split construction (98) is ambiguous in the same way as (96):

- (98) Was muß Susanne für ein Papier abgeben?
 what must Susanne for a paper hand in
 'What kind of paper does Susanne have to hand in?'

This means that the two scope-bearing elements contained in a *was für*-construction are semantically independent, and can and do get interpreted in different places. In particular, on this analysis there is no need to assume that the indefinite part joins the interrogative part at LF. In the LF (95), the indefinite accordingly occurs below the interrogative C⁰ position. Thus, in the split construction there is no reason to assume that the split-off part has to move at LF to join the rest of the phrase, as it would have to be reconstructed again anyway. Here, I will assume that it is basically interpreted in situ.

De Swart (1992) discusses the *wat voor*-construction (as well as French *combien de*) in interaction with quantifiers such as *nobody*, *everybody*, *often*, etc. I will use German examples, which to my knowledge are exactly parallel to the Dutch ones. Here are the relevant data:

- (99) a. Was für Bücher hat niemand gelesen?
 what for books has nobody read
 'What kind of books did nobody read?'
 b.*Was hat niemand für Bücher gelesen?
 what has nobody for books read
 'What kind of books did nobody read?'
- (100)a. Was für Bücher hat jeder gelesen?
 what for books has everyone read
 'What kind of books did everyone read?'
 b. Was hat jeder für Bücher gelesen?
 what has everyone for books read
 'What kind of books did everyone read?'
- (101)a. Was für Bücher hat Luise oft gelesen?
 what for books has Luise often read
 'What kind of books did Luise often read?'

- b. Was hat Luise oft für Bücher gelesen?
 what has Luise often for books read
 ‘What kind of books did Luise often read?’

A negative quantifier like *nobody* leads to ungrammaticality when it is intervening in a split *was für*-construction. (100b) and (101b), in contrast to (99b), are grammatical. However, they do not seem to mean quite the same as the corresponding non-split sentences.

De Swart (1992) and Pafel (1991a) claim that (100b) is unambiguously distributive. De Swart calls the reading that (101b) has a distributive reading, too. Her conclusion is that in a configuration like (102), the quantifier Q2 must have scope over Q1.

- (102) Q1_i Q2 [_{NP}[_{QP} e_i [prep N]]]
 Was Q für Bücher

She suggests the alternative semantic formulation of (102) that a quantifier Q2 may only separate a quantifier Q1 from its restriction if Q2 has scope over Q1. Since what we have is an interrogative sentence, for Q2 to have scope over Q1, according to de Swart, would mean that Q2 is quantified into the question to yield a distributive reading. It is well known that the distributive reading is impossible with *niemand* and negative quantifiers. So de Swart concludes that she has explained the ungrammaticality of (99b) as well as the reduced interpretational possibilities of (100b) and (101b).

If the above remarks concerning the semantics of *was für wh*-phrases are correct, things are a bit more complicated. In addition to the interrogative part of the *was für*-phrase, there is the indefinite part that has to be reconstructed. As demonstrated in (96), scope ambiguities are possible with respect to the indefinite part. Note that no distributive readings are involved here, because no other operator in the sentence has scope over the *interrogative* part of the *was für*-phrase. Accordingly, (101a) has a reading in which the adverb *oft* has wide scope with respect to the indefinite part that is reconstructed, but narrow scope with respect to the interrogative as a whole. This reading can be paraphrased as in (103):

- (103) For which property: it was often the case that Luise read books that have that property.

The intuitive paraphrase suggests the following formalization:

- (104) $\lambda p \exists P[R(P) \ \& \ p = \lambda w \ [often'(\lambda t[\exists X[books(X) \ \& \ P(X) \ \& \ read_{w,t}(luise, X)])]]]$

This reading is not a reading derived by quantifying *oft* into the question. According to the hypothesis expressed in section 3, to quantify into a question in the case of *oft* would not lead to a well-formed interpretation. This is where I crucially disagree with de Swart (1992), who calls this type of reading distributive.

Unlike (101a), (101b) only has this reading. That is, the indefinite *books* cannot have scope over *oft* in the split construction. In the narrow scope reading of the indefinite, the sentence is grammatical. *Oft* in (101) is a “week” intervener in the sense that, while it does have an interpretational effect, it does not render the sentence ungrammatical. Now consider *niemand* in (99): while (99a) has a narrow scope reading of the indefinite, just like (101a), (99b) is not unambiguous like (101b), but ungrammatical (i.e., out even under the narrow scope reading) at least for some speakers (de Swart 1992, Höhle 1990). Here is a paraphrase of the narrow scope reading:

- (105) For which property: nobody has read any books that have that property.

Again, the reading paraphrased in (105) is not a distributive reading, but a reading with the reconstructed indefinite having narrow scope with respect to *niemand* within the proposition. In (105), *niemand* has scope over an element that at S-Structure occurs in the SpecCP position, but which in fact has to be interpreted within the scope of the interrogative operator. The fact that *niemand* has scope over that element thus does not imply that we have a distributive reading. So no general regularities of the absence of distributive readings for *niemand* are going to help us here.

Importantly, I think that a narrow scope reading of the indefinite with respect to *niemand* is in principle possible. This is made particularly clear by (106a), as the narrow scope reading paraphrased in (106b) is the only reasonable reading that the sentence can have.²⁹

- (106)a. Was für Bücher hat niemand geschrieben?
 what for books has nobody written
- b. For which property: nobody has written any books that have that property.

So the ungrammaticality of (99b) in contrast to the effect of “weak” interveners like *oft* is really unexpected. It could not be explained in the same way as the intervention effects in the other *wh*-constructions from sections 2–4, because on the analysis suggested here, there is no reason

²⁹ If this intuition proves true, there is a difference here between the *was für*-construction and *how many*-phrases, which don’t allow a narrow scope reading with respect to negation.

to assume that the indefinite part is moved at LF. The split *was für*-construction is thus a very different case semantically from the other *wh*-in-situ constructions. Moreover, there is an empirical difference as well, in that quantifiers as interveners are not a homogeneous class in the case of *was für*-constructions (cf. *oft* vs. *niemand*).

With *jeder*, there is the further complication of the distributive reading. (100a) actually has three readings, given in (107): the distributive reading where *jeder* has scope over the entire question ((107a)), plus a non-distributive wide scope and a narrow scope reading relative to the indefinite ((107b) and (107c)).

- (107)a. For everybody, tell me what books s/he read.
 b. For which property: everybody is such that s/he read (some) books that have that property.
 c. For which property: there are some books that have that property and that everybody read.

In the split construction in (100b), we clearly don't have a reading corresponding to (107c). The question is whether the sentence has the distributive reading only, or whether it can have reading (107b) as well. Judgments of (99), (100), and (101) vary, making a conclusive statement difficult to arrive at. While some speakers even reject (101b), most people accept it (on the narrow scope reading of the indefinite). (99b) is rejected by many speakers who accept (101b), but not by all. (100b) seems to be interpreted as unambiguously distributive by those who reject (99b). More tolerant speakers accept (99b), and (100b) on readings (107a) and (107b).

What seems to be clear is that in the split construction the split-off indefinite cannot have wide scope with respect to any intervening quantifier. Now, under the semantic assumptions made here, the indefinite is just an ordinary indefinite (containing a *wh*-trace). Since, in addition, there is no reason to assume that it is moved at LF like a *wh*-phrase, this leads us to expect that it behaves in the same way as other indefinites with respect to scope interaction, and that's just what seems to be the case. In (108), just as in (101b) and (101b), the indefinite has narrow scope with respect to a c-commanding quantifier.

- (108)a. . . . weil Hans oft solche Bücher gelesen hat.
 . . . because Hans often such books read has
 ' . . . because Hans often read such books.'
 b. . . . weil jeder solche Bücher gelesen hat.
 . . . because everyone such books read has
 ' . . . because everyone read such books.'

So this fact about the split construction seems to follow from general regularities of scope interaction in the German Mittelfeld.

Reconstruction of the indefinite, occurring in the non-split *was für*-phrase, seems to have several potential landing sites. Hence the non-split constructions are often ambiguous. However, this leaves the additional effect that some interveners (*niemand* and *jeder*) have for many speakers as yet unexplained.

To summarize: what de Swart's approach does not take into account, according to the discussion above, is that a *was für*-construction contains two scope-bearing elements, thus giving us two *non-distributive* readings when another quantifier is contained in the question, and three readings (since we have the distributive reading in addition) if that quantifier is *jeder*. In order for the quantifier to have scope over the indefinite part of the *was für*-construction we don't have to have a distributive reading. So the effect of intervening negative quantifiers is not captured, because what's lacking is not only (predictably) the distributive reading, but also one potential non-distributive reading.

Since I can't explain the effect of strong interveners myself, the main interests of this section have been the following: The *was für*-construction has been mentioned in the context of intervention effects, without (to my knowledge) having been semantically analyzed very thoroughly. I have used the opportunity here to draw attention to some of its semantic properties that seem relevant in connection to intervention effects. Although the *was für*-construction at first sight looks very similar to the other constructions looked at so far, it is distinguished from them by these properties. In the *was für*-construction, there is no obvious necessity for the in situ part to move at LF at all, because it is semantically independent from the interrogative part of the construction. An analysis of intervention effects in the *was für*-construction thus can't be parallel to that of the other constructions.

Note that on the semantics for *was für*-phrases suggested here, the split-off part is not a restriction on the interrogative part of the *wh*-phrase. Thus the semantic formulation of de Swart's hypothesis would not apply. It does apply, however, to another set of data discussed in this paper, namely (109):

- (109)a.^{??} Wen hat keine Studentin von den Musikern getroffen?
 whom has no student of the musicians met
 'Which of the musicians did no student meet?'
 b. Wen hat jede Studentin von den Musikern getroffen?
 whom has every student of the musicians met
 'Which of the musicians did every student meet?'

For these data, de Swart's suggestion does indeed provide exactly the correct generalization. (109a) is ungrammatical, and (109b) only has the wide scope reading of *jeder*. So there is a subset of the data I discuss that de Swart's suggestion already captures. According to my analysis, however, this turns out to be just one instance of a much more general phenomenon. Her analysis as suggested in de Swart (1992) would not cover the other types of data exhibiting an intervention effect. In a sense, therefore, my analysis is an extension of de Swart's proposal.

6. CONCLUSIONS

The main subject of this paper has been to derive the ungrammaticality, or unambiguity, of a set of *wh*-interrogatives. An expression with inherent quantificational force has been shown to have an intervention effect for LF movement. That it is indeed LF movement that is concerned has been shown in each case by providing the desired interpretation for the sentence. The suggested LF is a structure that enables one to compositionally derive the desired meaning. An additional argument is the fact that the constructions looked at are quite diverse, thus making it difficult to discern a common element – if it weren't for the fact that for reasons of interpretation, it is necessary to move an in situ expression at LF. The blocking effect of a quantifier has been expressed in terms of a domain restriction: a quantified structure is the minimal domain in which an LF trace must be bound. Thus LF movement out of such a domain is effectively blocked.

My analysis benefits from previous work by Rizzi and others in that in my account, as well as in theirs, negation acts as a kind of barrier for certain kinds of movement. However, I differ from Rizzi in several respects. I deny that the effect is negation specific; that is, I claim that negation is just one case of a whole class of interveners. Accordingly, I don't express the intervention effect in terms of an intervening functional head. The effect is not due to special syntactic properties but to properties induced by the semantic status of an expression. As we're talking about an LF regularity, that seems legitimate. Secondly, my restriction is intended to cover a set of data largely different from Rizzi's. Therefore, I also differ in what elements are affected by the restriction – namely, in my view, only LF traces. I don't claim that negation plays any special role for S-Structural relations. As for some other effects of negation that Rizzi derives via the intervening A'-specifier theory, see Beck 1995 for an alternative analysis, which is in fact very much related to this paper. There I have come to the conclusion that, in a way, Rizzi ascribes the effect of negation to the wrong level; that is, that even those effects which he explains via S-Structural traces

really reflect an LF regularity. The suggestion is that in fact this regularity is the MNSC.

I have used LF to express a syntactic constraint on the derivation of interpretations. The constraint must be syntactic in nature because nothing is wrong with the interpretations themselves. The problem is to derive them from the given S-Structures. This kind of restriction is what I take to be the prototypical application of the theory of LF. The notion of LF I use is the one proposed, for instance, by Heim and Kratzer (1991). LF comes into play when (a) the derivation of an interpretation from a given S-Structure is non-trivial, and (b) when arbitrary constraints are at work that concern the way S-Structures are linked to their logically possible interpretations. If we can show that the processes linking an S-Structure to its interpretation crucially depend on syntactic information best represented at that level (e.g., if there are constraints at work that can only be expressed in syntactic terms) – and importantly, this is just the level that is needed for compositional interpretation anyway – this justifies the idea of the syntax-semantics interface as a syntactic level. I think I have provided some arguments in favor of that view.

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