Wh-constructions and transparent Logical Form

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Preface

Grammar is like a balloon:
if you squeeze in one place,
it bulges in another.

Hotze Rullmann

What this dissertation is about

From a theoretical perspective, this dissertation aims to argue for a syntactic level of Logical Form as the syntax-semantics interface, and for a restriction on that level, the Minimal Quantified Structure Constraint (MQSC). Logical Form (LF) is here conceived of as the level that is compositionally interpreted to yield the desired model-theoretic interpretation. The constraint MQSC is argued for on the basis of *wh-in-situ* data from German and Korean, with additional evidence coming from Hindi/Urdu and Turkish. Essentially, it prohibits LF movement across a quantifier. Hence, it amounts to the requirement that S-Structure already be transparent in a certain sense, in those languages that observe the MQSC. Transparency is linked to the availability of scrambling. From an empirical perspective, the MQSC constitutes the explanation for a complex pattern of grammaticality and interpretational possibilities of *wh*-constructions in interaction with quantified expressions. It is argued that the necessity of formulating such a constraint is strong evidence in favour of LF, as conceived of here, being the syntax-semantics interface.

A remark on the origin of the material presented

This dissertation is based on four closely related papers, namely Beck (1995), Beck (1996), Beck & Kim (1996) and Beck & Rullmann (1996). In addition to the material from these papers, there is some discussion of Hindi/Urdu and Turkish (chapter 3), and a discussion of Rullmann´s (1995) explanation for the negative island effect (chapter 4). Moreover, I have attempted to embed the theory propagated in the original papers into the system of transparent LF as the syntax-semantics interface (chapters 1 and 5). Still, much of this dissertation is virtually identical to the four papers mentioned above: Chapter 2 is based almost entirely on Beck (1996). Most of the material in chapter 3 comes from Beck & Kim (1996). Chapter 4 contains material from Beck (1995) (in section 4.2. and section 4.4.), parts of Beck & Kim (1996) (in section 4.3.), and large parts of Beck & Rullmann (1996) (section

4.5.). It should be stressed in particular that parts of this dissertation stem from joint work. Concerning the co-authored papers, the origin of the material will therefore be mentioned again at the beginning of the relevant sections.

Acknowledgements

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Up to this point, I found writing the acknowledgements relatively easy. From here on, however, I felt quite unable to say what is directly related to my dissertation and what isn´t - to separate my private life from linguistics, my friends from my collegues, my work from everything else. There are many people who I am grateful to, for various different reasons. These include discussion of my work, comments and judgements, and so on. But I will also use this opportunity to thank my friends and my collegues for being supportive in one way or another during the time I wrote this dissertation, be it related to linguistics or not. Since I can hardly explain at length how each of them helped me, I will simply say thanks very much to Steve Abney, Franz d´Avis, Steve Berman, Sabine Blum, Daniel Büring, Dirk Büttner, Kirsten Brock, Lansun Chen, Diana Cresti, Veneeta Dayal, Kordula De Kuthy, Regine Eckardt, Elisabet Engdahl, Caroline Féry, Veerle van Geenhoven, Willi Geuder, Inge & Wolfgang Götz, Fritz Hamm, Birgit Kaiser, Jung-Goo Kang, Graham Katz, Hap Kolb, Manfred Kupffer, Marc Light, Uli Lutz, Paola Monachesi, Bärbel & Frank Morawietz, Detmar Meurers, Claudia Nohl, Jürgen Pafel, Alla Paslawska, Irene Rapp, Susanne Riehemann, Stefan Riezler, Jochen Saile, Susanne Trissler, Hubert Truckenbrodt, Karina Wilkinson, the Sunday soccer crowd (Tübingen!) and the university´s women´s soccer team. There is nobody among them who I don´t feel genuinely grateful to, for one reason or another, or sometimes many.

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I dedicate this dissertation to my mother, Helga Beck.

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1. Introduction and background

1.1. General introduction

From an empirical perspective, the major aim of this dissertation is to find an explanation for the (un-)grammaticality and interpretational range of a number of *wh*-constructions. These include *wh-in-situ* data from German and Korean, as exemplified by (1)-(3), and negative island data like (4).[1]

(1) German:[2] a. * Wann hat niemand wem geholfen?
                      when has nobody whom helped
             b.   Wann hat wem niemand geholfen?
                      when has whom nobody helped

             `When did nobody help whom?'

(2) Korean: a. * amuto muôs-ûl sa-chi anh-ass-ni?
                      anyone what-Acc buy-CHI not do-Past-Q
             b.   muôs-ûl$_i$ amuto t$_i$ sa-chi anh-ass-ni?
                      what-Acc anyone buy-CHI not do-Past-Q

             'What did no one buy?'

(3) German: Wann hat jeder wen getroffen?
                  when has everybody whom met
                  `When did everybody meet whom?'

(4) German: Wieviele Kühe hat niemand gemolken?
                  how many cows has nobody milked

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[1]Some of the examples in this dissertation could be interpreted with an echo reading. Echo interpretations will be disregarded throughout.
[2]In Beck (1995a), these examples were marked with '??' rather than '*'. The '??' was supposed to stress the peculiar way in which these data are felt to be ungrammatical subjectively. I have not changed the judgment here, merely the notation for that judgment, because I want to use '??' with its usual meaning (i.e. awkwardness, but maybe not full ungrammaticality).

`How many cows did nobody milk?'

I look at the interaction of *wh*-construction with negation and quantifiers. In German, a *wh*-phrase in situ may not be preceded by a negative quantifier. The reverse linear order is fine. Korean exhibits the same behaviour with respect to the negative polarity item *amuto* 'anyone'. (3) shows that a *wh*-phrase *in situ* may be preceded by a universally quantified NP. However, the sentence can only have the so-called pair-list interpretation - a rather surprising observation, since this is a relatively marked reading normally. Finally, in (4) we have a *how many*-phrase in a negative island context. As has frequently been observed (e.g. Rullmann (1995)), the sentence can only be interpreted as (5a), but not as (5b):

(5)   a.   For which n: there are n cows such that nobody milked them.
        b.   For which n: nobody is such that s/he milked n cows.

The data will be derived by introducing a constraint for the level of Logical Form (LF), the Minimal Quantified Structure Constraint (MQSC). The MQSC as defined in (7) is based upon the notion of a Quantifier Induced Barrier (QUIB), given in (6).

(6)   Quantifier Induced Barrier (QUIB):

        The first node that dominates a quantifier, its restriction and its nuclear scope is a quantifier induced Barrier.

(7)   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.

The MQSC basically says that movement across a quantifier is prohibited at LF. It is primarily intended to restrict *wh*-movement at LF. A subcase of this is movement across a negation or negative quantifier. An intermediate step of formulating the MQSC will be the formulation of the Minimal Negative Structure Constraint (MNSC), which covers just the negative case. Applied to (1), for instance, the claim will be that the *in situ wh*-phrase *wem* will have to move at LF to a position structurally above the negative quantifier. This movement will be prohibited by the

MNSC (and the MQSC). Hence the MQSC excludes the structure in (8), which is the LF that (1) would have. Since the sentence does not have a well-formed LF, it is ungrammatical.

(8)   [wann wem$_i$ [$_{QUIB}$ niemand [t$_i^{LF}$ geholfen hat]]]

The primary theoretical goal of this dissertation is to argue for the MQSC. It is in a sense a transparency requirement for S-Structure: Scope relations have to be made clear at S-Structure as far as possible. The MQSC is expected to hold in languages that have the syntactic freedom to do so. This is a characteristic that Korean and German share, in contrast to English, for instance. We will see that this presupposes a view of scrambling in which scrambling cannot be irrelevant to the interpretation procedure. Rather, scrambling is a means by which transparency can be achieved.

This general perspective on the MQSC implicates that its effects go beyond wh-movement, and concern scope interaction in general. While scope interaction is not the main topic of this dissertation, I will explore some of the consequences that the MQSC has in this area as well.

The MQSC is supposed to operate at LF. It is a constraint that states a well-formedness requirement on structures at that level. It is argued that certain interpretations are unavailable because the LF that would yield this interpretation is ruled out by the MQSC. Sometimes this would be the only possible interpretation. The corresponding sentence is thus predicted to be ungrammatical. It should be stressed that the LFs that I will assume throughout this dissertation will all be semantically motivated in the sense that they are structures that can be compositionally interpreted to yield an appropriate model-theoretic semantics. This implies that I will give a detailed semantic analysis of the *wh*-constructions I want to account for. The semantic analysis will be based upon a semantics for interrogatives as proposed by Hamblin (1973) and Karttunen (1977). This semantics will be defended against certain critcisms raised against it (Groenendijk & Stokhof (1982), (1984), Rullmann (1995)). It is argued that a semantic system that employs a Hamblin/Karttunen semantics plus a semantic notion of what an answer to a question is (due to Heim (1994)), is in fact superior to either a Rullmann semantics or a Groenendijk & Stokhof semantics for interrogatives.

I will have to use three objects associated with a linguistic expression: its syntactic structure, its model-theoretic interpretation(s), and its Logical Form(s). I will briefly introduce the assumptions I make about these in section 1.2.

The enterprise sketched above faces one general problem. It is inherently difficult to argue that the Logical Form of a sentence should be a particular structure, and no other, since we do not have direct empirical evidence for what an LF looks like. It is usually possible to give more than one structure that could be compositionally interpreted to yield one and the same meaning.[3] If it were impossible to restrict the set of LFs that could potentially yield the same interpretation, the whole enterprise would be doomed. However, I think this can be done, i.e., I think that it is possible to state general, motivated restrictions on possible Logical Forms such that at least the majority of structures that could be interpreted to yield a particular meaning is ruled out. This will also be discussed in more detail in section 1.2.

1.2. Background

In this section, I will briefly look at the prerequisites for the plot sketched in section 1.1. Section 1.2.1. introduces the interrogative semantics I will use. In section 1.2.2. I will say a few words about the syntactic assumptions I will make. Most importantly, I will introduce in section 1.2.3. the notion of Logical Form I have in mind, including the necessary restriction just referred to.

1.2.1. Semantics

One general point first. Although I will, as I said, assume a model-theoretic semantics, I will not usually introduce model-theoretic objects as interpretations. What I will refer to as "interpretations" are translations into an extensional formal language like Ty2 (Gallin (1975)). This is standard practice. It is justifyable (though not a hundred percent correct) to call these translations interpretations because there are standard well-defined model-theoretic interpretations for them. As far as I can

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[3]This is under the assumption that we stick to one and the same interpretation. Sometimes there is even more than one candidate for that. This possibility will be ignored.

see, I could just as well have interpreted LF structures directly. The reason I do things this way is simply because I find formulas more readable than set notation.

I will be concerned almost exclusively with interrogative semantics. I will refer to the semantics I will use as the Hamblin/Karttunen semantics for interrogatives. In both a Hamblin and a Karttunen semantics (Hamblin (1973), Karttunen (1977)), a question denotes a set of propositions. The difference is that in Karttunen´s semantics, those propositions are required to be true. There is no such requirement in Hamblin´s system. The semantic system I use is exactly like Karttunen´s, except that the truth requirement has been dropped.[4] Let me briefly introduce the main features of this semantics (for a full exposition the reader is referred to Karttunen (1977)).

The basic idea is that the denotation of a question is a set of propositions, namely the set of all those propositions that are possible answers to the question. If for instance Mary, Sue and Jane are the persons in the context, then the denotation of the question (9a) will be the set of propositions informally given in (9b):

(9)   a.   Who was at the party?
        b.   {Mary was at the party, Sue was at the party, Jane was at
                the party}
        c. $\lambda p \exists x[\text{person}(x) \ \& \ p=\lambda w'[x \text{ was at the party in } w']]$

More generally, (9a) denotes the set of propositions (9c), a set of propositions that are identical to 'x was at the party', for some person x. So if the variable x can range over Mary, Sue and Jane (that is, if Mary, Sue and Jane are all the persons there are in the context), the formula in (9c) will denote the set of propositions in (9b). The denotation of a question is thus the set of all possible alternative answers to the question.

The Karttunen semantics is, as far as I can see, the standard interrogative semantics (and the modification I have made minor and quite unimportant formally).

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[4]The reason is that I feel more comfortable with a Hamblin-like denotation in the case of unembedded questions. However, this does not play a role for what I am going to do, so that I might as well have used a straightforward Karttunen denotation.

There is to my knowledge only one alternative to be seriously considered: Groenendijk & Stokhof´s (1982, 1984) semantics for questions. Interestingly, using a Groenendijk & Stokhof semantics would probably make a difference for quite a few of the data I analyse. I will not at this point enter into the longstanding discussion of Karttunen vs. Groenendijk & Stokhof. I will come back to this issue at the very end of this dissertation (section 4.5.). There, it will be argued that a Karttunen semantics has conceptual advantages over a Groenendijk & Stokhof semantics.

1.2.2. Syntax

I think of the syntactic framework I use as "GB-oriented". This means that I will assume a phrase structure syntax with traces. I will also in a general sense assume that we have restrictions on antecedent-trace relations. The restriction I will suggest (the MQSC) is inspired in particular by the barriers framework (Chomsky (1986)). I also assume the usual general things about movement (e.g. that it can be adjunction or substitution).

These remarks concern S-Structure and the syntax of LF. Obviously, the framework is also GB-oriented in that I have two levels of (syntactic) representation, S-Structure and LF.

I have carefully dubbed this "GB-oriented" because I don´t actually presuppose much of the government & binding or the barriers framework. I usually try to adopt the most uncontroversial syntactic analysis. Whenever I make other more specific syntactic assumptions they will be discussed when the occasion arises.

1.2.3. Transparent Logical Form and a type restriction

The data in this dissertation are mostly cases in which it is relatively hard to see how one could compositionally interpret S-Structure and get the desired interpretations. In fact, *wh-in-situ* data are what partly motivated the level of logical form and the notion of LF movement (e.g. May (1985)). I will follow this tradition and assume that interpretation is mediated by a syntactic level LF. Moreover, I will follow a more recent development within this tradition and assume that LF is transparent in the sense of von Stechow (1991, 1996). This basically means that in contrast to much of the more syntactically oriented research on LF, any LF proposed in this dissertation can (and mostly will) be compositionally interpreted to yield the

intuitively adequate, model-theoretic interpretation. See Heim & Kratzer (1993) and von Stechow (1991) for this concept of LF.

This in itself is already a restriction on the LFs I might propose a particular sentence to have: any LF I will propose is one that will yield the desired interpretation, and this will mostly be demonstrated in detail.

To give a very simple example, consider (10) and its lF (11):

(10)   John snores.

(11)

$$\lambda x[snore(x)](john)$$
$$= snore(john)$$

```
                    S
            _____|_____
           |                 |
         john          λx[snore(x)]
          NP                VP
          |                  |
         John          λx[snore(x)]
         john                V
                             |
                          snores
                       λx[snore(x)]
```
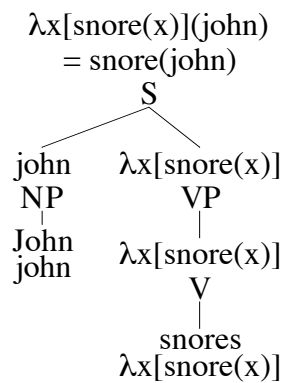
Each node in the tree is annotated with its interpretation. The interpretations of the leaves in the tree, which should really be lexical categories, must be provided by the lexicon. For simplicity, I will frequently not analyse non-lexical categories, though, and just assume an appropriate interpretation.

The interpretations of the other nodes are derived from the interpretations of their daughters by a set of standard mechanisms. For branching nodes, the "standard mechanisms" I have to assume are - with one exception, the interpretation of movement - restricted throughout to functional application (in either direction), with a choice of using either extensions or intensions (in the example above I have used only extensions, for convenience). Non-branching nodes inherit the interpretation of their daughter. As we can see from the interpretation of the root node, this LF gives us the desired interpretation for (10).

Next, consider an interrogative LF for a question like (12):

(12)   Who was at the party?

I will assume an LF for (12) that is in the important respects like (13).[5]

(13)

$$\lambda p \exists x[\text{person}_W(x) \ \& \ p = \lambda w'[\text{be\_at\_the\_ party}_{w'}(x)]]$$

CP

who$_i$
$\lambda P \exists x[\text{person}_W(x) \ \& \ P(x)]$ $\lambda x[p = \lambda w'[\text{be\_at\_the\_ party}_{w'}(x)]]$

C'

C^0
$\lambda q[p=q]$ $\lambda w'[\text{be\_at\_the\_ party}_{w'}(x)]$

IP

t_i
x $\lambda y[\text{be\_at\_the\_party}_{w'}(y)]$

I'

I   VP

be at the party
$\lambda y[\text{be\_at\_the\_party}_{w'}(y)]$
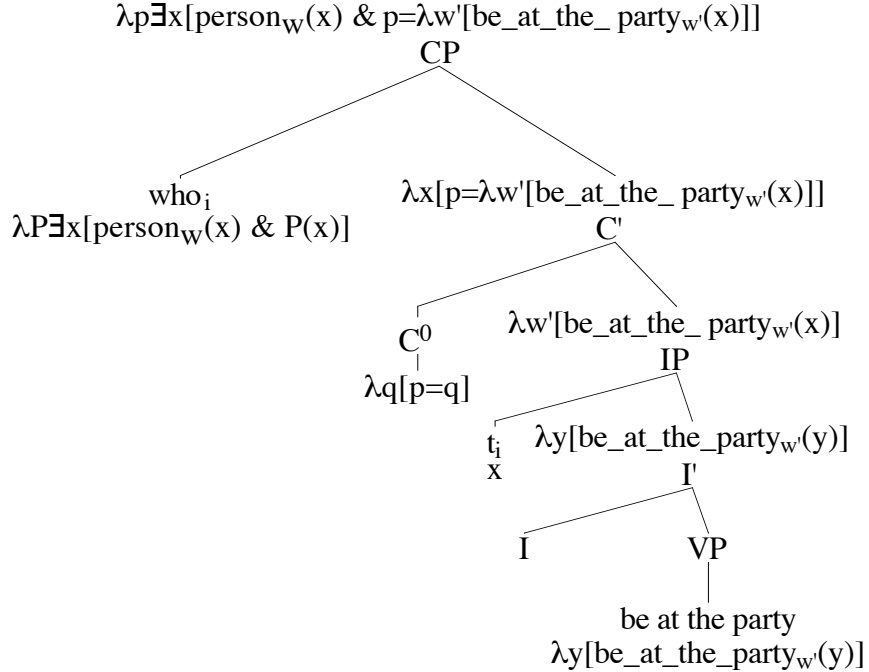
(13) is an interrogative LF along the lines of Stechow (1993a, 1993b, 1996), Heim (1992). The C^0 position is associated with the interrogative operator "$\lambda p[p=q]$". This is the important step to question-type meanings.[6] In order to be interpreted as an interrogative *wh*-phrase, *who* has to be interpreted outside the scope of this operator, and consequently, at LF, has to end up in a position structurally above the C^0 position. Wh-phrases correspond to existentials in this semantics.[7]

(13) also illustrates the interpretation of movement. Movement structures are interpreted by lambda abstraction as indicated informally in (14):

(14)   [X$_i$ [...t$_i$ ...]] -->   [X' λx[...x...]]

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[5]Implicit arguments are notated as subscripts where convenient.

[6]It corresponds to the formation of Proto-questions in Karttunen´s system.

[7]The translations of wh-phrases and quantifiers will usually be simplified to the purely extensional type <<e,t>,t>, for simplicity. However, in cases where I want to illustrate reconstruction of such a quantifier into an intensional context, I have to use the more appropriate type <s,<<s,<e,t>>,t>>. Therefore, translations of quantifiers vary a bit. This is harmless.

This is not compositional as it stands. Heim & Kratzer (1993) propose to regard (15) as the real representation of movement structures. (15) can be interpreted as in (16) in a more compositional way (compare Heim & Kratzer (1993)).

(15)   [X [i [...t$_i$...]]]

(26)   [X [λx[...x...]]]

I will use the traditional notation of movement structures (as in (14)) - bearing in mind that this should be viewed as an abbreviation.[8]

      (8), and the other LFs and interpretations to come, are very much simplified, and intended to be a proper analysis only of those aspects that have to do with interrogative semantics. For instance, I ignore tense completely.

      With this, we have a framework that allows us to compositionally derive question interpretations. But remember that the aim of this dissertation is not only to give a semantic analysis of certain constructions. For this it would in a sense be sufficient to provide one way of getting the right result. Rather, my goal is to argue for a syntactic restriction on possible LFs, the MQSC. With the MQSC I want to exclude, not in fact just one particular LF, but of course the interpretation that LF would yield. I thus run into the problem mentioned above: there might be a second structure (a second possible LF for the sentence) that could also be compositionally interpreted to yield the desired interpretation.

      To give a concrete example, consider (17):

(17)   John wants to read every book.

The sentence is usually considered ambiguous between two readings that could be paraphrased as (18a) and (18b) respectively:

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[8]One more aspect of (13) is not covered by the standard mechanisms alluded to: the lambda-abstraction over the propositional variable at CP-level. This can be regarded as an abbreviation as well, for giving the interrogative C-position the interpretation "λqλp[p=q]". Binding all propositional variables from the start necessitates type adjustment of wh-phrases. I do not want to discuss that here and will use the notation illustrated in (13) without further comment.

(18)   a.   What John wants to do is read every book.

        b.   For every book x: John wants to read x.

The ambiguity arises due to different scope relations of *every* and *want*. According to frequently made assumptions, the two readings can be characterized by two different LFs which would look roughly like (19a) and (19b):

(19)   a.   [John$_k$ [want [[every book]$_i$ [PRO$_k$ [to read t$_i$]]]]]

        b.   [[every book]$_i$ [John$_k$ [want [t'$_i$ [PRO$_k$ [to read t$_i$]]]]]]

(19a) yields the narrow scope reading paraphrased in (18a), as demonstrated in (20):

(20)

$\text{want}_w(\text{john}, \lambda w' \, \forall x[\text{book}_{w'}(x) \rightarrow \text{read}_{w'}(\text{john},x)])$
IP

John$_k$
john

$\lambda y[\text{want}_w(y, \lambda w' \, \forall x[\text{book}_{w'}(x) \rightarrow \text{read}_{w'}(\text{john},x)])]$
I'

I

$\lambda y[\text{want}_w(y, \lambda w' \, \forall x[\text{book}_{w'}(x) \rightarrow \text{read}_{w'}(\text{john},x)])]$
VP

want
want

$\lambda w' \, \forall x[\text{book}_{w'}(x) \rightarrow \text{read}_{w'}(\text{john},x)]$
CP

C

$\lambda w' \, \forall x[\text{book}_{w'}(x) \rightarrow \text{read}_{w'}(\text{john},x)]$
IP

every book$_i$
$\lambda P \forall x[\text{book}_{w'}(x) \rightarrow P(x)]$

$\lambda x[\text{read}_{w'}(\text{john},x)]$
IP

PRO$_k$
john

$\lambda y[\text{read}_{w'}(y,x)]$
I'

I

$\lambda y[\text{read}_{w'}(y,x)]$
VP

V
read
read

t$_i$
x
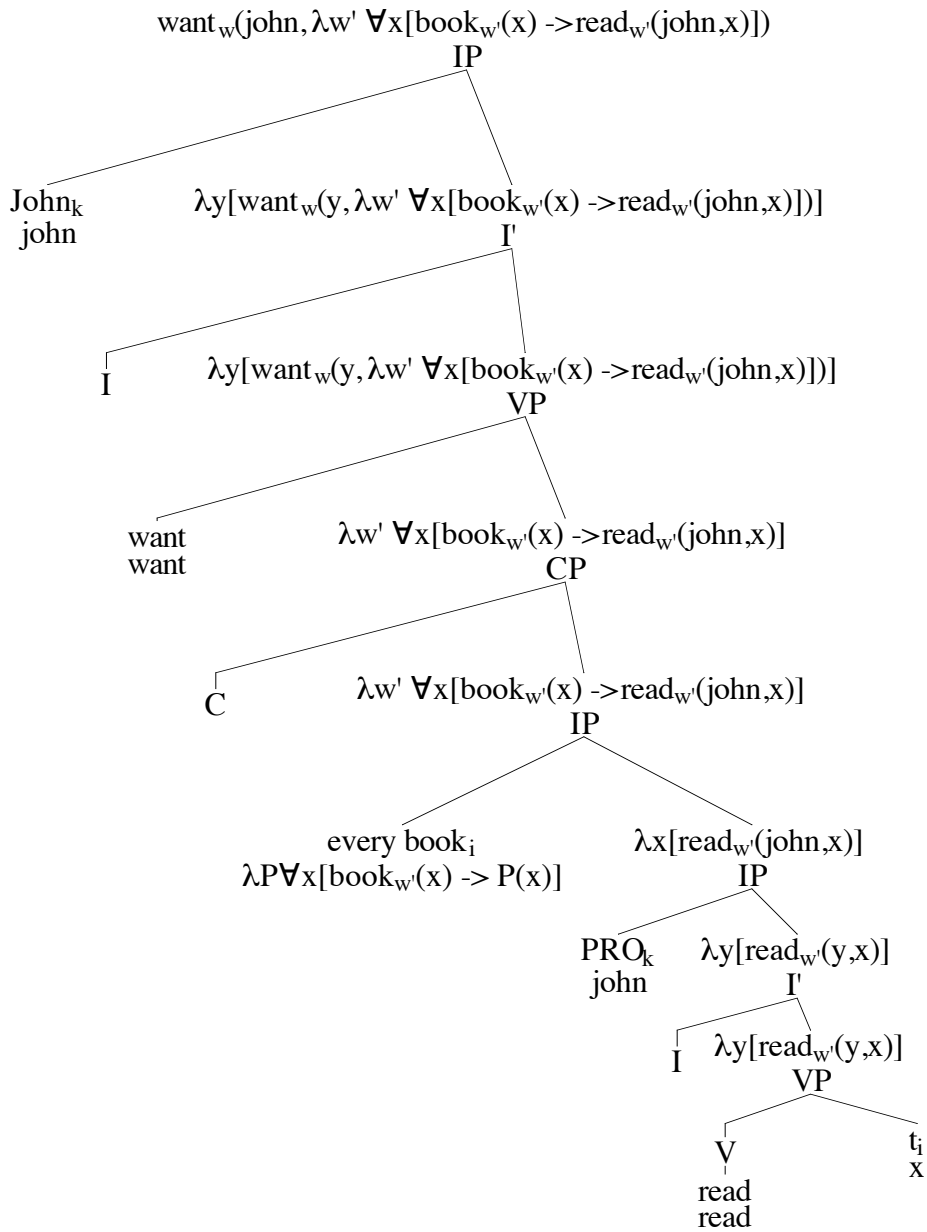
It is usually assumed that (19b) is interpreted as indicated in (21) to yield the wide scope reading of *every*:

(21)

19

$\forall x[book_w(x) \rightarrow want_w(john, \lambda w'[read_{w'}(john,x)])]$

IP

[every book]$_i$ $\lambda w \lambda x[want_w(john, \lambda w'[read_{w'}(john,x)])]$
$\lambda P \forall x[book_w(x) \rightarrow P(w)(x)]$

IP

John$_k$
john

I'

I $\lambda y[want_w\{y, \lambda w'[read_{w'}(john,x)])]$

VP

want $\lambda w'[read_{w'}(john,x)]$
want

CP

C $\lambda w'[read_{w'}(john,x)]$

IP

t'$_i$ $\lambda x[read_{w'}(john,x)]$
x

IP

PRO$_k$
john

I'

I $\lambda y[read_{w'}(y,x)]$

VP

read   t$_i$
read   x
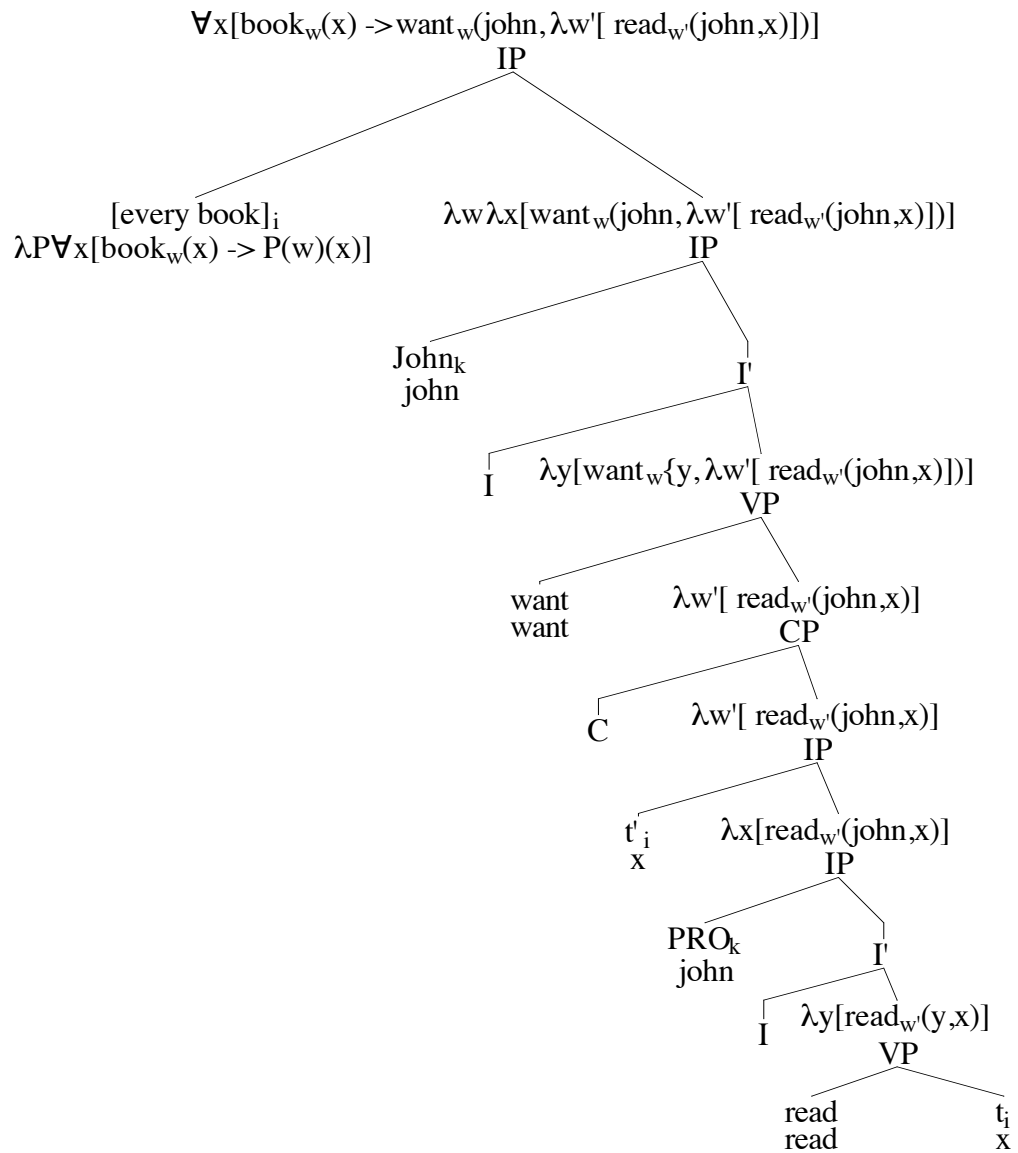
However, there is a second possibility of interpreting (19b): the trace *t'$_i$* of *every book* can get translated as a variable of type <s,<<s,<e,t>>,t>> rather than a variable of type e. The effect of this step is illustrated in (22):

(22)

$\lambda\wp[\text{want}_w(\text{john}, \lambda w'[\wp(w')(\lambda w\lambda x[\text{read}_w(\text{john},x)])])] (\lambda w\lambda P\forall x[\text{book}_w(x) \rightarrow P(w)(x)])$

IP

[every book]$_i$ $\lambda\wp[\text{want}_w(\text{john}, \lambda w'[\wp(w')(\lambda w\lambda x[\text{read}_w(\text{john},x)])])]$
$\lambda P\forall x[\text{book}_w(x) \rightarrow P(w)(x)]$ IP

John$_k$
john   I'

I $\lambda y[\text{want}_w(y, \lambda w'[\wp(w')(\lambda w\lambda x[\text{read}_w(\text{john},x)])])]$
VP

want
want   CP

C $\lambda w'[\wp(w')(\lambda w\lambda x[\text{read}_w(\text{john},x)])]$
IP

t'$_i$ $\lambda w\lambda x[\text{read}_w(\text{john},x)]$
$\wp_{<s,<<s,<e,t>>,t>>}$ IP

PRO$_k$
john   I'

I $\lambda y[\text{read}_w(y,x)]$
VP

read   t$_i$
read   x
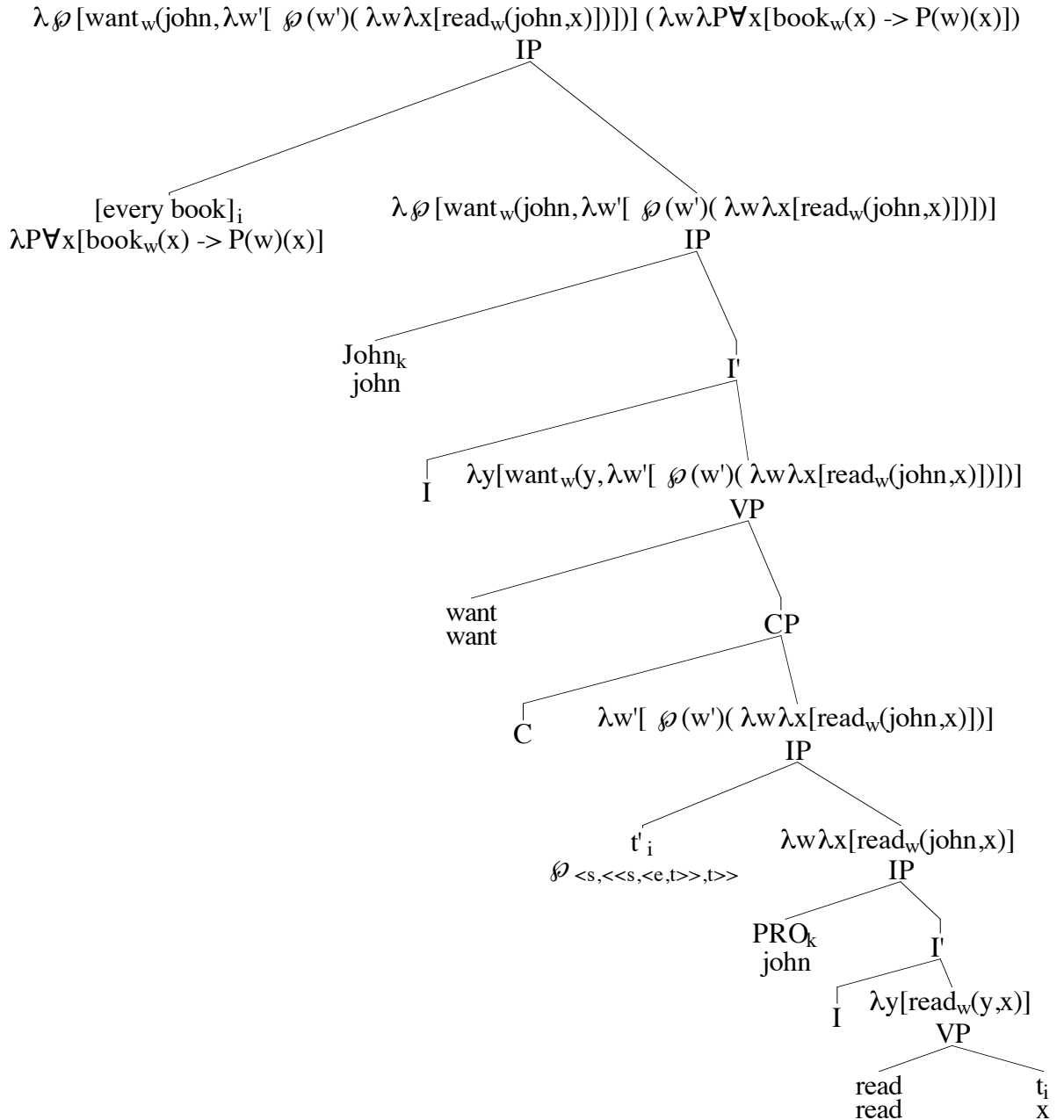
The resulting formula can be simplified by lambda conversion as shown in (23).

(23)

$\lambda\wp[\text{want}_w(\text{john}, \lambda w'[\wp(w')(\lambda w\lambda x[\text{read}_w(\text{john},x)])])] (\lambda w\lambda P\forall x[\text{book}_w(x) \rightarrow P(w)(x)]$

iff $\text{want}_w(\text{john}, \lambda w'[\lambda w\lambda P\forall x[\text{book}_w(x) \rightarrow P(w)(x)](w')(\lambda w\lambda x[\text{read}_w(\text{john},x)])])$

iff $\text{want}_w(\text{john}, \lambda w'[\lambda P\forall x[\text{book}_{w'}(x) \rightarrow P(w')(x)](\lambda w\lambda x[\text{read}_w(\text{john},x)])])$

iff $\text{want}_w(\text{john}, \lambda w'[\forall x[\text{book}_{w'}(x) \rightarrow (\lambda w\lambda x[\text{read}_w(\text{john},x)])(w')(x)]])$

iff $\text{want}_w(\text{john},\lambda w'[\forall x[\text{book}_{w'}(x) \to \text{read}_{w'}(\text{john},x)]])$

Now this is exactly the interpretation of (19a), the narrow scope reading of *every* with respect to *want*. So (22) is an alternative LF to (20) that yields the same interpretation, although the LF structures look remarkably different.

A type raising mechansim for traces was in fact suggested by Cresti (1995) and Rullmann(1995) to capture reconstruction effects.

This means that by ruling out a particular LF by means of a syntactic restriction (like the MQSC), we have not really made sure that the corresponding interpretation is ruled out as an interpretation of the sentence in question. There might be a second LF structure that produces exactly the same interpretation. This second LF might not be excluded by the restriction argued for (or by other syntactic considerations either). Thus one cannot claim that the restriction excludes the corresponding interpretation: there would still be a possiblity to derive that interpretation, even if maybe the first attempt failed.

So suppose for sake of the argument that we wanted to rule out the narrow scope interpretation of *every* in (17) (which we don´t want to do in this case of course, but a parallel case will arise in which we want to do something similar: in example (3), the non-pair-list reading must be ruled out). It would not be enough to rule out (20), the "canonical" LF for that interpretation, since we still have (22), although this does not seem to be what we had in mind with (19b).

It is therefore neccessary to further restrict the structures that could be LFs of a sentence on a given reading. As a first step, I suggest (24):

(24)   Restriction on the types of traces

Traces may only be translated as variables of the simplest type that makes them combinable with their sister category, and that is compatible with their binder.

By "combinable with their sister category" I mean that the interpretations of the two daughters in a local tree must be combinable via the usual mechanisms (see above).

By "compatible with their binder" I mean the following: As in Heim & Kratzer (1993), I will assume that movement always gets interpreted as lambda abstraction over the variable introduced by the trace. Lambda abstraction takes place

when the trace binder is encountered. The semantic type of the trace variable is compatible with the binder if at this step the two daughters in the local tree (binder and abstract) are combinable.

Looking back to (22), we observe that $<s,<<s,<e,t>>,t>>$ is not the simplest type for the trace t'_i that would be both combinable with the sister category and compatible with the binder. The simplest such type is e. Thus (22) violates (24).

In what follows, I will assume that (24) holds. This clearly restricts the set of possible LFs that could lead to a particular interpretation.

However, it turns out that (24) is not quite sufficient. Suppose we had decided to raise the type of the verb *read*, that is, we get a verb *read*$^{\#}$ that takes a direct object of type $<s,<<s,<e,t>>,t>>$, rather than of type e. The simplest type for the trace variable of both t_i and t'_i that would be combinable with that verb in the LF (19b) (repeated here) would be type $<s,<<s,<e,t>>,t>>$.

(19b)   [[every book]$_i$ [John$_k$ [want [t'_i [PRO$_k$ [to read t_i]]]]]]

The interpretation we get (assuming a reasonable interpretation for the type raised verb) is again a narrow scope reading.

Hence, the restriction on types (24) has to be part of a general restriction on types in order to be meaningful. In effect, we want to restrict the interpretation of local trees like (25) to the simplest option in terms of types:

(25)   [$_X$ t Y]

This is reminiscent of Partee and Rooth´s (1983) case of conjunction of extensional transitive verbs:

(26)   [TV and TV]

They argue that (26) should only be interpreted by using the simplest types possible for the TVs. Type raising has to be restricted to those cases in which we would not otherwise get a well-formed interpretation.

(25) is not altogether identical to (26) since we have a trace in (25), not an ordinary lexical expression. The cases would be parallel if higher typed traces could only exist due to type raising, not lexically. Else, we could assume that traces may

not force an expression to type raise. I will leave open what would be the best way to enforce the simplest types interpretation for (25). I will assume that the interpretational mechanism is restricted in such a way that structures like (25) will only receive the simplest interpretation, and refer to that restriction as the Simplest Types Restiction (STyR). I hope that the general relevance of such a restriction has become clear. I will come back to the specific consequences for my proposal in chapter 5.

The simplest types restriction takes care of the cases discussed in the remainder of this dissertation, i.e. as far as I can see, it narrows down the possibilities of interpreting structures in such a way that there remains only the simplest case (or irrelevant variations thereof).

If the STyR should prove useful as a restriction on what LFs can look like, this would be an important step. The problem with LF always is that there is no direct empirical evidence for a particular structure being the LF of a sentence. Having to be able to compositionally interpret what one suggests as an LF puts a break on too absurd proposals. It doesn´t allow one, however, to speak about the LF of a sentence, even when the sentence is totally unambiguous. Once we depart from interpreting S-Structure directly, a range of possibilities opens up. There are various options of what the structure we claim to be the LF of the given S-Structure could be.

Our goal could be, like Rullmann (1995) proposes, to have an LF distinct from S-Structure, but to assume that LF is as close to S-Structure as possible. I will follow a strategy that is in a sense the opposite strategy: I will assume a level of LF that is as close to interpretation as possible. That is, I will assume that reading an interpretation off an LF is trivial.

Stated like this, neither strategy means very much. Note that while my own proposal might sound even more vague, the other strategy is not at all well-defined either. It is necessary to formalize both strategies in order to say whether they make any sense, or whether one makes more sense than the other. I have made a first proposal as to what the second strategy should mean (the STyR), but I won´t say anything about the first. It is clear, though, that a general strategy of some sort is needed in order to have an interpretational mechanism that is at all restrictive.

The position I will take in the remainder of the dissertation (i.e., the syntax-semantics interface is a level of syntax, restricted by principles that are syntactic in nature) is one I consider to be theoretically difficult. It is also a position that I don´t

see an easy alternative to, considering the data I am interested in - in other words, I believe that the data I will discuss lead one to this position. I hope to have made this view of the syntax-semantics interface a little clearer above. My hope is that the rest of this dissertation will show that while difficult for theoretical reasons, this view gives one a machinery that is very well suited to the task. If I can show this, I will have made my view more plausible. In this respect this dissertation aims to argue for transparent LF as the syntax-semantics interface.

1.3. Structure of the dissertation

Chapter 2 is concerned with *wh*-in-situ constructions in German. These include multiple *wh*-questions, scope marking and split *wh*-constructions. I will look at interaction with negative quantifiers and suggest the MNSC to explain the pattern of grammaticality. Another important issue is the role of universal quantifiers in these constructions. It is shown that an extension of the MNSC will explain some regularities of the so-called pair list reading of universals in questions. On the basis of these and related data, the MNSC will be extended to the MQSC. The chapter ends with some remarks on the *was für*-construction and some considerations concerning the relevance of the MQSC in non-interrogative contexts.

In chapter 3, the empirical range of the proposal is extended to Korean. As a language that is basically *wh*-in-situ, but optionally has scrambling of *wh*-phrases, Korean proves to be particularly interesting for the MQSC. It will be shown how the MQSC interacts with negation and negative polarity. We will also see evidence that the MQSC is at work in Turkish and Hindi/Urdu, and conclude with some speculation on the general status of the MQSC.

I will look at a set of data that are discussed as negative island effects in the literature in chapter 4. It will be shown that so called referential vs. non-referential readings of *how many* phrases, for instance, can be analyzed as MNSC effects. The analysis presupposes a particular view of semantically motivated reconstruction. Again, the explanation extends to Korean in a natural way. The chapter concludes with a discussion of accounts of negative islands in the literature, in particular in Rullmann (1995). Although Rullmann´s proposal in terms of a maximality operator is very elegant, we will see that there are general problems with it. I will argue

contra maximality, thus showing that we are still in need of a good explanation for the negative island effect. My hope is, of course, that that explanation be the MNSC.

Chapter 5 concludes the dissertation with a summary, some more specific remarks on the role of the simplest types restriction STyR for my analysis, and an attempt to define the position of my dissertation in the discussion on the syntax-semantics interface.

2. Intervention effects at LF I: German

2.1. Introduction to chapter 2

In this chapter, 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.

In section 2.2, I will give the paradigm of constructions that are the main issue of this chapter 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: the Minimal Negative Structure Constraint (MNSC). 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 2.3, 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 2.4, 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 in German, the expressions with a blocking effect are the inherently quantified expressions. A formalization of (2) is suggested, the Minimal Quantified Structure Constraint MQSC. I conclude this section with some speculation concerning the role of the MQSC in non-interrogative contexts.

Section 2.5 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 more careful when considering the *was für*-construction in the context of intervention effects.

Finally (in section 2.6) 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 it to related work.

2.2. Intervening negation

In this section, I will introduce the *wh*-constructions that are the empirical basis of this chapter, and look at the effect that interaction with negation[9] has in those constructions (2.2.1.). 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 (2.2.2.). In 2.2.3. 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 2.2.4. I relate my suggestion to some of the recent literature on intervention effects by negation. My proposal differs from other suggestions in that it exclusively affects 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, it 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.

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[9]In this section, I will refer to *nicht (not), niemand (nobody), nie (never), kein (no)* as negation, for simplicity.

It will also prove useful in later chapters to have the MNSC at hand as an intermediate step, since there is variation between languages with respect to which expressions induce LF barriers.

2.2.1. Data

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

(3) * Was glaubst du nicht mit wem Hans gesprochen hat?
       what believe you not with whom Hans spoken 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; I will in fact look at the paradigm (4).[10]

(4) a. * Was glaubt niemand <u>wen</u> Karl gesehen hat?
            what believes nobody whom Karl seen has
            'Who does nobody believe that Karl saw?'

     b. * Wen hat niemand <u>wo</u> gesehen?[11]
            whom has nobody where seen
            'Where did nobody see whom?'

     c. * Wen hat niemand <u>alles</u> gesehen?
            whom has nobody all seen
            'Who-all did nobody see?'

     d. * Wen hat keine Studentin <u>von den Musikern</u> getroffen?
            whom has no student of the musicians met
            'Which of the musicians did no student meet?'

---

[10]The judgements about 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 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".

[11]The judgements 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.)

I will refer to the underlined expression as the *in situ* expression (which, I claim, has to be moved at LF).[12]

Sentence (4a) is a scope marking construction (see e.g. Stechow/Sternefeld (1988), McDaniel (1989) and Dayal (1994)), (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. (5a) - (5d) are grammatical examples for the respective constructions:

(5)   a.   Was   glaubt   Luise <u>wen</u> Karl   gesehen   hat?
                what   believes   Luise whom Karl   seen   has
                'Who does Luise believe that Karl saw?'

        b.   Wen   hat   Luise <u>wo</u>   gesehen?
                whom has   Luise where seen
                'Where did Luise see whom?'

        c.   Wen   hat   Luise <u>alles</u> gesehen?
                whom has   Luise all   seen
                'Who-all did Luise see?'

        d.   Wen   hat   Luise <u>von den Musikern</u>   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):

(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 statisfied with an example for an answer, but wants the complete list of people that Luise saw. *Alles* can be stranded

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[12]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.

(as in (5c)) or move to the Spec of CP with the *wh*-phrase, as in (7). There is no interpretational 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   niemanden   angetroffen?
            who   has   where nobody   met
            'Who didn´t meet anybody where?'

(11) a. * Welche   Kinder haben niemandem   welche Bilder
            which   children   have nobody.Dat   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.Dat
            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) - (4d) require a uniform treatment. This will be confirmed in sections 2.3 and 2.4. My suggestion will be that the *in situ* expressions for semantic reasons 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.

2.2.2. 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), e.g., 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?'

An LF like (15) is not as such suited for interpretation. I will suggest what Dayal (1994) calls a direct dependency analysis for scope marking in German. Thus, I propose 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):[13]

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[13] Although I am convinced by Dayal´s arguments that an indirect dependency analysis is preferable for Hindi, I believe that in the light of the differences between Hindi and German, a direct dependency analysis for German is defendable. See Beck & Berman (1996) for arguments. See also Müller & 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 for Natural Language Semantics points out, Dayal´s proposal could be reconciled with my suggestions under certain reasonable assumptions. These are that finite complement clauses in German occur

(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).

In a Hamblin/Karttunen semantics for questions, (18a) -(18d) represent the interpretations that (4a) - (4d) should have if they were well-formed:

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

        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 (4d) 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 a weakly 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   is   left
                  'who left?'
        b.   Wer   ist   alles   gegangen?
                  who   is   all   left

---

in a fairly low position at S-Strucure, 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.

'who-all left?'

c.   { Sarah left, Jenny left, Hans left}

d.   { Sarah left and Jenny left, Sarah left and Hans left,

            Jenny left and Sarah left and Hans left, ...}

(where Jenny, Sarah and Hans are the persons in the context)

That is, *alles* turns a Hamblin-set of answers into a set of weakly exhaustive alternative answers. This is achieved by the following semantics of *alles*:

(20)   alles'(Q) = { $\bigcap$ X : X⊆Q }

Thus, *alles* operates on a question denotation, and its scope is the entire question.[14] See chapter 4 for some discussion of the semantics of *alles*.

In order to derive the interpretations in (18), the sentences in (4) should have the (simplified) LFs given in (21).

Most of the LFs in this chapter will be annotated with their interpretations. In (21a), the translation of each node in the tree is provided. In the other examples, I will just give the translations of the leaves in the tree and its root.

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[14]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?'

(21)

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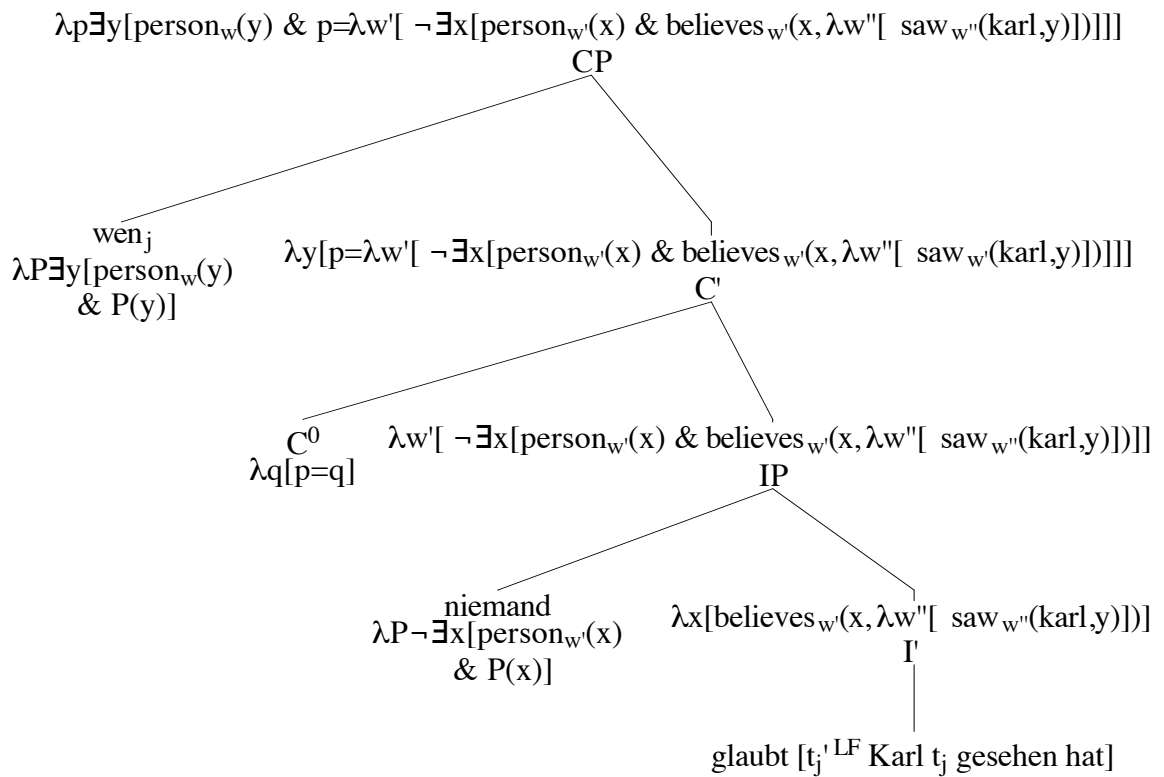
$\lambda p \exists y [\text{person}_w(y) \ \& \ p = \lambda w'[\ \neg\exists x[\text{person}_{w'}(x) \ \& \ \text{believes}_{w'}(x, \lambda w''[\ \text{saw}_{w''}(\text{karl},y)])]]]$

CP

wen$_j$
$\lambda P \exists y[\text{person}_w(y) \ \& \ P(y)]$

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

C'

C^0
$\lambda q[p = q]$

$\lambda w'[\ \neg\exists x[\text{person}_{w'}(x) \ \& \ \text{believes}_{w'}(x, \lambda w''[\ \text{saw}_{w''}(\text{karl},y)])]]$

IP

niemand
$\lambda P \neg\exists x[\text{person}_{w'}(x) \ \& \ P(x)]$

$\lambda x[\text{believes}_{w'}(x, \lambda w''[\ \text{saw}_{w''}(\text{karl},y)])]$

I'

glaubt [t$_j$'^{LF} Karl t$_j$ gesehen hat]

*	Was	glaubt niemand	<u>wen</u>	Karl	gesehen	hat?
	what	believes nobody	whom	Karl	seen	has

b.

$\lambda p[\exists x[person_w(x) \ \& \ \exists z[place_w(z) \ \& \ p=\lambda w'[\ \neg\exists y[person_{w'}(y) \ \& \ saw_{w',z}(y,x)]]]$

CP

wen$_j$
$\lambda P\exists x[person_w(x)$
$\& \ P(x)]$

C'

wo$_k$
$\lambda P\exists z[place_w(z)$
$\& \ P(z)]$

C'

C^0
$\lambda q[p=q]$

IP

niemand
$\lambda P\neg\exists y[person_{w'}(y)$
$\& \ P(y)]$

I'

hat t$_j$ t$_k^{LF}$ gesehen
$\lambda y[saw_{w',z}(y,x)]$

*	Wen	hat	niemand	<u>wo</u>	gesehen?
	whom	has	nobody	where	seen

39
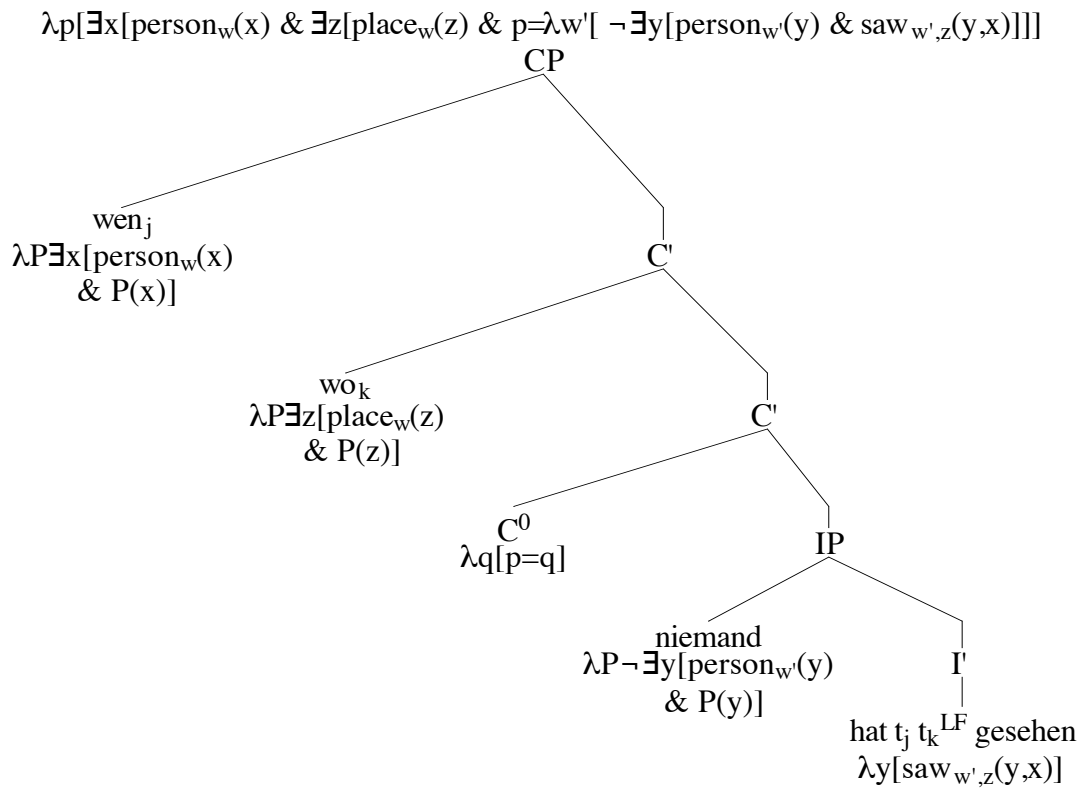
c.

$alles'(\lambda p\exists y[person_w(y) \ \& \ p=\lambda w' \ \neg\exists x[person_{w'}(x) \ \& \ saw_{w'}(x,y)]])$
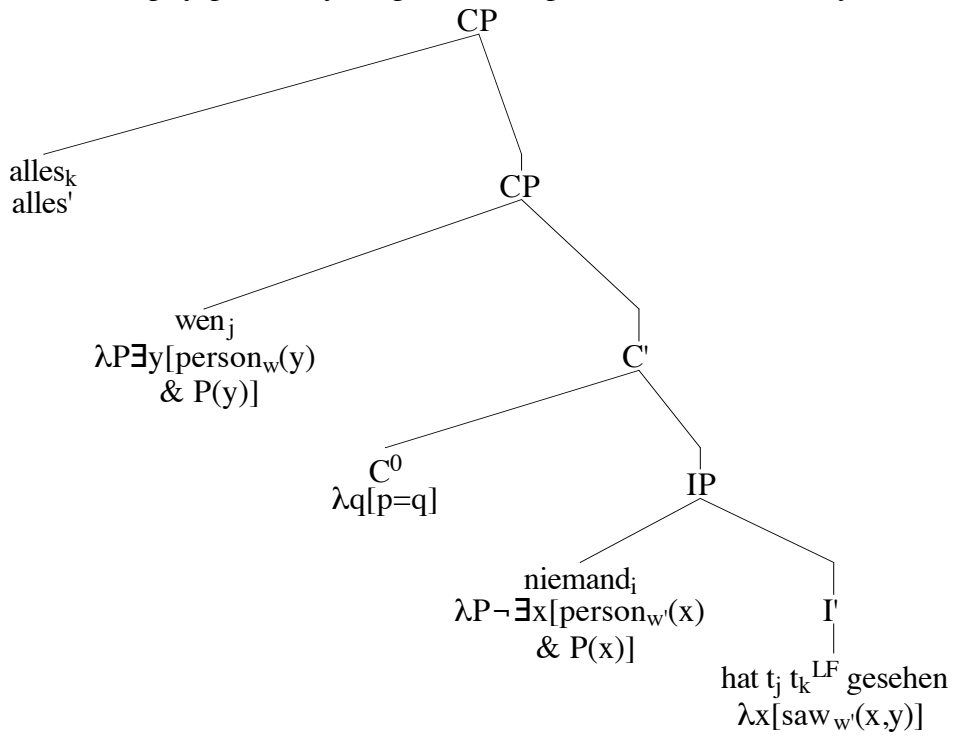
CP
    $alles_k$
    $alles'$

    CP

    wen_j
    $\lambda P\exists y[person_w(y)$
    $\& \ P(y)]$

    C'

    C^0
    $\lambda q[p=q]$

    IP

    $niemand_i$
    $\lambda P\neg\exists x[person_{w'}(x)$
    $\& \ P(x)]$

    I'

    hat t_j t_k^{LF} gesehen
    $\lambda x[saw_{w'}(x,y)]$

*	Wen	hat	niemand	<u>alles</u>	gesehen?
	whom	has	nobody	all	seen

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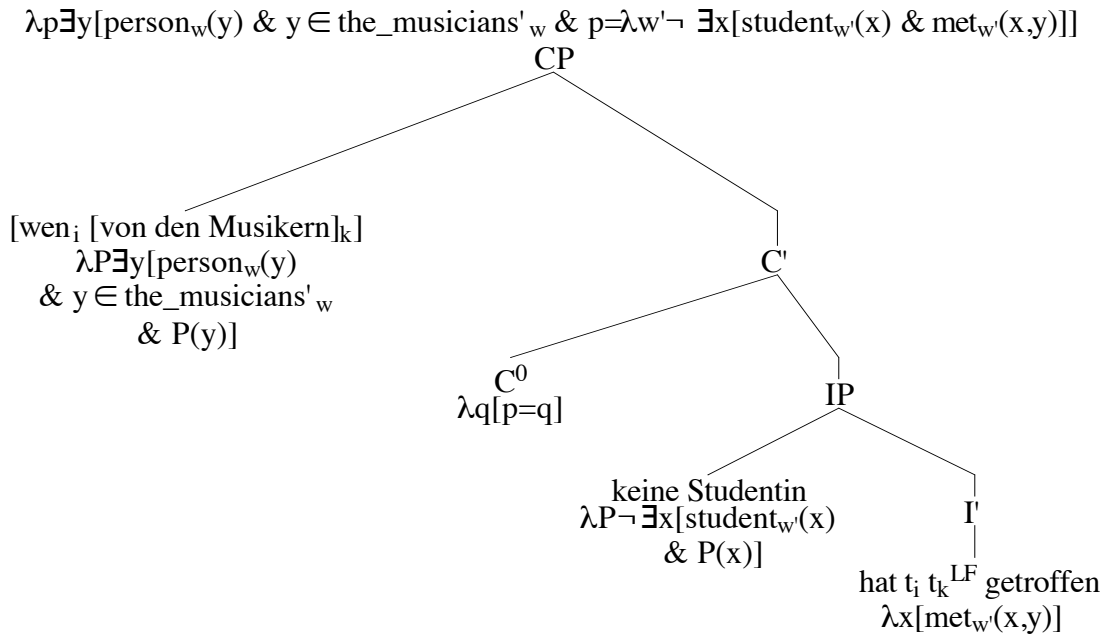
$\lambda p \exists y[\text{person}_w(y) \ \& \ y \in \text{the\_musicians'}_w \ \& \ p=\lambda w'\neg \ \exists x[\text{student}_{w'}(x) \ \& \ \text{met}_{w'}(x,y)]]$

CP

[wen$_i$ [von den Musikern]$_k$]
$\lambda P \exists y[\text{person}_w(y)$
$\& \ y \in \text{the\_musicians'}_w$
$\& \ P(y)]$

C'

C^0
$\lambda q[p=q]$

IP

keine Studentin
$\lambda P \neg \ \exists x[\text{student}_{w'}(x)$
$\& \ P(x)]$

I'

hat t$_i$ t$_k$^{LF} getroffen
$\lambda x[\text{met}_{w'}(x,y)]$

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

Note that in each of (21a) - (21d), the *in situ* expression has to occur structurally above the interrogative C^0 position, leaving an LF trace within the scope of negation.

My explanation for the ungrammaticality of (4a) - (4d) 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) - (21d) as the LFs for (4a) - (4d), rendering the sentences ungrammatical. I thus propose the following preliminary generalization:

(22)   An intervening negation blocks LF movement.

Although I will sometimes use a derivational terminology for expository reasons, we will see in chapter 4 that the actual formalization has to be a restriction on representations. The formalization of (22) (to be introduced in the next subsection) will exclude structures like (23) and hence all LFs in (21).

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(23)   [X_k ...[Neg [...$t_k{}^{LF}$...]]...]

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) - (9d) 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 <u>uniform</u> syntactic explanation, as that relation is hardly the same in the three cases. 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.[15] 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.

There are some other types of restrictions on the *wh*-element (*an Aufgaben, außer Fritz* and *Schönes* in the sentences below) that can be split off the *wh*-phrase at S-Structure.

(24)   a.   Was   hat   Luise   an   Aufgaben   gelöst?
               what   has   Luise   of   problems   solved
               'Which problems did Luise solve?'

       b.   Was   <u>an Aufgaben</u> hat   niemand   gelöst?
               what   of problems has   nobody   solved

---

[15]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 questions 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 argue against such alternative proposals, I appeal to the generality of my suggestion.

'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 Lusie meet?'

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 (24b) is grammatical, (24c) is out. (24e) is fine, (24f) is out on the reading where *außer Fritz* belongs to the *wh*-phrase.[16] (24g) with a harmless proper name is fine, and (24h) with intervening *niemand* is out again.

These facts are explained analogously to (4) by assuming that the negation blocks the 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*: they can either form a constituent with

---

[16]I take (i) to be the meaning of (24e):

(i) $\lambda p \exists x [person(x) \ \& \ \neg[x=fritz] \ \& \ p=\lambda w \neg \exists y[person(y) \ \& \ met_w(y,x)]]$

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

the wh-phrase or be split off, but they cannot be split off when interacting with a negation.

(25) a.   Wen   <u>zum Beispiel</u> hat   niemand   getroffen?
              whom for example has   nobody   met
              'Whom, for example, did nobody meet'

      b. * Wen   hat   niemand   <u>zum Beispiel</u> getroffen?
              whom has   nobody   for example   met
              'Whom, for example, did nobody meet'

      c.   Wen   <u>genau</u>/<u>ungefähr</u>   hat   noch   niemand
   eingeladen?
              whom exactly/approximately has   yet   nobody   invited
              'Whom exactly/approximately has nobody invited yet?'

      d. * Wen   hat   noch   niemand <u>genau</u>/<u>ungefähr</u>
   eingeladen?
              whom has   yet   nobody exactly/approximately   invited
              'Whom exactly/approximately has nobody invited yet?'

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

2.2.3. Formalization

The expressions in (26a) - (26d) are again the LFs that I assume for (4a) -(4d).

(26) a. $[_{CP}$ wen$_k$ $[_{C'}$ C^0 $[_{IP}$ niemand glaubt [t$_k$'^{LF} Karl t$_k$ gesehen hat]]]]]

      b. $[_{CP}$ wen$_j$ wo$_k$ $[_{C'}$ C^0 $[_{IP}$ niemand t$_j$ t$_k$^{LF} gesehen hat]]]]

      c. $[_{CP}$ alles$_k$ $[_{CP}$ wen$_j$ $[_{C'}$ C^0 $[_{IP}$ niemand t$_j$ t$_k$^{LF} gesehen hat]]]]

      d. $[_{CP}$ [wen$_j$ [von den Musikern]$_k$] $[_{C'}$ C^0 $[_{IP}$ keine Studentin t$_j$

                                                              t$_k$^{LF}getroffen hat]]]

What we need to exclude are structures like (23), repeated below:

(23)   [X$_k$ ...[Neg [...t$_k$^{LF}...]]...]

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.[17]

The definition of NIB is supposed to cover sentence negation as well. See section 4 for a discussion concerning which expressions exactly are assumed to induce barriers. An LF trace is a trace that comes into existence only at LF. I presuppose that these are distinguishable from traces that existed at S-Struture already.

This is how the MNSC works for (25d), for example: The negative quantifier *keine Studentin* induces a NIB, the shadowed 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) -(25c) are parallel. In each case, the offending LF trace t_k is not bound within the minimal NIB it is dominated by. Thus, (4a) -(4d) 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)?'

---

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

If we have obligatory QR, the most likely assumption is that the LF position of *niemand* c-commands the S-Structure position (and hereby the LF trace) of *wo*.[18] The sentence would be predicted to be out in the same way that a. is, as *wo* is excluded at LF by the NIB induced by *niemand*. If *niemand* can be interpreted *in situ*, on the other hand, the sentence 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. While (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, I think the sentence is ok (e.g., again think 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?'
      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 (1996) for one possible technical solution and more arguments in favour of interpreting quantifiers *in situ*. Compare also section 2.4.3 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,   what for people who no grant
           get

                 wohnen   alles in Wohnheimen?

---

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

		live	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
Luise has told who no book of which
Autor gelesen hat.
author read has
'Luise told us who read no book by which author.'

b. * Wen hat kein Pferd, das wer gefüttert hat,
whom has no horse that who fed has
gebissen?
bitten
'Whom did no horse that who fed bite?'

The MNSC thus has the desired effects.

2.2.4. 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 & Zwarts (1991), Szabolcsi & Zwarts (1993), Rullmann (1995). However, the focus of research in 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 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 & Zwarts, Rullmann). In contrast to this range of papers, my proposal so far 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 proposal, the "problematic" *wh*-phrases include those that are characterized as (potentially) referential and that are unproblematic with respect to S-Structural movement (e.g. *who, what, which N, where*); compare (34a), (35a) with the various data from section 2.2. 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 the data discussed in this chapter. The distinction between S-Structural and LF movement is absolutely crucial, and the respective sets of data should not be confused. I will talk about the classical Negative Island data in chapter 4.

Although the empirical focus of this chapter 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 the data in this chapter and my explanation for them, namely de Swart (1992). I will come back to it in section 2.5.

2.3. Intervening universals and pair-list readings

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 2.3.1.

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 2.3.2.

2.3.1. *every* as an intervener

The data in (36) parallel those in (4) in section 2.2, 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 muscians		met	
		'Which of the musicians did every student meet?'							

Unlike (4), (36a) - (36d) 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 met Karl, Marion met 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) - (36d) 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 does not seem to be a very clear intuition for some speakers. Is there a more reliable way to make sure that (36a) - (36d) 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
          I   want   not   of   everyone (dat) know   who   he
          alles   gesehen hat,   sondern   ich   will   wissen,
          all   seen   has   but   I   want   know
          wen   **jeder**   **alles** gesehen   hat.
          who   everyone   all   seen   has
          'I don´t want to know of everyone who-all s/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 (dat) 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) - (36d) 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.[19]

---

[19]An anonymous reviewer for NaLS 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?

There has been some discussion in the literature as to how to account for the pair-list reading (see, e.g., Groenendijk & 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 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).[20] This is in agreement with the facts observed in Pafel (1991a). For this reason, I 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 thesis, only two points are important:

- the distributive reading of *every* in questions is a reading in which *every* has scope over the entire question,
- *every* is the only quantifier that can have such a reading.

The importance of the second point will become clearer in section 2.4.

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:

The corresponding German sentence is to my intuition ungrammatical.

[20]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 2.4.1.2.
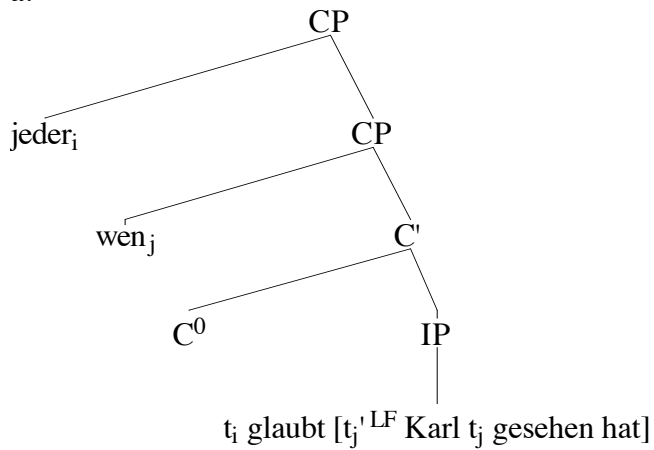
(46)

CP
├── jeder$_i$
└── CP
    ├── wen$_j$
    └── C'
        ├── C^0
        └── IP
            └── t$_i$ hat t$_j$ gesehen
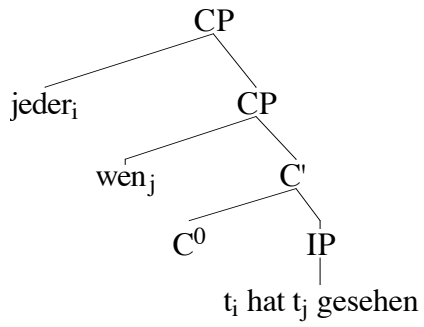
Wen	hat	jeder	gesehen?
whom	has	everyone	seen

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

(47) a.

CP
├── jeder$_i$
└── CP
    ├── wen$_j$
    └── C'
        ├── C^0
        └── IP
            └── t$_i$ glaubt [t$_j$'^{LF} Karl t$_j$ gesehen hat]

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

55

b.

CP
- jeder$_i$
- CP
  - wen$_j$
  - C'
    - wo$_k$
    - C'
      - C^0
      - IP
        - t$_i$ hat t$_j$ t$_k$^{LF} gesehen

Wen	hat	jeder	wo	gesehen?
whom	has	everyone	where	seen

c.

CP
- jeder$_i$
- CP
  - alles$_k$
  - CP
    - wen$_j$
    - C'
      - C^0
      - IP
        - t$_i$ hat t$_j$ t$_k$^{LF} gesehen

Wen	hat	jeder	alles	gesehen?
whom	has	everyone	all	seen

d.

```
                              CP
                     _____/  \
                    /            \
            jede Studentin_i      CP
                          _____/  \
                         /           \
              [wen_j [von den Musikern]_k]   C'
                                        ____/ \
                                       /       \
                                      C^0       IP
                                            t_i hat t_j t_k^{LF} getroffen
```
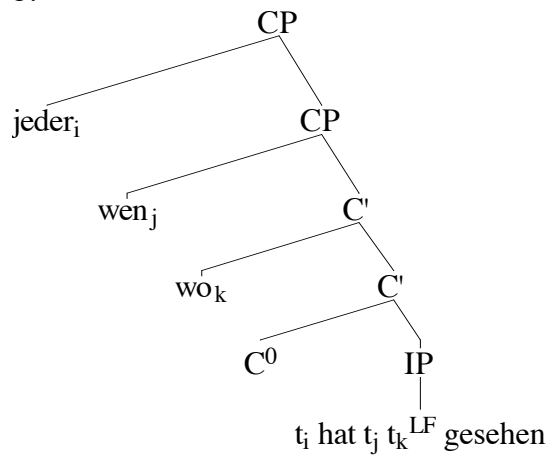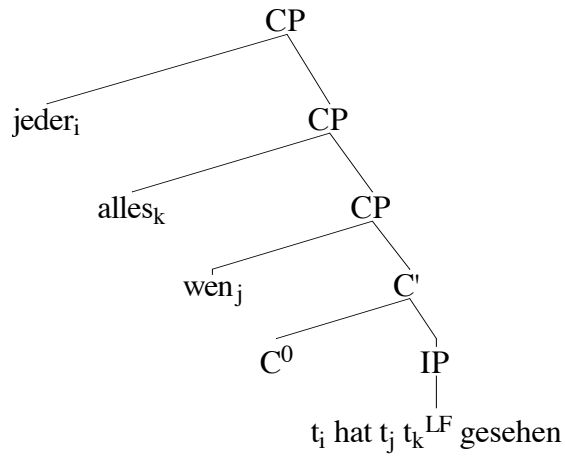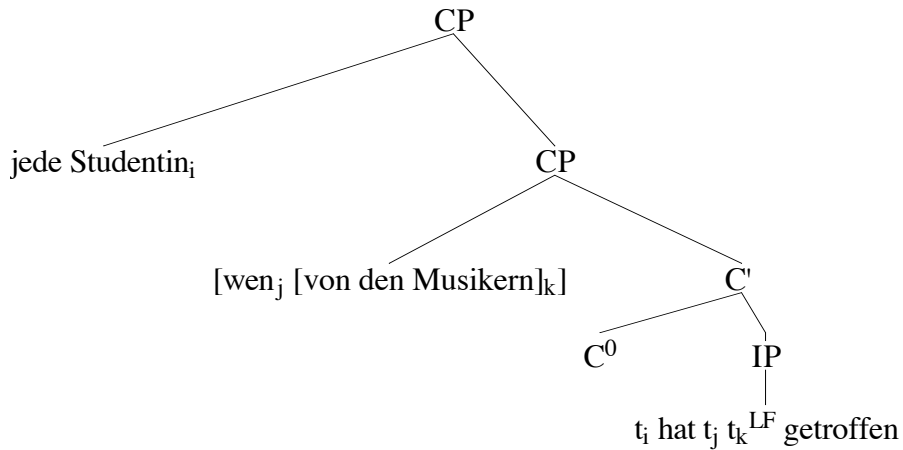
Wen	hat	jede	Studentin	von	den	Musikern	getroffen?
whom	has	every	student	of	the	musicians	met

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

(48)   a. $\lambda p \exists y[person_w(y)\ \&\ \exists z[place_w(z)\ \&\ p=$

$$\lambda w'[\forall x[person_{w'}(x) \to saw_{w',z}(x,y)]]]$$

b.

$$\lambda p\exists y[person_w(y)\ \&\ \exists z[place_w(z)\ \&\ p=\lambda w'[\ \forall x[person_{w'}(x)\ ->\ saw_{w',z}(x,y)]]]]]$$

CP
    wen$_j$
  $\lambda P\exists y[person_w(y)$
      $\&\ P(y)]$

C'
  wo$_k$
  $\lambda P\exists z[place_w(z)$
     $\&\ P(z)]$

C'

C^0
$\lambda q[p=q]$

IP

jeder
$\lambda P\forall x[person_{w'}(x)$
    $->\ P(x)]$

I'

hat t$_j$ t$_k$^{LF} gesehen
$\lambda x[saw_{w',z}(x,y)]$
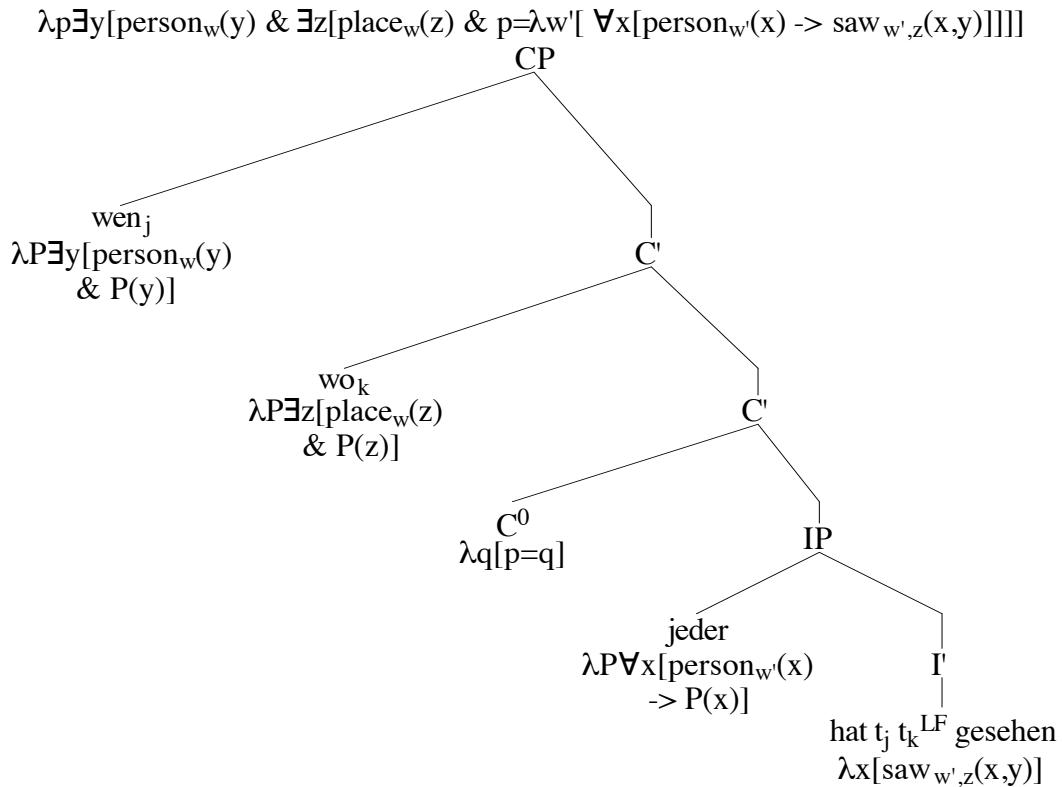
#	Wen	hat	jeder	wo	gesehen?
	whom	has	everyone	where	seen

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, i.e. 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. reading with a grammatical underlying LF) left for (36), there is no such reading in (4) and the sentences are ruled out.

This means that an extended version of MNSC should be found which applies to *jeder* as a problematic intervener in the same way as negation. Section 2.4 is an attempt to find out just how MNSC should be extended. The extension will be the MQSC.

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 to have wide scope should have an intervention effect just like negation. This leads us to expect that (50a) be ungrammatical, which it is.

(50) a. * Wer hat jede Aufgabe alles gelöst?
who has every problem all solved
'Who-all solved every problem?'
b. Wer hat diese Aufgabe alles gelöst?
who has this problem all solved
'Who-all solved this 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 (50b) is included to make sure that it´s really the presence of the intervener *jede Aufgabe* that is responsible for the ungrammaticality of (50a). (51) makes the same point as (50):

(51) a. Wer hat wann jede Aufgabe gelöst?
who has when every problem solved
'Who solved every problem when?'
b. * Wer hat jede Aufgabe wann gelöst?
who has every problem when solved
'Who solved every problem when?'

The example in (49) provides an opportunity to prevent a possible misunderstanding of my claims about the (im-)possibility of pair-list readings in questions. I do not intend to give a complete explanation for when these readings are or aren´t available with the MQSC. It has long since been observed that syntactic configuration plays an important role in determining whether the pair-list reading is available. This includes well-known subject-object asymmetries as in (52):

(52)   a.   Who did everyone meet?
          b.   Who met everyone?

This is a factor that the MQSC is not intended to cover. Rather, the MQSC interacts with other, independent restrictions on the availablity of pair-list readings to produce the complex linguistic pattern we observe. So the MQSC is meant to be an addition to, not a replacement for other proposals concerning the interaction of universals and wh-phrases (e.g. May (1985), Aoun & Li (1993), Liu (1990)). I think that the explanation for subject-object asymmetries and the like is in principle independent of my proposal. Hence, I will not adopt any particular theory, but simply presuppose that there is a restriction to draw upon.

2.3.2. Distributive movement blocked

In the previous subsection, I argue that *every* on the distributive reading is moved to a CP-adjoined position. If the MNSC from section 2.2 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*.[21] 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?'

---

[21]I will gloss *jeweils* as *each (time)*, because it can mean both.

(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.
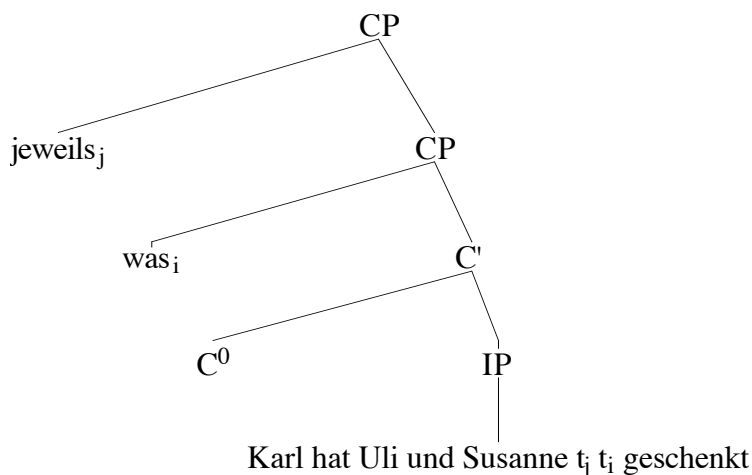
(55)   a.   Was   hat   Karl   Uli und Susanne   jeweils geschenkt?
               what   has   Karl   Uli and Susanne   each (time)   given
               'What did Karl give to Uli and Susanne each (time)?'
        b.   Was   haben   die Kinder   jeweils geschenkt bekommen?
               what   have   the children   each (time)   been given
               '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).
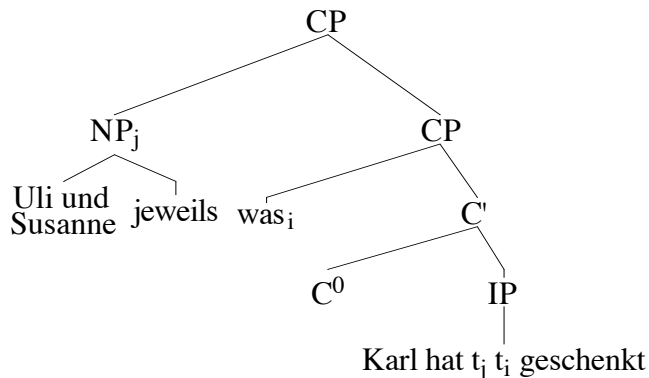
(56)   a.   For each occasion, what did Karl give to Uli and Susanne at
               that occasion?
        b.   For each x, x is one of Uli and Susanne: what did Karl give
               to x?

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

(57)

CP
  jeweils$_j$
  CP
    was$_i$
    C'
      C^0
      IP
        Karl hat Uli und Susanne t$_j$ t$_i$ geschenkt

(58)

```
                        CP
            ┌───────────┴───────────┐
          NP_j                      CP
        ┌──┴──┐              ┌───────┴──────┐
    Uli und  jeweils      was_i            C'
    Susanne                          ┌──────┴──────┐
                                    C⁰             IP
                                                   │
                                          Karl hat t_j t_i geschenkt
```

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   geschenkt?
          what   has   nobody   Uli and Susanne each (time) 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 esehen?
          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 is a further case of movement at LF being blocked by an intervening negation.[22] It is quite an interesting case since, as in

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[22]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 e veryone each (time) seen?
     'who did everyone see each time?'

(ii) For each person x: for each occasion: 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?

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.

2.4. A more general picture of intervention

In this section, I will formulate a generalization as to which elements are problematic interveners (section 2.4.1.), and revise the formalization from section 2 accordingly (section 2.4.2.). 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 (section 2.4.3.).

2.4.1. What is an intervener?

2.4.1.1. 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:[23,24]

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

[23]If a distributive reading were at all possibel with *almost everyone* etc., one would expect this reading to be enforced under the same circumstance 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.

[24]For some speakers, (61a) seems to be considerably better than the other data. I have no explanation for this. In the embedded case (i), I marginally get a reading in which *fast jeder* is interpreted with matrix scope, but it seems impossible to interpret *fast jeder* in the interrogative clause.

(i) ?? Luise hat mir gesagt was   fast   jeder   glaubt wen   Karl gesehen hat.
     Luise has me told   what   almost everyone believes who   Karl   seen
     has
     'Luise told me who almost everyone believes that Karl saw.'

(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
what believe at most three librarians
welche Bücher Ottilie gefressen hat?
which books Ottilie eaten has
'Which books do at most three librarians believe that Ottilie 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?'

d. * Wen haben weniger als vier Studentinnen
whom have less than four students (fem)
von den Musikern getroffen?
of the musicians met
'Which of the musicians did fewer than four students meet?'

65

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?'

Focussing negation (see Jacobs (1982), (1990)) leads to ungrammaticality in a configuration like (64) with a *sondern* (*but*) phrase:[25]

(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 2.4.2.

　　　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*).[26]

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[25]Without the *sondern* phrase, a question containing a focussing 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 focussing negation.

[26]I will ignore a possible reading of *die meisten* in questions that might be called a superlative reading: (i) below can be understood to mean (ii):

(i)　　Wen 　haben die meisten 　getroffen?

66

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

---

      who   have   most   met
      'Who did most people meet?'

(ii)   Who was met by more people than any other person?

		c.	Wen	alles	haben	die meisten	Studenten	getroffen?

       c.   Wen   alles   haben die meisten   Studenten   getroffen?
             whom all   have   most   students   met
             'Who-all did most students meet?'

       d.   Luise weiß   welche Kurse   die meisten
             Luise knows which   courses   most
             Studenten   alles   besucht   haben.
             students   all   attended   have
             'Luise knows which courses most students attended.'

I claim that a narrow scope quantificational reading for *die meisten* is missing in (65a,b,d). 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. This is even clearer in the embedded case. (65d) cannot mean "Luise knows the complete answer to the question which courses were attended by a possible varying majority of students." It means approximately "Luise knows about a majority of students which courses they attended." 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 collegues, I trust.'

      b. * Fast   jeder Kollege,   dem   vertraue   ich.
             Almost every colleague   him   trust   I
             'I trust almost every collegue'

      c.   Die meisten von   uns   treffen sich   nachher im "Storchen".
             Most   of   us   meet refl   later   in   the
"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 option of being interpreted as *a majority of the students*. Questions like (65b,d) are relatively acceptable on a reading that involves this interpretation of *die meisten*, as opposed to the standard interpretation attributed to *die meisten* as a generalized quantifier. In addition, in the reading in question *a majority of the students* is not interpreted within the interrogative. It receives a "specific" interpretation. This reading is parallel to the readings we get with indefinites in the same interrogative constructions. These will be discussed in more detail in the next subsection. It will turn out that no matter what semantics for these "specific" readings is adopted, there will not be an intervening quantifier in these readings.

Hence, in the reading on which (65a,b,d) are acceptable, *die meisten* is not an intervening quantifier.

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   Ida gebissen hat?
              what   believes   not   only   Fritz whom   Ida bitten   has
              'Who does not only Fritz believe that Ida 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 that 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:[27]

(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   prises at least twice   won
            'Who has won which prises at least twice?'

      c. * Wer   hat   mindestens   zweimal   welche Preise gewonnen?
            who   has   at least   twice   which prises won

---

[27] These adverbials might be bad with the scope marking construction for independent reasons:

(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 & 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 hat.
          Luise compares/lists   which   friend Karl often   where   met
           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.

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'Who has won which prises 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.[28] Downward entailing expressions are always quantificational, so they naturally constitute a large part of those expressions that intervene.

2.4.1.2. Indefinites

I will now turn to indefinite expressions. The picture is more complex here. Indefinites permit a number of readings, not all of which lead to an intervention effect. I will first discuss the pertinent data and then conclude section 2.4.1 with a characterization of the set of problematic interveners which excludes indefinites. The problematic interveners are the inherently quantified expressions. Indefinites (following Heim (1982)) are not lexically quantified expressions, hence are not problematic interveners.

Although indefinites seem to have some effect on the sentences they occur in, this effect is not the same as that of genuinely quantified expressions.

(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?'

---

[28]Data with a negation or a negative quantifier (like those in section 2.2) are sometimes worse than data with other quantifiers (like those considered in this section). I attribute this to the pragmatic effect of negation in questions, cf. chapter 4.

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. In contrast to (70c), (71) is fully grammatical.

It seems impossible to get a narrow scope existential reading for the indefinite. This indicates that on the existential reading, the indefnite does have an intervention effect. The surviving "specific" reading in (71) could be viewed as a wide scope existential reading, in which the existential quantifier does not intervene, since it takes scope in the matrix and thus does not inhibit the LF-movement of *alles*. In this respect, the reading is similar to the distributive reading of *every*. The unembedded case is interesting: a wide scope existential representation for the "specific" reading of the indfinite would lead to a type conflict. This would lead one to expect that these data are absolutely ungrammatical. If, on the other hand, the representation of the specific reading of the indefinite were different entirely (something non-quantificational), specific indefinites would not count for the MQSC and the resulting representation would be well-formed grammatically. However one could argue that the question on that reading would be pragmatically strange, because (according to this view of what specific indefinites are) the speaker would ask a question about something that s/he knows the identity of, but the hearer does not.[29] See Enç (1991) for a discussion of specificity. My intuitions are closer to the second option: The matrix questions are not ungrammatical, but infelicitous.

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[29]Thanks to Hotze Rullmann for pointing this out to me.

With a singular indefinite, a generic reading is sometimes possible (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
         what believes   a   conservative politician   how   one
         die   Wirtschaft   ankurbeln   soll?
         the   economy   boost   should?
         'How does a conservative politician believe one should boost the economy?'

Similarly 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, the sentences in (75) are not ungrammatical:

(75) a.   Otto   hat   mir   erzählt,   was   viele   Wähler
         Otto   has   me   told   what   many voters

glauben,	wer	alles	in	den	Bundestag	kommt.
believe	who	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, however. 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 easiliy 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

Otto	has	me	told	who	some

Studentinnen von den Musikern eingeladen haben.

students (fem)	of the musicians	invited	have

'Otto has told me which of the musicians some students invited.'

b. Otto hat mir erzählt, wen einige seiner Katzen

Otto	has	me	told	who	some of his cats

alles gebissen haben.

all	bitten	have

'Otto has told me who-all some of his cats bit.'

c. * Otto hat mir erzählt, wen lauter Katzen alles

Otto	has	me	told	who	many	cats		all

gebissen haben.

bitten	have

'Otto has told me who-all many cats bit.'

To summarize: we have to distinguish between narrow scope existential readings of indefinites, "specific" readings and generic readings. Only the narrow scope existential reading is ungrammatical.

Let us now consider on the basis of these data and the data from the previous sections what constitutes the class of problematic interveners.

It is fairly obvious that the availablity of the "specific" reading will be independent of the characterization of the set of problematic interveners, since (depending on the analysis of specific indefinites we choose) either we do not have a quantified expression at all, or it takes wide scope and hence gets out of the way. So this case can be ignored - such readings are in principle predicted to be available. Hence we just have to distinguish between existential and generic indefinites. Existential indefinites and quantifiers have a blocking effect, generic indefinites do not.

I will adopt Heim´s (1982) view of indefinites, according to which indefinite expressions are not quantifiers. They get introduced as open sentences. On the existential reading, they end up in a quantified structure, but the quantificational force does not come from the indefinite itself, but from a default existential quantifier. I assume that *wh*-phrases are indefinites in this sense, too. That is, while I have interpreted *wh*-phrases as existential quantfiers in the LF provded so far (and will continue to do so for simplicity), this ought to be seen as default existential quantification. The distinction I make (following Heim) between indefinites and quantifiers is well-established in the semantic literature, although it has unfortunately frequently been ignored in syntactic literature on scope interaction.

I propose the following generalization of (22) as a restriction for LF movement (of the types looked at so far):

(77)   Quantifiers block LF movement.

The property of being a quantifier is a lexical semantic property, the property of denoting a higher-order relation. Thus we have a precise characterization of the class of blocking expressions. Note that indefinite expressions are not quantifiers in this sense, no matter that they will end up as quantified structures eventually: they do not denote a higher order relation. Hence this generalization leads one to expect that indefinites generally do not have an intervention effect.

Concerning the existential reading, we have seen that this is false: existential indefinites do seem to have an intervention effect. If we are unwilling to include them into the set of quantifiers, we might want to include the default existential quantifer into the class of blocking expressions.

While I think the latter strategy should be pursued, I will not attempt to do so now. The reason is that there are two further related issues that complicate the matter. One is that if *wh*-phrases (being indefinites)[30] 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 2.4.3.).

Existentially interpreted expressions thus present a more complex picture, indicating that different kinds of LF movement (*wh*-movement and QR) ought to be distinguished in a more sophisticated version of (77). I will not do this here, though. Hence, the default existential quantifier will uniformly be ignored as an intervener, although the data in this subsection indicate that this should be remidied in the future.

Concerning the generic reading, we make prima facie the correct prediction that generic indefinites are not interveners, independently of the exact analysis of genericity. Still, in view of the fact that apparently, default quantifiers might ultimately have to be included in the class of blocking expressions, it would seem that the data are more compatible with a non-quantificational Carlsonian analysis of generic NPs (Carlson (1977)) than with a quantificational analysis (e.g. Wilkinson (1991)). However, I think that this area needs to be looked into more carefully than I can do here. Clearly, an important issue such as the LF representation of generic NPs ought not to be decided on the basis of these data, but needs much more careful consideration.

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. Thus I stick to (77) as an empirical generalization.

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[30]Wh-phrases are indefinites in the adopted Hamblin/Karttunen semantics. In a Groenendijk & Stokhof (1982) semantics for interrogatives, wh-phrases are not indefnites (nor in any other way quantified expressions). Hence, in a Groenendijk & Stokhof semantics the issue would not arise.

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

2.4.2. Formalization

The following two definitions are the generalizations from the definitions of NIB (Negation Induced Barrier) and MNSC (Minimal Negative Structure Constraint) from section 2.2, designed to cover the data discussed in sections 2.3 and 2.4.

(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 for quantifiers looked at so far; in each case, the shadowed category is the barrier. The trace violating the MQSC is t_k^{LF}.

(80)   a.   [$_{CP}$ wen$_k$ [$_{C'}$ C^0 [$_{IP}$ fast jeder glaubt [t_k^{LF} Karl t_k gesehen hat]]]]]
        b.   [$_{CP}$ wen$_j$ wo$_k$ [$_{C'}$ C^0 [$_{IP}$ fast jeder t_j t_k^{LF} gesehen hat]]]]

c. $[_{CP}$ alles$_k$ $[_{CP}$ wen$_j$ $[_{C'}$ C^0 $[_{IP}$ wenige t$_j$ t$_k$^{LF} gesehen haben$]]]]$

d. $[_{CP}$ [wen$_j$ [von den Musikern]$_k$] $[_{C'}$ C^0 $[_{IP}$ 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 type of information must be accessible at LF, as it is the trigger of 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 once more that according to this definition of QUIBs, whether an expression induces a QUIB depends on the semantic type of its (lexical) denotation.

While the notion of QUIB is obviously reminiscent of the notion of *barrier* (Chomsky (1986)), it is evident that QUIBs and barriers in the formal sense of the barriers framework ought not to be formally identified. Thus I draw on the barriers framework conceptually, but do not wish to integrate QUIBs into that framework. The similarity is of course that QUIBs like barriers block certain syntactic relations.[31]

Note that a constraint like the MQSC could not be expressed configurationally if it was possible to delete at LF traces that are irrelevant for interpretation, as that 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.

Firstly 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:

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[31]Barriers can block more than one kind of syntactic relation, while QUIBs so far have only been shown to block the antecedent trace relation for LF traces. Another relation that might be blocked by QUIBs is the licensing of negative polarity items. Linebarger (1980) observes that a quantifier intervening between the NPI and its licenser blocks licensing. This is mere speculation, though.

(81) Wie   denkt jeder   daß Hans sich benommen   hat?
      How   thinks everyone   that Hans refl behaved   has
      'How does everyone think that John 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   getroffen?
            whom has   the   man   who   everyone likes all   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.[32]
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 2.2.4. (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.

2.4.3. QR: Some speculation

What has been looked at so far has been LF movement across an interrogative C^0 position - what I will call *wh*-related LF movement. The status of the MQSC (stated as a general constraint for LF movement in section 2.4.2.) 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 adjunction to C'/CP.

Declaratives and declarative LFs are not the subject of this thesis. 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 is not necessarily the case, as I´m going to argue now.

I suggest that a version of 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 in

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[32]This sentence might have a singular reading.

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	
	Vorfeld	FIN	Mittelfeld		VK

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

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 I^0 or C^0. The Vorfeld position is the specifier position of that category (see for instance Stechow/Sternefeld (1988)).

I share the empirical view of scope interaction in German expressed in Höhle (1991a), Jacobs (1982), (1989) and Pafel (1991b), which I will now very briefly introduce. It should be noted that this view is not shared by some of the recent literature on scope interaction in German, e.g. Frey (1989)).[33]

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

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[33]The divergance concerns most notably the readings that are taken to be available in sentences that involve scrambling of quantifiers. While I take scrambled examples to figure on a par with base generated word order in that no ambiguity comes about in the interaction of genuine quantifers (cf (85b)), scrambling is related to topicalization in that both movement types lead to ambiguity in Frey (1989). I do not share some of the relevant intuitions. However, it should be stressed that there are two parameters the setting of which separates us. It might be possible to more or less reconcile the empirical generalizations if these are properly intergrated. One factor is that the other tradition (e.g. Frey (1989), Krifka (1994)) frequently uses examples which involve operators that I would regard as indefinites, which fall out of my generalization anyway. Compare also Lechner (1995) concerning weak vs. strong quantifiers. The other factor is intonation, which I igenore, while another tradition is to fix intonation to either unmarked intonation or verum focus. It is not clear to me why one ought to fix intonation once and for all, but it is evident that intonation plays an important role that I completely ignore. It is to be hoped that once these two factors are properly taken into account, there will be agreement on the empirical side. See chapter 3 for an explicit discussion of the perspective on scrambling that my view leads to.

cannot be paraphrased as in c., that is, *keinen Semantiker* cannot have scope over *fast jeder Esel*. Similarly in (85b) the two quantifiers can only have scope according to linear order.

(85)   a.   Luise glaubt, daß   fast   jeder Esel   keinen
               Luise   believes   that   almost every   donkeyno
               Semantiker   gebissen   hat.
               semanticist (acc)   bitten   has
               'Luise believes that almost every donkey bit no semanticist.'
       b.   Luise glaubt, daß   fast   jeden Semantiker   kein
               Luise   believes   that   almost every   semanticist (acc)   no
               Esel   gebissen   hat.
               donkeybitten   has
               'Luise believes that no donkey bit almost every semanticist.'
       c.   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.[34]

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

---

[34]Hotze Rullmann has pointed out to me (pers. comm.) that (86) involves an unaccusative predicate. The D-Structure position of the subject might thus be lower than its S-Structure position. So even this example might be subjectable to an alternative analysis to raising the universal quantifier. In (i) below with an unergative predicate, the reasonable reading is much harder to get:

(i) ..., daß   in Sizilien   ein   Polizist   vor jeder Bank
      telefoniert.
      that   in Sicily   a   policeman   in   fromt   of   every   bank
      telephones
      'that there is a policeman making a phone call 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   donkeybitten
              '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.   QR is restricted by the MQSC (see (78), (79)).
      d.   Indefinite expressions do not induce QUIBs.
      e.   Reconstruction is not LF movement for the purposes of
              the MQSC, that is, is not blocked by an intervening quantifier.

This would account for (85a,b), in contrast to (86), being unambiguous. (88) would capture the fact that the Vorfeld position has different properties from Mittelfeld positions (see (87) vs. (85)), as it´s here that reconstruction enters the picture. Reconstruction is here taken to mean that syntactic material occurs at LF in a position lower than its S-Structure poistion. 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 of the licensing of empty categories. See chapter 4 for more discussion of reconstruction.

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. It guarantees a close correspondence of S-Structure and LF positions of quantifiers, which the data indicate we need to have. The close correspondance extends to linear order derived via scrambling. Note that while I propose that topicalized material can be reconstructed, scrambling may not be undone. See chapter 3 for more discussion of scrambling.

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 gut.
           no   product   of   every EEC country sells   refl
      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. I will leave a more thorough discussion for another time, though.

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 over MQSC to declarative contexts. I take that to be an indication of the general status of 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 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 MQSC is of a more general nature raises the question of its crosslinguistic status. We would not expect a constraint like the MQSC to be language specific.

German is a language that has scrambling and accordingly a relatively free word order. There seems to be a grammatical principle ensuring that since scope order can be marked at S-Structure as linear order, a given linear order <u>has</u> to be taken to reflect relative scope. Movement at LF thus has to be severely restricted. The MQSC is one way of formalizing this intuition. Thus the MQSC can be regarded as a principle guarantees transparency. 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.

If this view of the MQSC is correct, we expect to detect MQSC effects in other scrambling languages. This seems to be borne out; chapter 3 deals with the crosslinguistic status of the MQSC. However, it should be stressed that the version of MQSC introduced in this chapter is developed on the basis of German data. We will see that, predictably, some modification is necessary when applying the proposal to other languages.

2.5. 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. I will consider two alternative semantic approaches to the *was für*-construction which differ in their empirical predictions about scope interaction. Since neither is actually able to explain the behaviour 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 2.2, 2.3 and 2.4.

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 criticise her analysis with respect to the *was für* - construction, it will become clear that it is somewhat related to my own proposal.

(92a) can be analyzed as in (92b); that is, as querying a property[35,], or as in (92c), querying a kind.

(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.

        c.   For which x, x a kind of books: Luise bought objects that are realizations of x.

On the property analysis, *books* occurs as an indefinite within the proposition. (93) is the formalization corresponding to the paraphrase in (92b).[36]

(93) $\lambda p \exists P_{<e,t>}[R(P)\ \&\ p= \lambda w \exists X[books(X)\ \&\ P(X)\ \&\ [bought_w(luise,X)])]]$

(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.

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[35]This suggestion is due to Arnim von Stechow (p.c.).

[36]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. Otherwise it is treated as an individual variable.

R is supposed to be some sort of restriction for the variable P. Intensionality is ignored.
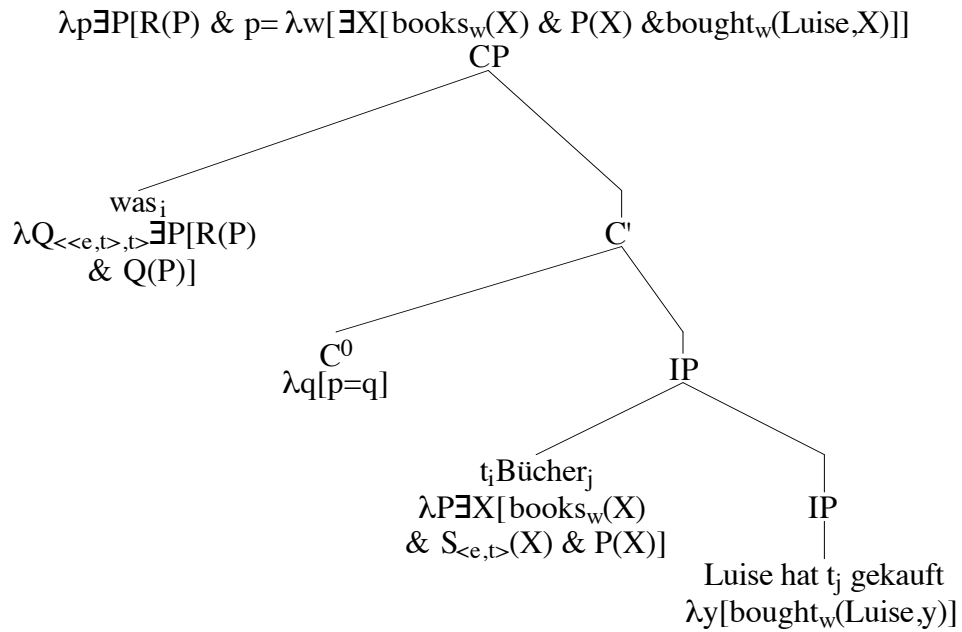
Suppose that we didn´t reconstruct the indefinite; we´d then get an interpretation like (94):

(94) $\lambda p \exists P[R(P)$ & $\exists X[books(X)$ & $P(X)$ & $p= \lambda w[bought_w(luise,X)])]]$

(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):

(95)

$$\lambda p \exists P[R(P) \ \& \ p= \lambda w[\exists X[\,books_w(X) \ \& \ P(X) \ \& bought_w(Luise,X)]]$$

CP

was$_i$
$\lambda Q_{<<e,t>,t>}\exists P[R(P)$
$\& \ Q(P)]$

C'

C^0
$\lambda q[p=q]$

IP

t_iBücher$_j$
$\lambda P \exists X[\,books_w(X)$
$\& \ S_{<e,t>}(X) \ \& \ P(X)]$

IP

Luise hat t_j gekauft
$\lambda y[bought_w(Luise,y)]$

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*[37] in the SpecCP position, and the indefinite, in this case [t_i Bücher]$_j$, which has to be reconstructed into the scope of the interrogative operator. Again, I assume that reconstruction occurs in the syntax of LF and postpone a proper discussion to chapter 4, where I propose a semantic analysis of *how many*-phrases that also makes use of reconstruction.
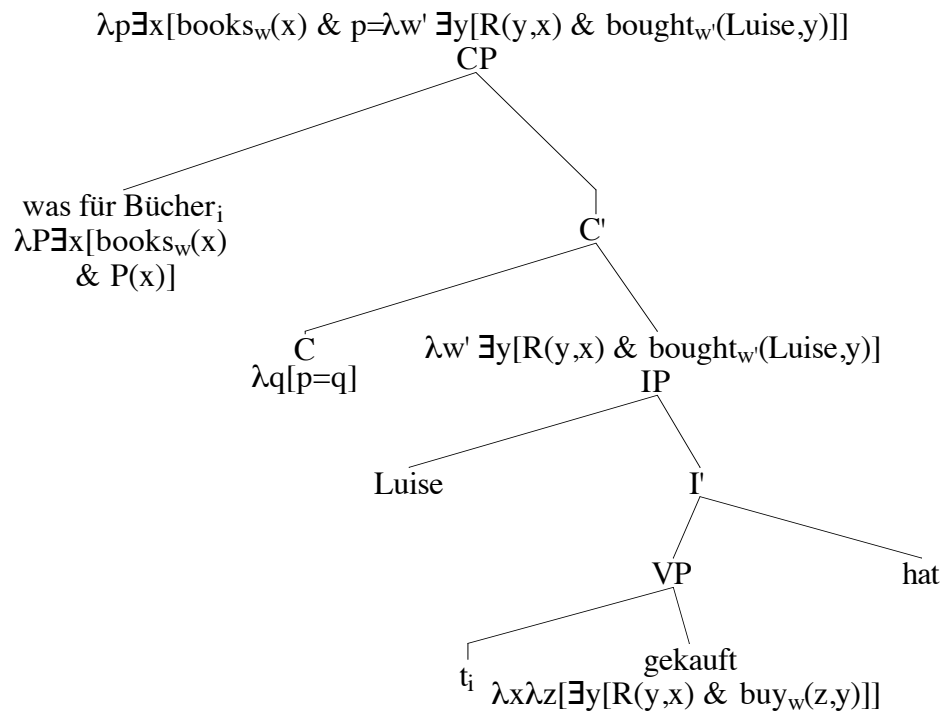
(96) is a formalization of the paraphrase (92c) of (92a), the analysis in terms of kinds.

(96) $\lambda p \exists x[books(x) \ \& \ p= \lambda w \exists y[R(y,x) \ \& bought_w(luise,y)]]$

The variable *x* ranges over kinds (which according to Carlson (1977) are a special kind of individual), and is restricted to book kinds. The relation *R* is the realization relation, a relation that holds between a kind and specific individuals of that kind. (96) can be derived via an LF that could look roughly like (97):

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[37]On this analysis, *für* does not play any semantic role whatsoever, so it is left out in the LF (95). *was für Bücher* is regarded as parallel to English *what books*.

(97)

$$\lambda p\exists x[\text{books}_w(x) \ \& \ p=\lambda w' \ \exists y[R(y,x) \ \& \ \text{bought}_{w'}(\text{Luise},y)]]$$

CP

was für Bücher$_i$
$\lambda P\exists x[\text{books}_w(x) \ \& \ P(x)]$

C'

C
$\lambda q[p=q]$

$\lambda w' \ \exists y[R(y,x) \ \& \ \text{bought}_{w'}(\text{Luise},y)]$
IP

Luise

I'

VP

hat

t$_i$ $\lambda x\lambda z[\exists y[R(y,x) \ \& \ \text{buy}_w(z,y)]]$

gekauft

Here, also, there are two scope bearing elements that are in a sense associated with the direct object NP: The *wh*-phrase *was für Bücher*, which is treated as a normal *wh*-phrase except that it ranges over kind individuals, and the existential quantifier over individuals that are realizations of that kind. The way that these two scope bearing elements are introduced into the semantics is completely different, however: the existential quantification over relaizations comes from the predicate. It has nothing to do with the *wh*-phrase. Hence, the *was für*-phrase is treated as a unit semantically and as a whole takes scope over the interrogative operator.

Thus the LF positions of the *was für*-phrase and its parts are quite different in the two analyses. Consider now a split *was für*-phrase as in (98):

(98)　Was　hat　Luise　für　Bücher　gekauft?
　　　what　has　Luise　for　books　bought
　　　'What books did Luise buy?'

Only on the analysis in terms of kinds would we expect the expression *für Bücher* to join *was* in SpecCP at LF. On the property analysis, it could conceivably be left in its S-Structure position, since it would have to be reconstructed again anyway.[38]

In (99), there is another scope bearing element in the question, the modal *muß* 'must':

(99) 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, I think, ambiguous; it can mean either (100a) or (100b) (using the property paraphrase):[39]

(100) 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 non-interrogative existential quantifier (be it the reconstructed indefinite or the quantifier over realizations) can have either wide or narrow scope with respect to the modal. This is very similar to the "referential" vs. "non-referential" reading of *how many*-phrases (compare chapter 4 for discussion of *how many*-phrases). The split construction (101) is ambiguous in the same way as (99):

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[38]In Beck (1993) I suggested to raise *für* at LF. The semantic motivation for this seems rather thin, though, since arguably *was* can range over properties on its own. Hence there is no compositional contribution of *für* which would make it necessary to raise it. It has been pointed out to me by Tilman N. Höhle that nonetheless there might be a semantic motivation for raising *für* in that *was für* is idiomatic, and idioms can only be interpreted as a whole. The question seems to me to be how idiomatic *was für* is. If *was* can range over properties anyway, the only semantic oddity of the construction would be the occurance of a meaningless marker *für*. Otherwise it is fairly compositional.

[39]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 (99) is ambiguous is to say that it has two "property" readings.

(101) 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.

Since the two analyses of *was für* make different claims about what the construction looks like at LF, it is clear that they will lead to different predictions about scope interaction with quantifiers in connection with the MQSC. Let us consider the empirical side first.

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:

(102) 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?'

(103) 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?'

(104) 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. (103b) and (104b), in contrast to (102b), 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 (103b) is unambiguously distributive. De Swart calls the reading that (104b) has a distributive reading, too. Her conclusion is that in a configuration like (105), the quantifier Q2 must have scope over Q1.

(105)   Q1$_i$ Q2   [$_{NP}$[$_{QP}$ e$_i$ [prep N]]]
             Was   Q   für Bücher

She suggests the altenative semantic formulation of (105) that a quantifier Q2 may only seperate 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 (102b) as well as the reduced interpretational possibilities of (103b) and (104b).

If my observations 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 non-interrogative existential part. As demonstrated in (99), scope ambiguities are possible with respect to this existential part. Note that no distributive readings are involved here, because no other operator in the sentence has scope over the <u>interrogative</u> part of the *was für* phrase. Accordingly, (104a) has a reading in which the adverb *oft* has got wide scope with respect to the non-interrogative existential, but narrow scope with respect to the interrogative as a whole. This reading can be paraphrased as in (106):

(106) a.   For which property: It was often the case that Luise read books that
               have that property.
       b.   For which kind of books: It was often the case that Luise read

realizations of that kind.

This reading is not a reading derived by quantifying *oft* into the question. According to the hypothesis expressed in section 2.4, 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 (104a), (104b) only has this reading. That is, the non-interrogative existential cannot have scope over *oft* in the split construction. In the narrow scope reading of the indefinite, the sentence is grammatical.

Oft in (104) is a "weak" intervener in the sense that, while it does have an interpretational effect, it does not render the sentence ungrammatical. Now consider *niemand* in (102): while (102a) has got a narrow scope reading of the existential quantifier, just like (104a), (102b) is not unambiguous like (104b), 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:

(107) a. For which property : nobody has read any books that have that
           property.
       b. For which kind of books: nobody read any realizations of that kind.

Again, the reading paraphrased in (107) is not a distributive reading, but a reading with the non-interrogative existential having narrow scope with respect to *niemand* <u>within the proposition</u>. 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 existential with respect to *niemand* is in principle possible. This is made particularly clear by (108a), as the narrow scope reading paraphrased in (108b,c) is the only reasonable reading that the sentence can have.

(108) a. Was   für   Bücher   hat   niemand   geschrieben?
           what   for   books has   nobody   written
           'What books did nobody write?'
       b. For which property: nobody has written any books that have that
       property.
       c. For which kind of books: nobody has written any realizations of that

kind.

If this is true, the ungrammaticality of (102b) in contrast to the effect of "weak" interveners like *oft* is really unexpected. Moreover, this would be an interesting difference to *how many*-phrases, which do not seem to permit an analogous "non-referential" reading (compare chapter 4).

With *jeder*, there is the further complication of the distributive reading. (103a) actually has three readings, given in (109): the distributive reading where *jeder* has scope over the entire question ((109a)), plus a non-distributive wide scope and a narrow scope reading relative to the existential (given in terms of the property analysis in (109b) and (109c)).

(109) 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 (103b), we clearly don´t have a reading corresponding to (109c). The question is whether the sentence has the distributive reading only, or whether it can have reading (109b) as well. I have not been able to clarify this, intuitions being extremely subtle.

To summarize: what de Swart´s approach doesn´t 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 (as we in addition have the distributive reading) if that quantifer 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 missing is not only (predictably) the distributive reading, but also one potential non-distributive reading.

Now what do the two analyses predict about these data together with the MQSC? Obviously, neither will make exactly the right predictions. The property

analysis will incorrectly predict (102b) to be grammatical, while the kind analysis will incorrectly predict (104b) to be ungrammatical. The problem is that in the intervention effect in the *was für*-construction there is no uniformity in the effect of intervening quantifiers (*niemand* vs. *oft*). The MQSC predicts uniformity, as we found it in the other data in this chapter.[40]

Judgements of (102), (103) and (104) vary, making a conclusive statement difficult to arrive at. While some speakers even reject (104b), most people accept it (on the narrow scope reading of the indefinite). (102b) is rejected by many speakers who accept (104b), but not by all. (103b) seems to be interpreted as unambiguously distributive by those who reject (102b) More tolerant speakers accept (102b), and (103b) on readings (109a) and (109b). Moreover, the singular/plural distinction seems to play a role, too, in that plural *was für*-phrases appear more tolerant with regard to intervening quantifiers. (104b) is a case in point, (110) below is maybe even clearer.

(110) | Es | ist | mir | egal, | | was | da | oft | für | Leute
| it | is | me | all the same | | what | there | often | for | people
| rumhängen.
| hang about
'I don´t care what kind of people hang about there.'

In contrast to (104b), the singular example (111) seems fairly bad, though:

(111) | * | Was | hat | Luise | oft | für | ein | Buch | gelesen?
| | what | has | Luise | often | for | a | book | read
| 'What book/what kind of book did Luise often read?'

A singular/plural contrast is not expected in either analysis. I think that there must be an additional factor involved in producing the empirical pattern which I have not been able to figure out. Since the data are extremely difficult, I have not followed this up any further.

Since I can´t explain the data myself, the main interests of this section have been the following: The *was für* - construction has been mentioned in the context of

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[40]The property analysis would also make wrong predictions in connection with reconstruction. This will become clear in chapter 4.

intervention effects, without (to my knowledge) having been semantically analyzed very thoroughly. I have used the opportunity 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, it is not clear that it is necessary for the *in situ* part to move at LF at all, because it may be analysed as semantically independent from the interrogative part of the construction. An analysis of intervention effects in the *was für* - construction thus need not be parallel to that of the other constructions. Moreover, there is an empirical difference in that quantifiers as interveners are not a homogeneous class.

I have criticised de Swart´s proposal for not taking the semantic complexity of the construction into account. Note, however, that the semantic formulation of de Swart´s hypothesis would apply to another set of data discussed in this chapter, namely (112):

(112) a. * Wen   hat   keine Studentin   von den Musikern   getroffen?
              whom has   no   student (fem) of themusicians   met
              'Which of the musicians did no student meet?'
       b.   Wen   hat   jede   Studentin   von den Musikern   getroffen?
              whom has   every student (fem) 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. (112a) is ungrammatical, and (112b) 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. The 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.

2.6. Conclusion of chapter 2

The main subject of this chapter 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 syntactically 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 has to 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 negation has 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 differ again 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 classical negative island effects which Rizzi also derives via the intervening A'-specifier theory, see chapter 4 for an alternative analysis, which is in fact very much related to this chapter. There I argue 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 transparent LF. 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 that 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 motivated by compositional interpretation anyway - this justifies the idea of the syntax-semantics interface as a syntactic level. I think that I have provided some arguments in favour of that.

3. Intervention Effects at LF II: Korean

3.1. Introduction to chapter 3

In this chapter, the MNSC/MQSC is shown to apply to Korean. I owe all data and judgements to Shin-Sook Kim.

Korean is an SOV language with a relatively free word order derived by scrambling. While Korean is a *wh-in-situ* language, *wh*-phrases can optionally be scrambled.[41]

(1) a. Suna-ka muôs-ûl sa-ss-ni?

    Suna-Nom what-Acc buy-Past-Q

  b. muôs-ûl$_i$ Suna-ka t$_i$ sa-ss-ni?

    what-Acc Suna-Nom   buy-Past-Q

    'What did Suna buy?'

Now consider the following contrast:[42]

(2) a. * amuto muôs-ûl sa-chi anh-ass-ni?

    anyonewhat-Acc buy-CHI not do-Past-Q

  b. muôs-ûl$_i$ amuto t$_i$ sa-chi anh-ass-ni?

    what-Acc anyonebuy-CHI not do-Past-Q

    'What did no one buy?'

Here, the *wh*-phrase has to be scrambled across the negative polarity subject in order for the sentence to be grammatical. In a multiple question, both *wh*-phrases have to be scrambled across the negative polarity item (henceforth NPI):

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[41]Throughout the dissertation, I will use the McCune-Reischauer system of romanization for Korean, except that ^ will be used instead of § .

[42]The status of the verbal suffix *chi* is not clear. Some assume it to be a nominalizer (Han 1987, Kang 1988, Lukoff 1982); others call it COMP, which is not identical with the syntactic category *complementizer*(Cho & Sells 1995, Sells 1995). I will assume that there is a kind of morphological selection between the negative verb *anh-* and the embedded verb. The exact analysis of *chi* will be left for further research.

(3)   a. *   amuto nuku-lûl   ôti-esô   manna-chi anh-ass-ni?

               anyonewho-Acc   where-Loc   meet-CHI   not do-Past-Q

      b. *   nuku-lûl   amuto   ôti-esô manna-chi anh-ass-ni?

               who-Acc   anyonewhere-Loc   meet-CHI   not do-Past-Q

      c. *   ôti-esô   amuto nuku-lûl   manna-chi anh-ass-ni?

               where-Loc   anyonewho-Acc   meet-CHI   not do-Past-Q

      d.   nuku-lûl   ôti-esô   amuto manna-chi anh-ass-ni?

               who-acc   where-Loc   anyonemeet-CHI   not do-Past-Q

      e.   ôti-esô nuku-lûl   amuto   manna-chi anh-ass-ni?

               where-Loc   who-Acc   anyonemeet-CHI   not do-Past-Q

‘Where did no one meet whom?’

This is strongly reminiscent of German data like (4) from chapter 2:

(4)   a. *   Wer   hat   niemanden   wo   angetroffen?

               who   has   nobody   where met

      b.   Wer   hat   wo   niemanden   angetroffen?

               who   has   where nobody   met

‘Who didn't meet anybody where?’

This chapter provides an explanation of the Korean contrasts along the lines of the analysis for German suggested in chapter 2. The basic idea is that in both German and Korean, the intended scope relations can be made visible at S-structure via scrambling. Since they can be made visible, they have to be. This idea will be formally expressed by saying that some version of the MQSC holds in both languages.

      The structure of this chapter is as follows: Section 3.2 is an empirical survey of the interaction of *wh*-phrases with negation in Korean. In section 3.3, structural representations will be suggested for the Korean data at S-structure and at LF. It will become clear that the linearization effect in Korean can be analysed as an MNSC effect in a natural way. The suggested analysis has consequences for the role of the morphological negation in Korean and for the view of semantic (ir)relevance of

scrambling, which will be discussed in some detail. In section 3.4, I address the question whether other scope bearing elements behave in a way similar to negation, and, since this will prove to be the case, in what way the MNSC should be extended. We will see that the set of QUIB inducing expression is smaller in Korean than in German. In section 3.5 we look at the data from a more general perspective: the restriction suggested seems reasonable in the light of scope interaction facts in Korean in general. Moreover, an effect that looks very similar to the Korean MNSC effect is observable in Turkish and Hindi/Urdu as well. Section 3.6 concludes my survey of *wh-in-situ* phenomena with a summary.

Sections 3.2 - 3.4 (apart from minor changes) stem from Beck & Kim (1996).

3.2. Wh-in-situ in Korean

Korean does not have obligatory *wh*-movement at S-structure. It optionally has scrambling of *wh*-phrases. (5a) illustrates a normal *wh*-question in the unmarked word order with the subject preceding the direct object. In (5b) the *wh*-phrase is scrambled. Both options are grammatical.

(5) a. Suna-ka   muôs-ûl   ilk-ôss-ni?
         Suna-Nom   what-Acc   read-Past-Q
     b. muôs-ûl$_i$ Suna-ka   t$_i$ ilk-ôss-ni?
         what-Acc   Suna-Nom   read-Past-Q

     'What did Suna read?'

This changes if the subject is negated. Korean does that by incorporating a sentential negation into the dummy verb *ha* 'do' and having a negative polarity subject "anyone". A declarative example is given in (6).

(6) a. amuto kû   ch'aek-ûl   ilk-chi anh-ass-ta.
         anyonethat   book-Acc   read-CHI   not do-Past-Dec
     b. kû   ch'aek-ûl$_i$ amuto   t$_i$ ilk-chi anh-ass-ta.
         that   book-Acc   anyoneread-CHI   not do-Past-Dec

     'No one read that book.'

Now consider the negated question (7):

(7)   a. *   amuto muôs-ûl   ilk-chi anh-ass-ni?
              anyonewhat-Acc   read-CHI   not do-Past-Q
      b.   muôs-ûl$_i$ amuto t$_i$ ilk-chi anh-ass-ni?
              what-Acc   anyoneread-CHI   not do-Past-Q

          'What did no one read?'

The unmarked word order (7a) is ungrammatical. Only the scrambled version (7b) is an available well-formed option. The same effect shows up with other types of *wh*-phrases that occur after the subject in the unmarked case:

(8)   a. *   amuto   ôti-e   ka-chi anh-ass-ni?
              anyonewhere-Dir   go-CHI   not do-Past-Q
      b.   ôti-e$_i$ amuto t$_i$ ka-chi anh-ass-ni?
              where-Dir   anyone   go-CHI   not do-Past-Q

          'Where did no one go?'

So, apparently we cannot have a *wh*-phrase linearly behind an NPI subject. Negated questions are fine as long as there is no *wh*-phrase behind an NPI:

(9)   nuku-ka   amuto   ch'otaeha-chi anh-ass-ni?
      who-nom   anyoneinvite-CHI   not do-Past-Q
      'Who didn't invite anyone?'

If the NPI object is scrambled across the subject *wh*-phrase, the sentence becomes bad:

(10) *   amuto$_i$ nuku-ka   t$_i$ ch'otaeha-chi anh-ass-ni?
             anyonewho-Nom   invite-CHI   not do-Past-Q
             'Who didn't invite anyone?'

Another example of this kind is given in (11). The ungrammaticality is due to the fact that the *wh*-phrase occurs behind the NPI object.

(11) * Suna-ka amuto ôti-esô manna-chi anh-ass-ni?
     Suna-Nom anyonewhere-Loc meet-CHI not do-Past-Q
     'Where did Suna meet no one?'

If the *wh*-phrase occurs before the NPI object, the sentence is fine:

(12) a. Suna-ka ôti-esô amuto manna-chi anh-ass-ni?
        Suna-Nom where-Loc anyonemeet-CHI not do-Past-Q
     b. ôti-esô Suna-ka amuto manna-chi anh-ass-ni?
        where-Loc Suna-Nom anyonemeet-CHI not do-Past-Q

     'Where did Suna meet no one?'

In the case of multiple *wh*-questions, all *wh*-phrases have to occur before the NPI:

(13) a. * amuto nuku-lûl ôti-esô manna-chi anh-ass-ni?
           anyonewho-Acc where-Loc meet-CHI not do-Past-Q
     b. * nuku-lûl amuto ôti-esô manna-chi anh-ass-ni?
           who-Acc anyonewhere-Loc meet-CHI not do-Past-Q
     c. * ôti-esô amuto nuku-lûl manna-chi anh-ass-ni?
           where-Loc anyonewho-Acc meet-CHI not do-Past-Q
     d. nuku-lûl ôti-esô amuto manna-chi anh-ass-ni?
        who-Acc where-Loc anyonemeet-CHI not do-Past-Q
     e. ôti-esô nuku-lûl amuto manna-chi anh-ass-ni?
        where-Loc who-Acc anyonemeet-CHI not do-Past-Q

     'Where did no one meet whom?'

So the generalization seems to be that the following configuration at S-structure is out:

(14) *[...NPI...[...*wh*-phrase...]]

I propose to analyse these data as MNSC effects. The basic idea is that in a configuration like (14), the NPI has to be in the scope of a negation in order to be

licensed. Since the *wh*-phrase has to cross the NPI on its way to its LF position, it will also have to cross a negation.

3.3. Analysis

How far the analysis for the German data carries over to Korean depends on the structural representations one would assign to the Korean *wh*-interrogatives. I argue in this section with Beck & Kim (1996) that with a set of well-motivated assumptions the analysis does in fact extend to Korean.
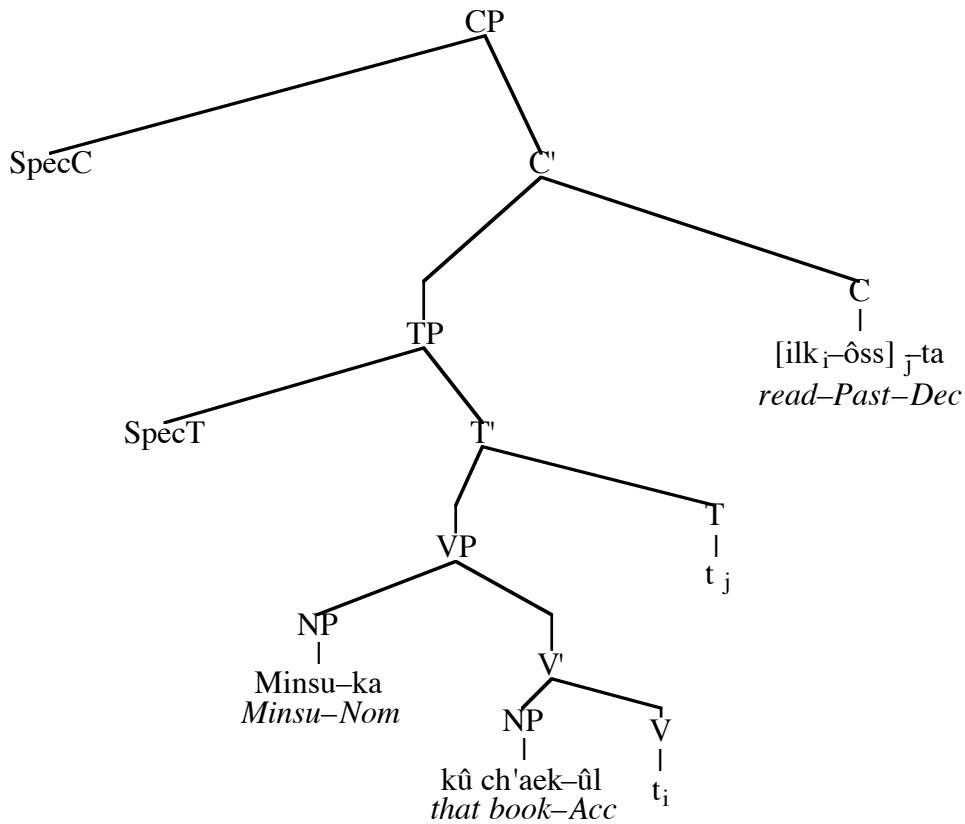
3.3.1. S-Structure

Some general aspects first. Korean is an agglutinative language in which verbal suffixes play an important role in combining clauses and marking tense, aspect, and modality. Korean is in addition a (strictly) head-final language in which lexical as well as functional heads come after the complements which they select. Take an example like (15):

(15)   Minsu-ka   kû ch'aek-ûl   ilk-ôss-ta.
       Minsu-Nom   that book-Acc read-Past-Dec
       'Minsu read that book.'

The S-Strucutre sugeested for (15) is (16):

(16)

```
                              CP
                         ╱         ╲
                  ╱                   C'
          SpecC               ╱            ╲
                            TP              C
                         ╱      ╲            │
                    SpecT        T'      [ilk_i–ôss]_j–ta
                             ╱      ╲      read–Past–Dec
                          VP          T
                        ╱    ╲         │
                      NP      V'       t_j
                      │      ╱  ╲
                  Minsu–ka  NP    V
                  Minsu–Nom │     │
                      kû ch'aek–ûl  t_i
                      that book–Acc
```

The finite verb presumably undergoes head-movement to C (compare Baker (1988) on incorporation). Based on data of ECM constructions and multiple nominative constructions, Heycock & Lee (1989) and Lee (1990) argue that the nominative case in Korean is not assigned by some INFL-like element, be it Tense or Agr. The nominative case *-ka* marks the syntactic subject of a predication structure which is independent of the argument structure of the clause. Thus, following them, the subject will be assumend to stay in its base position, i.e. [Spec, VP]. It need not move to SpecT at S-structure, since it is assigned nominative case by the predicate V'.

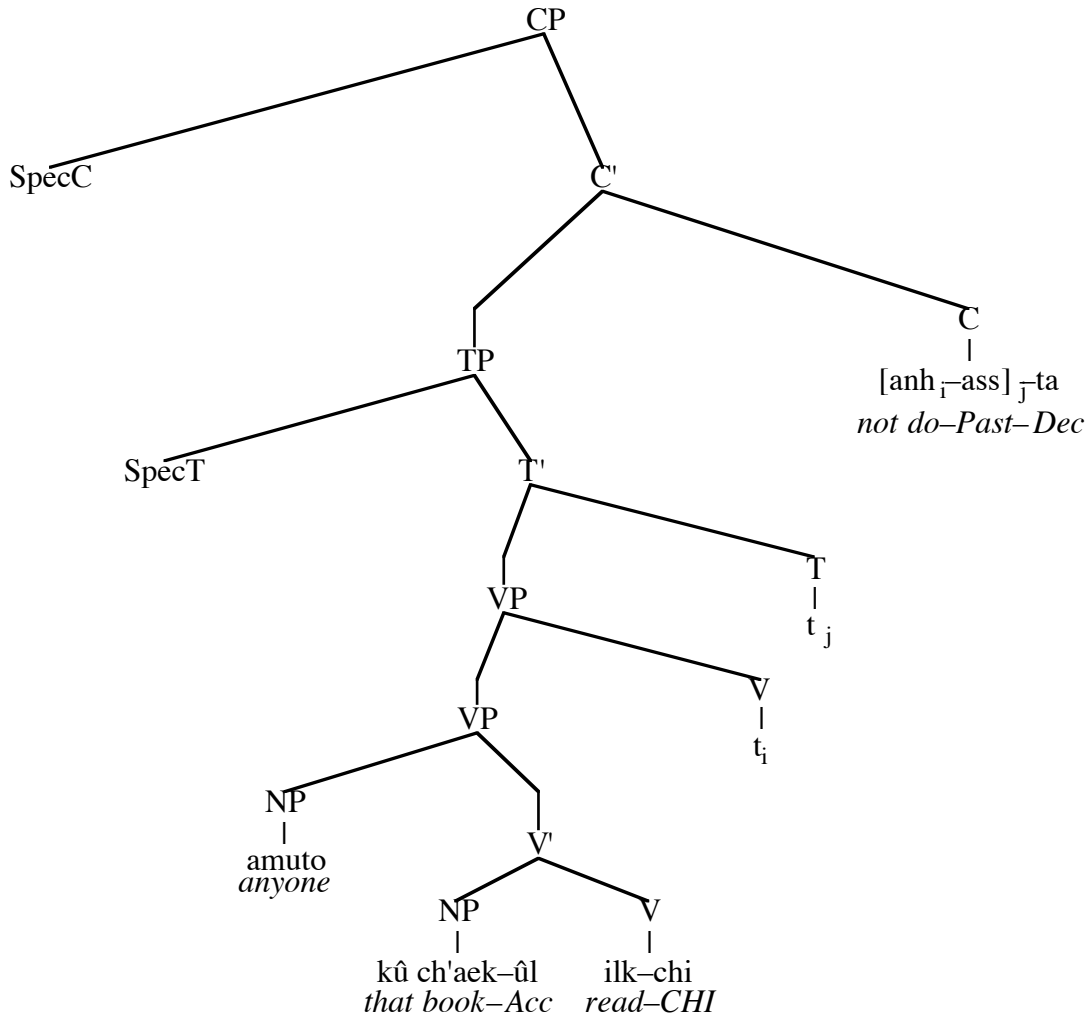(17) is an example involving negation:

(17) amuto   kû ch'aek-ûl   ilk-chi anh-ass-ta.
      anyone that book-Acc read-CHI   not do-Past-Dec
      'No one read that book.'

Here is the syntax I am going to assume for negation, following Beck & Kim (1996):

(18) D-structure

```
                              CP
                            /    \
                        /           \
                   SpecC             C'
                                    /   \
                                   /      \
                                  TP        C
                                 /  \       |
                                /     \     –ta
                            SpecT       T'  [Dec]
                                       /  \
                                      /     \
                                    VP        T
                                   /  \       |
                                  /     \     –ass
                                VP        V   [Past]
                               /  \       |
                              /     \     anh
                            NP       V'   not do
                            |       /  \
                          amuto    /     \
                          anyone  NP       V
                                  |        |
                            kû ch'aek–ûl  ilk–chi
                            that book–Acc read–CHI
```

9
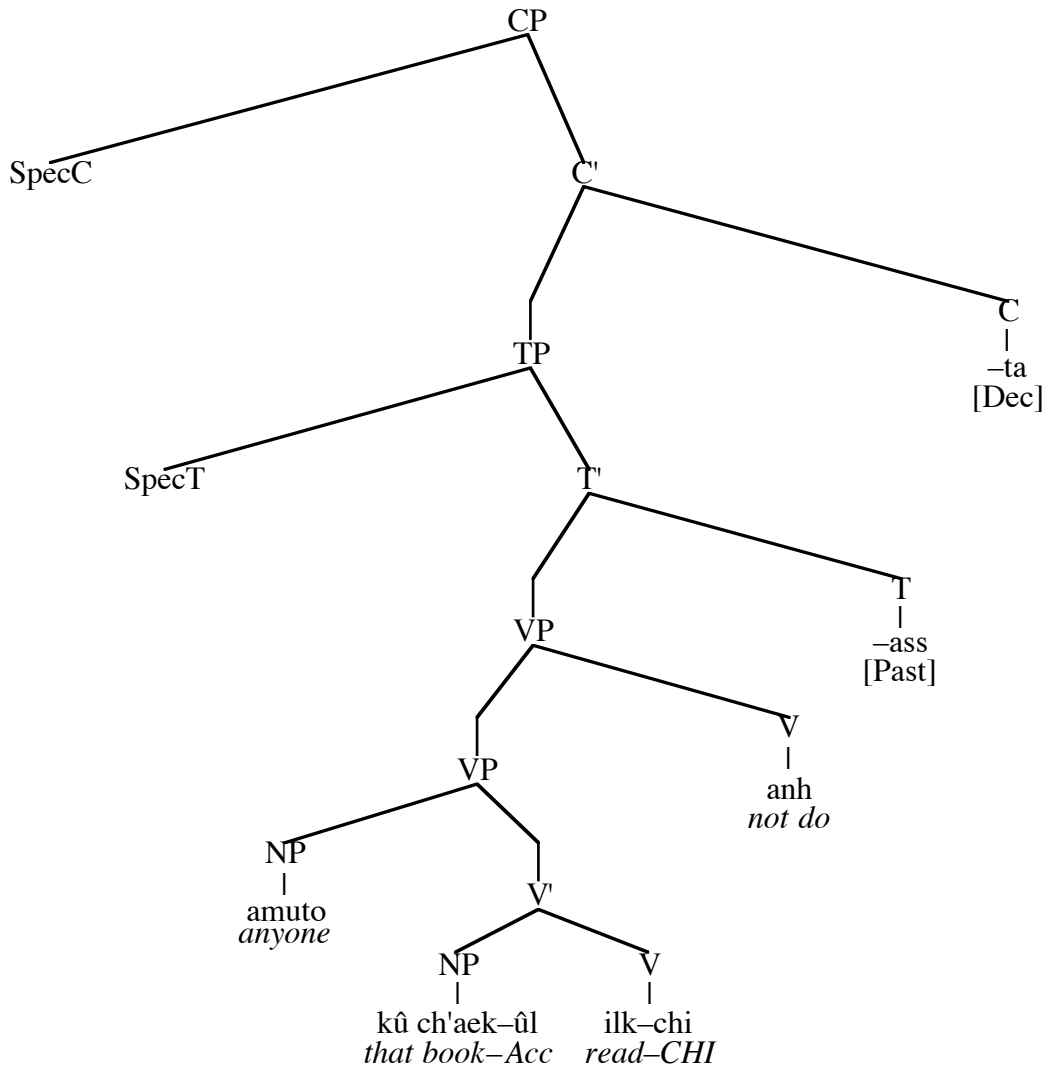
(19)   S-structure

At S-structure the negation is incorporated into a finite dummy verb "do" and presumably occurs in C. I will talk about a negative verb *anh*, which will not be further analysed.

Now back to *wh*-questions. According to the asumptions just sketched, (21) and (23) are the S-structures of (20) and (22). (20) is an unmarked SOV-order, while (22) is a scrambled version. I will assume that scrambling is (or can be) adjunction to VP.
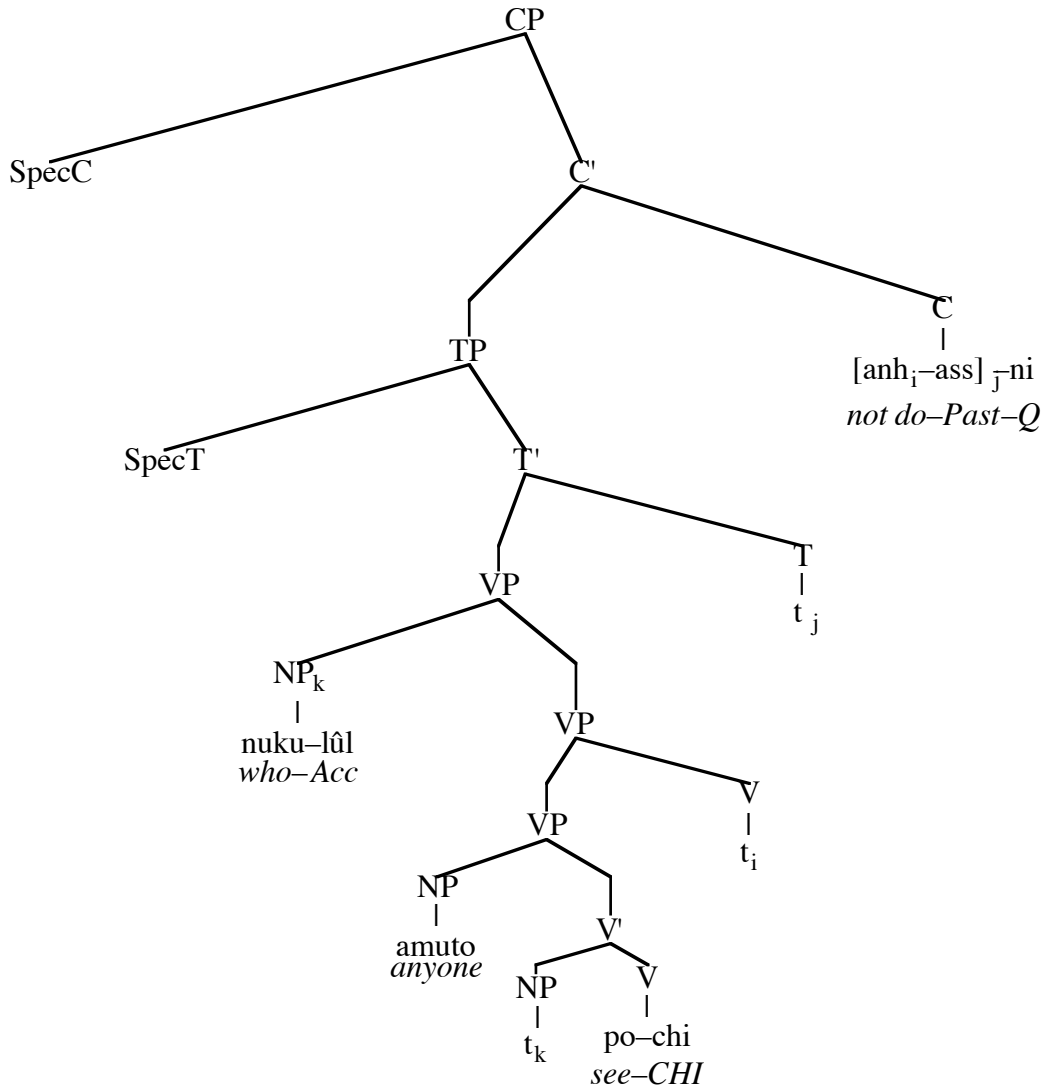
(20)   *   amuto   nuku-lûl   po-chi anh-ass-ni?

anyonewho-Acc   see-CHI   not do-Past-Q

'Whom did no one see?'

(21)
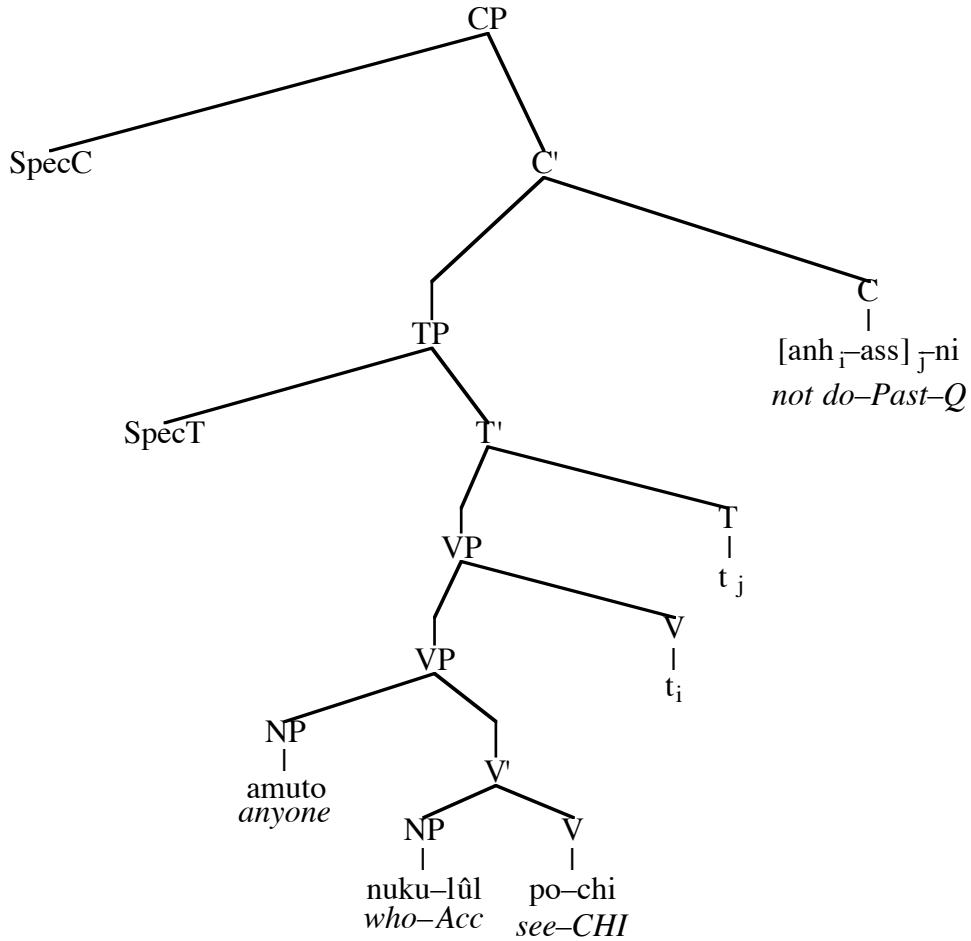
(22)   nuku-lûl$_i$ amuto t$_i$ po-chi anh-ass-ni?

who-Acc   anyonesee-CHI   not do-Past-Q

'Whom did no one see?'

(23)

```
                                    CP
                   _____/\
                  /                      \
               SpecC                      C'
                                        __/_____
                                       /            \
                                      TP             C
                                    ___/\            |
                                   /     \      [anh_i–ass] _j-ni
                                SpecT     T'     not do–Past–Q
                                        __/_____
                                       /           \
                                      VP            T
                                    __/\            |
                                   /    \           t_j
                                 NP_k    VP
                                  |    __/\____
                              nuku–lûl /        \
                              who–Acc VP         V
                                    __/\         |
                                   /    \        t_i
                                  NP     V'
                                  |    __/\
                               amuto   /    \
                               anyone NP     V
                                      |      |
                                      t_k   po–chi
                                            see–CHI
```

(21) and (23) will be revised slightly below, when we have a better understanding of negation in Korean.

3.3.2. Logical Form

My general assumptions about Korean interrogative LFs will be the same as those we made in chapter 2 for German. So again, the LFs will have to be compositionally interpreted to yield the appropriate Hamblin/Karttunen semantics (although the LF trees will not be annotated with their interpretations when these are straightforward). W*h*-phrases will have to be moved at LF to SpecC or a related position above C^0. C^0 still is associated with the interrogative operator, which in Korean is overtly realized by *ni*.

The aspect of our logical forms that will necessitate most discussion is the LF position of negation. I argue with Beck & Kim (1996) for an abstract view of negation, i.e. what is morphologically visible as a negative particle does not correspond directly to semantic negation. Let us elaborate on this.

While at S-structure, both negation and interrogative marker are reflected morphologically on the verb, they have to be seperated for compositional interpretation. Consider (24):

(24) manhûn   ai-tûl-i   o-chi   anh-ass-ni?
      many   child-PL-Nom come-CHI   not do-Past-Q
      'Did many children not come?'

The sentence expresses the question in (25a), which can be paraphrased as in (25b):

(25) a. $\lambda p[p= \lambda w \exists X[many_w(X)$ & $children_w(X)$ & $\neg come_w(X)]$
             $\vee p= \lambda w \neg \exists X[many_w(X)$ & $children_w(X)$ & $\neg come_w(X)]]$
      b.   Is it the case that there were many children who did not come?

Note that in (25a) the interrogative operator and the negation are seperated. In this particular example, they are seperated by *many children*, which takes scope under the interrogative operator and above negation. So "NEG Verb Q" cannot be interpreted as one meaningful unit. The point can be made with arbitrary scope bearing elements.

(26) is a similar example with a *wh*-question:

(26) a. manhûn   ai-tûl-i   ôti-e   ka-chi
          many   child-PL-Nom where-Dir   go-CHI
          anh-ass-ni?
          not do-Past-Q
      b. ôti-e$_i$ manhûn   ai-tûl-i t$_i$ ka-chi
          where-Dir   many   child-PL-Nom go-CHI
          anh-ass-ni?
          not do-Past-Q

      'Where did many children not go?'

The interpretation we are after is (27). It can be derived via an LF like (28).[43]

(27) a. $\lambda p \exists x[place_w(x) \,\&\, p=\lambda w' \exists Y[many_{w'}(Y) \,\&\, children_{w'}(Y) \,\&\, go_{w'}(Y,x)]]$
      b. 'For which place x: there were many children who did not go to x.'

---

[43]I provide an LF for the more complex example with the *wh*-phrase rather than for the Yes/No question because I don't want to discuss the logical from of Yes/No questions here.

(28)

$$\lambda p\exists x[\text{place}(x) \ \& \ p=\lambda w\exists Y[\,\text{many}_w(Y) \ \& \ \text{children}_w(Y) \ \& \ \neg \text{go}_w(Y,x)]]$$

CP

ôti-e$_i$
where
$\lambda P\exists x[\text{place}(x) \ \& \ P(x)]$

$$\lambda x[p=\lambda w\exists Y[\,\text{many}_w(Y) \ \& \ \text{children}_w(Y) \ \& \ \neg \text{go}_w(Y,x)]]$$

C'

$$\lambda w\exists Y[\,\text{many}_w(Y) \ \& \ \text{children}_w(Y) \ \& \ \neg \text{go}_w(Y,x)]$$

VP

ni
$\lambda q[p=q]$

manhûn ai-tûl-i
many children
$\lambda P\exists Y[\,\text{many}_w(Y) \ \&$
$\text{children}_w(Y) \ \& \ P(Y)]$

$\lambda y[\neg \text{go}_w(y,x)]$

V'

V'

Neg

t$_i$ ka-chi
go
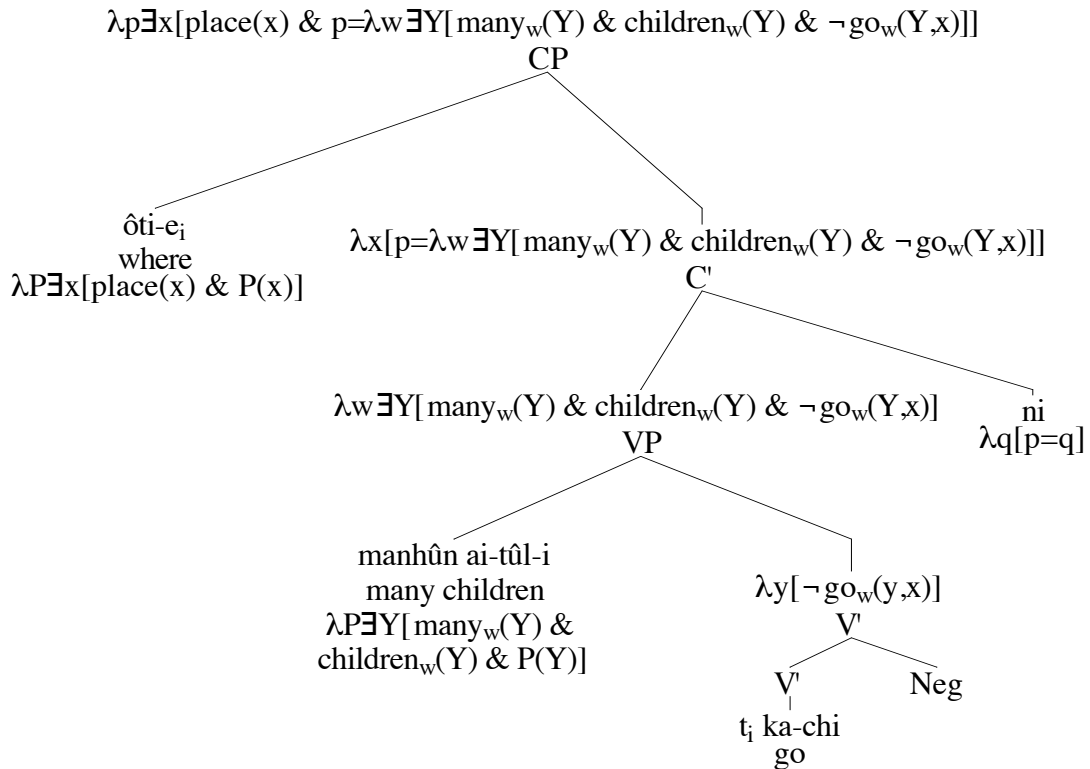
Again, the NP *many children* takes scope below the interrogative operator and above negation. So the interrogative operator and the negation have to be separated at LF. Assuming that *ni* is the lexicalization of the interrogative operator "$\lambda p[p=q]$", and that this operator is associated with C^0, the LF position of the negation is lower than C^0, since the negation has to be interpreted in the scope of this operator.

So S-structure position and LF position of negation in Korean have to be dissociated. There are various ways to go about this. One possibility would be to assume movement at LF. Supposing that the position of the interrogative operator at LF is fixed to C^0, the negation would have to be reconstructed and possibly raised again afterwards. See Suh (1990) for such an analysis. However, I believe that it is more insightful to acknowledge that in Korean, the relation of morphological negation and semantic negation is somewhat more abstract. The proposal I am going to make will be seen to be empirically well-motivated when we are able to consider the entire range of relevant data.

Thus, I propose that the negative verb *anh* takes as its complement a VP that contains a semantic negation. It does not itself express negation, but is semantically empty. It makes the semantic negation within its complement VP visible. I will

assume that the semantic negation is adjoined to a verbal projection - it is basically an adverb (this concerns LF in particular, as we will see in a minute, but semantic negation should presumably be already included in our S-structure representations). I will not assume a fixed LF position (like the Spec of NegP), so there is an element of choice here. I will come back to this issue.

There is a second type of negation in Korean (called "short form negation" in the literature) which has been analysed as being adjoined to the verb (Suh (1990)). An example is given in (29).

(29) a.   Minsu-ka   kû ch'aek-ûl   an   ilk-ôss-ta.
             Minsu-Nom   that book-Acc not   read-Past-Dec
             'Minsu did not read that book.'

      b.   nuku-lûl$_i$ amuto t_i an   po-ass-ni?
             who-Acc   anyone not   see-Past-Q
             'Whom did no one see?'

This type of negation will not be discussed.

For a question like (30a), an LF as in (30b) will be assumed:

(30) a. *   amuto nuku-lûl   po-chi anh-ass-ni?
             anyone who-Acc   see-CHI   not do-Past-Q
             'Whom did no one see?'

      b.

16
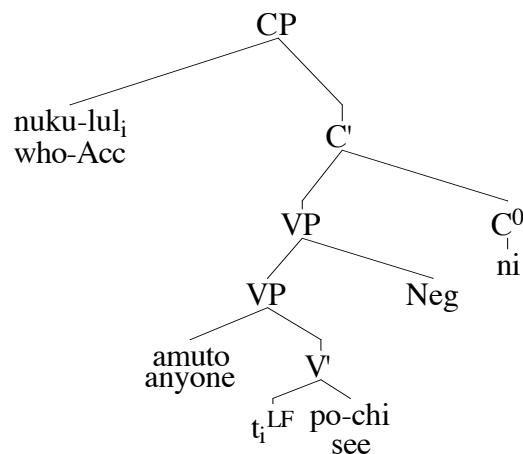
A few more comments on (30b):

As in chapter 2, the assumption is that verbs get translated as open sentences. How argument slots get identified with arguments is on this view not a matter of the functional structure of the verb, but a matter of syntax. See Büring (1996) and Sternefeld (1995) for this analysis.

If the verb is an open sentence, there is no neccessity for type-driven QR. We can therefore interpret quantifiers in their S-structure positions. Moreover, our assumption that a negation can be adjoined to any V-projection makes sense semantically, since any V-projection is a sentence and can be combined with negation.

I have simply deleted the negative verb *anh*, since it is meaningless anyway. I have also ignored the entire TP level for convenience.

For completeness, I give the S-Structure of (30a) in (31) including semantic negation (which was left out in (21) ((23) should be similarly revised, of course).

(31)
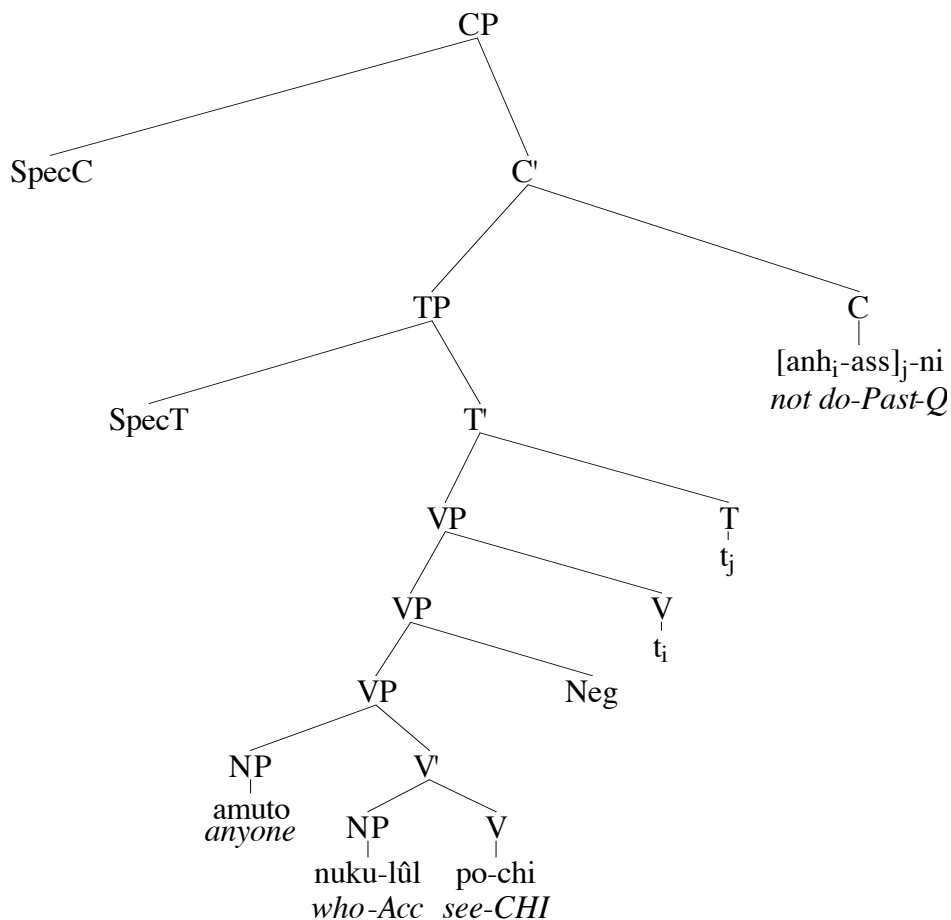
In (30), we consider a sentence containing a negation and a negative polarity item (expressing something equivalent to a negative quantifier). It is well known that a negative polarity item occurs only in the scope of negation (see e.g. Ladusaw (1981)). In this sense, the NPI makes the scope of the negation visible, since the negation has to have scope over the NPI in order for the NPI to be licensed.

The LF in (30b) satisfies the licensing conditions of the NPI. However, the *wh*-trace occurs at LF in the NIB (the VP dominating *Neg*) while its binder *nuku* 'who' does not. Therefore, the LF violates the MNSC. The definitions of NIB and MNSC are repeated below:

(32)   Negation Induced Barrier (NIB):
        The first node that dominates a negative quantifier, its restriction and its
        nuclear scope is a negation induced barrier.

(33)   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.

Any LF in which the negation would occur in a position below the *wh*-trace would not meet the licensing requirement of the NPI. So (30) is ungrammatical, because it does not have a grammatical LF.

Now consider (34). The object *wh*-phrase is now scrambled to a position higher than the NPI subject, and the sentence is grammatical.

(34)   nuku-lûl$_i$ amuto t$_i$ po-chi anh-ass-ni?
        who-Acc   anyone   see-CHI   not do-Past-Q
        'Whom did no one see?'

(35) is an LF for (34):

(35)

```
                        CP
              ┌──────────┴──────┐
        nuku-lul_i              C'
        who-Acc          ┌──────┴──────┐
                        VP             C⁰
                   ┌─────┴──┐          │
                 t_i^LF     VP         ni
                       ┌────┴────┐
                      VP        Neg
                  ┌────┴──┐
                amuto     V'
                anyone  ┌─┴────┐
                       t_i   po-chi
                              see
```
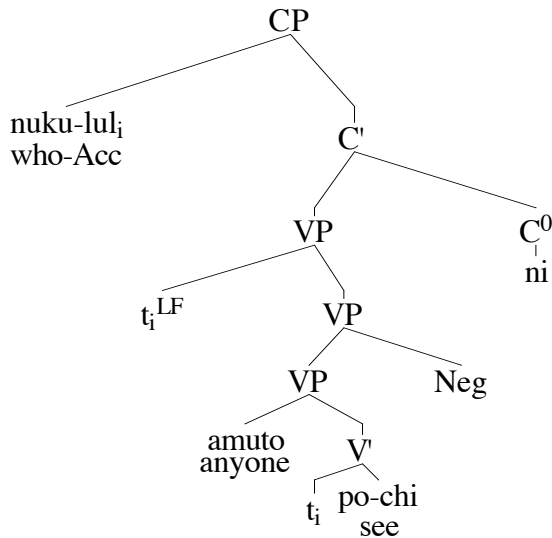
In this LF, we can safely assume that the negation is in a position to license the NPI. This can still be a position structurally below the LF-trace of the *wh*-phrase, as indicated in (35). So (35) is a grammatical LF for (34), that violates neither the licensing condition for the NPI nor the MNSC. There are other potential LFs for (34) (with various adjunction sites for the negation) which will violate either MNSC or the licensing condition for the NPI. The point is that there is also a grammatical LF for the sentence. Thus, if we assume that MNSC holds for Korean as well as German, the contrast between (30) and (34) is to be expected.

(37) is the LF I propose for example (36) with a *wh* subject and an NPI object:

(36)   nuku-ka   amuto   ch'otaeha-chi anh-ass-ni?
       who-Nom   anyone invite-CHI   not do-Past-Q
       'Who did not invite anyone?'

(37)
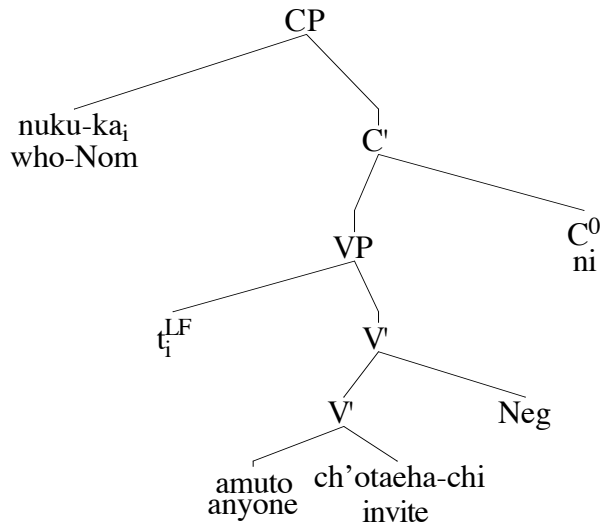
Again, we have the option of adjoining the negation to a V projection lower than the position of the LF-trace of the *wh*-phrase, which leads to a grammatical LF. In the scrambled version (38), in contrast, this is impossible. Any LF that licenses the NPI (like (39)) clashes with the MNSC.

(38)   *   amuto$_j$ nuku-ka   t$_j$ ch'otaeha-chi anh-ass-ni?
             anyone who-Nom   invite-CHI   not do-Past-Q
             'Who did not invite anyone?'

(39)
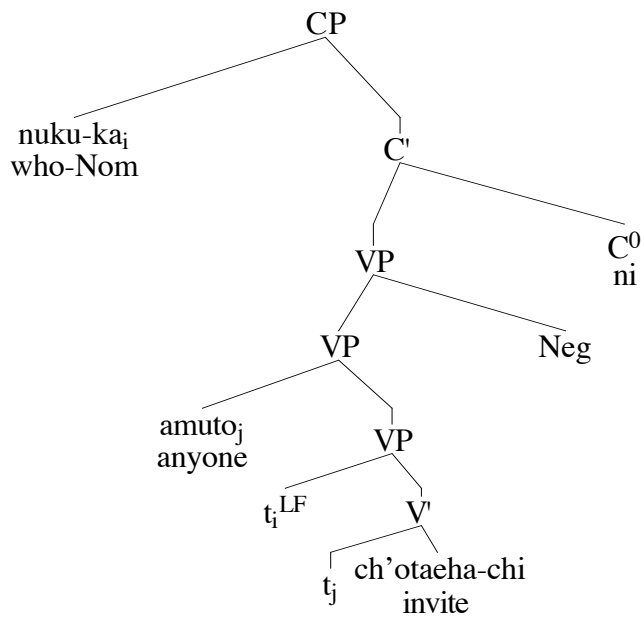
It should be obvious that the MNSC covers the data considered in section 3.2. The foundation of the analysis is the assumption of a close correspondence between linear order, syntactic structure and scope. Whenever a *wh*-phrase precedes an NPI at S-structure, there is an adjunction site for the negation that c-commands the NPI, but not the S-Structure position of the *wh*-phrase. Whenever the NPI precedes the *wh*-phrase, there is no adjunction site for the negation that would license the NPI without inducing an MNSC violation. Thus, the MNSC characterizes a violation that comes about when the intended scope relations are not made transparent enough at S-structure.

It should be stressed that some of the assumptions that have been made are not neccessary for the analysis to work, but have been made in order to come up with a concrete proposal. In some cases, a different set of assumptions would have worked as well. For example, we could have assumed obligatory movement of arguments at S-Structure to case positions. Then it would not have been necessary to introduce the verb as an open sentence in order to be able to interpret quantified arguments in their S-structure positions. The important assumptions are the following:

As in the case of German, the data point to a fairly close connection between S-Structure and LF positions. Thus, there is no obligatory QR. This reflects the observation that it is plain linear order that makes all the difference between grammaticality and ungrammaticality. I have here suggested that set of assumptions that accounts for this observation which seemed simplest. Other solutions are of course possible.

Secondly, it is important that negation is reconstructed in some sense from its S-Structure position and that there is a certain freedom in what LF positions it can have. If it always went to NegP, for instance, I could not have accounted for the data the way I did: Presumably, NegP would have to dominate the subject position in order to be able to license subject NPIs. Now consider (37). The only way to account for the grammaticality of the example would be to claim that the *wh*-subject has been invisibly scrambled, since in its base position it would be c-commanded by the negation. Next, consider (11) vs. (12), repeated below for convenience:

(11)   *   Suna-ka   amuto   ôti-esô manna-chi   anh-ass-ni?
                 Suna-Nom   anyonewhere-Loc   meet-CHI   not do-Past-Q
                 'Where did Suna meet no one?'

(12) a.   Suna-ka   ôti-esô amuto   manna-chi   anh-ass-ni?
            Suna-Nom   where-Loc   anyonemeet-CHI   not do-Past-Q
      b.   ôti-esô Suna-ka   amuto   manna-chi   anh-ass-ni?
            where-Loc   Suna-Nom   anyonemeet-CHI   not do-Past-Q

      'Where did Suna meet no one?'

In (12a), the *wh*-phrase is still linearly behind the subject. Hence, on the NegP analysis one would have to assume invisible scrambling of the subject and the *wh*-phrase. This might be feasible, but I find it very unattractive and my actual proposal much simpler.

3.3.3. A few further consequences

The above analysis with regard to the LF position of the negation leads us to expect that *wh*-interrogatives with a simple sentential negation like (40) are grammatical:

(40) a.   Suna-ka   ônû ch'aek-ûl tosôkwan-e   pannapha-chi
            Suna-Nom   which book-Acc   library-Dir   bring back-CHI
            anh-ass-ni?
            not do-Past-Q
      b.   'Which book did Suna not bring back to the library?'

This is because there is a grammatical LF for the sentence in which the negation is adjoined to a position lower than the S-structure position of the *wh*-phrase. The expectation is borne out.

There is a case with plain sentential negation in which it is nonetheless clear that the surface position of a *wh*-phrase is in the scope of the negation, namely in "long" *wh*-questions.

Korean allows "long" *wh*-questions, in which the *wh*-phrase can remain *in situ* in the embedded clause, cf. (41) and (42):

(41) Suna-nûn [Mira-ka nuku-lûl po-ass-ta-ko] saengkakha-ni?
      Suna-Top Mira-Nom who-Acc see-Past-Dec-C think-Q
      'Who does Suna think Mira saw?'

(42) Suna-nûn [Mira-ka ch'aek myôch' kwôn-ûl
      Suna-Top Mira-Nom book how many CL-Acc
      ilk-ôss-ta-ko] saengkakha-ni?
      read-Past-Dec-C think-Q
      'How many books does Suna think Mira read?'

It is also possible to long-distance scramble the *wh*-phrase, as in (43) and (44):

(43) nuku-lûl$_i$ Suna-nûn [Mira-ka t$_i$ po-ass-ta-ko]
      who-Acc Suna-Top Mira-Nom see-Past-Dec-C
      saengkakha-ni?
      think-Q
      'Who does Suna think Mira saw?'

(44) [ch'aekmyôch' kwôn-ûl]$_i$ Suna-nûn [Mira-ka t$_i$
      book how many CL-Acc Suna-Top Mira-Nom
      ilk-ôss-ta]-ko saengkakha-ni?
      read-Past-Dec-C think-Q
      'How many books does Suna think Mira read?'

Note that in both cases the only possible interpretation is as a matrix question, since the matrix clause is marked as interrogative and the embedded clause as declarative.

An interesting case arises when the superordinate clause is marked interrogative, the embedded clause is marked declarative and the matrix clause contains a sentential negation. Consider first (45), where a *wh*-phrase in the embedded clause has been left *in situ*:

(45) a. * Suna-nûn   [Mira-ka   ch'aek myôch'   kwôn-ûl
             Suna-Top   Mira-Nom   book   how many   CL-Acc

             ilk-ôss-ta-ko] saengkakha-chi   anh-ni?
             read-Past-Dec-C   think-CHI   not do-Q
             'How many books$_i$ doesn't Suna think Mira read t$_i$?'

       b. * Suna-nûn   [Mira-ka   nuku-lûl   po-ass-ta-ko]
             Suna-Top   Mira-Nom   who-Acc   see-Past-Dec-C

             saengkakha-chi   anh-ni?
             think-CHI   not do-Q
             'Who$_i$ doesn't Suna think Mira saw t$_i$?'

       c. * Suna-nûn   [Mira-ka   wae   tosôkwan-e   ka-ss-ta-ko]
             Suna-Top   Mira-Nom   why   library-Dir   go-Past-Dec-C

             saengkakha-chi   anh-ni?
             think-CHI   not do-Q
             'Why$_i$ doesn't Suna think Mira went to the library t$_i$?'

In these cases, it is clear that the LF-position of the negation has to be structurally above the S-structure position of the *wh*-phrase. At LF, the *wh*-phrase should be moved across the negation to the matrix SpecC. The negation in the matrix sentence seems to block this movement.

As mentioned above, we can scramble complement-*wh*'s long-distance in Korean. Scrambling the *wh*-phrases remedies the ungrammaticality:[44]

(46) a.   [ch'aekmyôch'   kwôn-ûl]$_i$ Suna-nûn   [Mira-ka
             book   how many   CL-Acc   Suna-Top   Mira-Nom

             t$_i$ ilk-ôss-ta]-ko   saengkakha-chi   anh-ni?
                   read-Past-Dec-C   think-CHI   not do-Q

       a'   'For which number n: there are n books which Suna does not
             think Mira read.'

       b.   nuku-lûl$_i$ Suna-nûn   [Mira-ka   t$_i$ po-ass-ta]-ko
             who-Acc   Suna-Top   Mira-Nom   see-Past-Dec-C

             saengkakha-chi   anh-ni?
             think-CHI   not do-Q

---

[44]It is generally assumed that adjuncts cannot be scrambled long-distance. Thus scrambling the adjunct *wae* ('why') in (45c) out of the embedded clause does not improve the grammaticality of the example.

b'.   'For which person x: Suna does not think Mira saw x.'

Obviously, (45) violate the MNSC, while (46) do not. The MNSC thus accounts for these data as well.

I conclude that the MNSC restricts LF *wh*-movement in Korean as well as in German.

3.3.4. Semantic effects of scrambling

The fact that the S-structural linear order seems crucial for the relative scope of quantifier phrases (including *wh*-phrases) both in Korean and in German leads to the question of what the semantic effect of scrambling is. Saito (1989; 1992), among others, assumes that scrambling has no semantic effect and that scrambled elements can be reconstructed to their D-structure positions at LF (scrambling is regarded as semantically vacuous A'-movement. cf. Saito (1989)).[45] According to this, the scrambled phrase *kû ch'aek-ûl* in (47) may be reconstructed to its trace position at LF for the interpretation.

(47)   kû ch'aek-ûl$_i$ Suna-nûn   [Mira-ka   t$_i$ ilk-ôss-ta-ko]
        that book-Acc Suna-Top   Mira-Nom   read-Past-Dec-C
        saengkakha-n-ta.
        think-Pres-Dec
        'That book$_i$, Suna thinks that Mira read t$_i$.'

Now consider an example of a scrambled *wh*-phrase:

(48)   nuku-lûl$_i$ Suna-ka   t$_i$ po-ass-ni?
        who-Acc   Suna-Nom   see-Past-Q
        'Whom did Suna see?'

We assume that the *wh*-phrase should move to SpecC at LF in order to get scope. For (48) there can be two possible derivations: (i) The scrambled *wh*-phrase is first reconstructed to its D-structural position, as in the case of (47), (if scrambling has no

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[45]But see Saito (1994). In contrast to Saito (1989) who proposed that scrambling can be semantically vacuous and hence can be freely undone at LF, Saito (1994) argues, based on some data related with functional interpretation of *wh*-phrases, that there are cases where scrambling necessarily creates a semantically significant operator-variable relation. The established relation is retained at LF.

semantic effect, as Saito argues, this should be allowed) and subsequently moved to SpecC; (ii) The scrambled *wh*-phrase is moved directly to SpecC.

I will distinguish between two possible interpretations of the alleged semantic vacuity of scrambling:

(i)   Scrambling is obligatorily reconstructed, that is, there is no derivation in which scrambling isn´t first undone.

(ii)   Scrambling is optionally reconstructed, i.e. there is a derivation in which scrambling is undone (plus possible other derivations in which it isn´t).

Both options will be seen to be incompatible with my analysis and will be rejected. Hence this section is an argument against the claim that scrambling is semantically vacuous.

The cases with an NPI element blocking *wh*-movement at LF show that the first interpretation is not desirable.

(49) a. * amuto   nuku-lûl   po-chi anh-ass-ni?
             anyonewho-Acc   see-CHI   not do-Past-Q
      b.   nuku-lûl_i   amuto t_i   po-chi anh-ass-ni?
             who-Acc   anyonesee-CHI   not do-Past-Q
             'Whom did no one see?'

If the scrambling movement in (49b) had to be totally undone at LF, there would be no way to distinguish (49b) from (49a) at LF. In both cases, the *wh*-phrase should be moved over the NPI subject to get to SpecC. This is not what we want.

Thus, for (49b) there has to be a derivation in which the scrambled *wh*-phrase is not reconstructed to its trace position, but is moved directly to SpecC at LF to get its scope. This movement does not cross the NPI, hence, does not cross a NIB and is thus fine. For (49a), however, there exists no derivation in which the *wh*-phrase gets to its scope position without crossing a NIB. The contrast between the two can thus only be explained if the first option is rejected.

The following examples also illustrate the same point:

(50) a. * Suna-nûn   [amuto nuku-lûl   ch'otaeha-chi anh-
             Suna-Top   anyonewho-Acc   invite-CHI   not do-
             ass-nûnchi]   a-n-ta.
             Past-Q know-Pres-Dec

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b. Suna-nûn   [nuku-lûl_i   amuto t_i   ch'otaeha-chi

Suna-Top   who-Acc   anyone invite-CHI

anh-ass-nûnchi]   a-n-ta.

not do-Past-Q know-Pres-Dec

c. nuku-lûl_i   Suna-nûn   [amuto t_i   ch'otaeha-chi

who-Acc   Suna-Top   anyone   invite-CHI

anh-ass-nûnchi]   a-n-ta.

not do-Past-Q know-Pres-Dec

'Suna knows whom no one invited.'

The ungrammaticality of (50a) results from the fact that the *wh*-phrase must be moved over the NPI to get to the embedded SpecC at LF. This movement violates the MNSC. In (50b), the *wh*-phrase is scrambled over the NPI at S-structure, and the sentence is fine. At LF the *wh*-phrase is moved from its S-structural position to the embedded SpecC without crossing the NPI subject. In (50c), the *wh*-phrase is long-distance scrambled out of the embedded interrogative sentence. Since the matrix sentence is marked as declarative, the *wh*-phrase cannot be licensed in its S-structural position. It should be reconstructed to SpecC of the embedded sentence marked as interrogative. This shows that even when we have to have reconstruction, it is not obligatorily to the base position. Here too, if the *wh*-phrase had to be reconstructed to its trace in base position and then moved to SpecC of the embedded sentence, this movement would violate the MNSC, and the sentence should be ungrammatical, which in fact is not the case.

The above observations exclude the first option, obligatory reconstruction. They are compatible with the second option (optional reconstruction), because there would still be one derivation without reconstruction. However, consider (10) from section 2:

(10) * amuto_i nuku-ka   t_i   ch'otaeha-chi anh-ass-ni?

anyone who-Nom   invite-CHI   not do-Past-Q

'Who didn't invite anyone?'

If it were possible to reconstruct the scrambled NPI object, the sentence would have a well-formed LF. The negation could have scope over the base position of the NPI

(to which the latter got reconstructed, thus fulfilling the licensing conditions for the NPI) without blocking the LF *wh*-movement of the *wh*-subject.

Even optional reconstruction of short scrambling in cases like (10)[46] is thus incompatible with the analysis presented. I suggest that within one simple sentence scrambling is never undone. Thus, scrambling does have a semantic effect (contra Saito (1989; 1992)).

3.4. Other operators

I have concentrated here on the interaction of *wh*-phrases with negative operators. Of course, this is just a subcase of interaction with scope bearing elements in general. This issue is important with respect to the formulation of the MNSC. In chapter 2, I do not argue for a negation specific constraint like the MNSC, but rather, for a constraint concerning quantified structures in general (the MQSC, see (53) below). This is motivated by data like (51).

(51) a. * Wen   hat   Karl   zweimal   von den Musikern   getroffen?
        whom has   Karl   twice   of the musicians   met
        'Which of the musicians did Karl meet twice?'
     b. * Wen   haben   wenige   wo   getroffen?
        whom have   few   where met
        'Who did few meet where?'

Other quantifiers seem to have an effect very similar to negation in these constructions in German. Accordingly, MNSC is only a subcase of the constraint MQSC, repeated below:

(52)   Quantifier induced Barrier (QUIB):
        The first node that dominates a quantifier, its restriction and its nuclear scope
        is a Quantifier-Induced Barrier (QUIB).

(53)   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.

---

[46]Since Korean allows long scrambling I don´t want to generalize the claim that scrambling is not reconstructed to all cases. I assume that for cases like (50c), for instance, we have to reconstruct long scrambling.

The question that arises now is whether the barrier inducing expressions are the same in Korean and German. This does not seem to be the case. However, I have not yet been able to come up with a good answer to the question of what characterises the class of barrier inducing expressions in Korean. There are some examples in Korean with a barrier inducing expression other than negation, namely *only, also* and *every*, cf. (55), (56), (57):[47]

(54)   a.   Minsu-man   Suna-lûl   po-ass-ta.
               Minsu-only   Suna-Acc   see-Past-Dec
               'Only Minsu saw Suna.'

         b.   Minsu-to   Suna-lûl   po-ass-ta.
               Minsu-also   Suna-Acc   see-Past-Dec
               'Minsu, too, saw Suna.'

(55)   a.   *   Minsu-man   nuku-lûl   po-ass-ni?
               Minsu-only   who-Acc   see-Past-Q
               'Who did only Minsu see?'

         b.   nuku-lûl$_i$ Minsu-man   t$_i$ po-ass-ni?
               who-Acc   Minsu-only   see-Past-Q
               'Who did only Minsu see?'

(56)   a.   *   Minsu-to   nuku-lûl   po-ass-ni?
               Minsu-also   who-Acc   see-Past-Q
               'Who did Minsu, too, see?'

         b.   nuku-lûl$_i$ Minsu-to   t$_i$ po-ass-ni?
               who-Acc   Minsu-also   see-Past-Q
               'Who did Minsu, too, see?'

---

[47]Moreover, Hoji´s (1985) restriction for Japanese comes to mind, where certain structures of the form (i) are ruled out:
       (i)   *[QP...[...WhP...]]
However, intuitions about Korean do not seem to be quite the same as Hoji´s in all cases. I will not discuss the matter here.

(57) a. ?? nukuna-ka   ônû kyosu-lûl chonkyôngha-ni?[48]

           everyone-Nom   which professor-Acc respect-Q

      b. [ônû kyosu-lûl]$_i$ nukuna-ka   t$_i$ chonkyôngha-ni?

          which professor-Acc everyone-Nom   respect-Q

      b'. 'For which x, x a professor: everyone respects x.'

Interestingly, genuine universal quantifiers (in contrast to definites) do not seem to be so easily able to induce a pair list reading in questions in Korean.[49] If universals are to be included in the set of barrier inducing expressions in Korean, too, the oddness of (57a) would thus follow from the MQSC plus general considerations. Moreover, the focusing elements *only* and *also* exhibit the familiar linearization effects. This shows that in Korean as well as in German, the barrier inducing expressions are not limited to negation. On the other hand, some quantificational elements clearly don't induce a barrier:

(58) a. taepupun-ûi   haksaeng-tûl-i ônû kyosu-lûl

       most-Gen   student-PL-Nom   which professor-Acc

       chonkyôngha-ni?

       respect-Q

      b. 'For which x, x a professor: most students respect x.'

---

[48](57a) is not well-formed. However, it seems slightly better than (55a) and (56a).

[49]In Suh (1990), it is claimed that a pair list reading is possible in Korean with the universal *motunsalam*. According to Shin-Sook Kim, my informant on Korean, *motunsalam* corresponds to *all* rather than *every*. Suh claims that the universal *nukuna* that is used in this dissertation is unsuitable, since it is more similar to free choice *any* than to *every*. Thus according to Suh, *nukuna* in questions is odd, similar to *any* in English, which cannot be free choice *any* either in questions.
I am not convinced by Suh's argumentation. Moreover, according to Shink-Sook Kim, *nukuna* is acceptable in questions, cf. (i):

    (i)   nukuna-ka   kû   cháek-ûl   ilk-ôss-ni?
          everyone-nom   that   book-accread-past-Q
          'Did everyone read that book?'

Since the status of *every* as a quantifier is much clearer than that of *all*, *nukuna* will be the universal quantifier used. The data do not correlate in all cases with Suh's judgements on the basis of *motunsalam*.

(59)   a.   Minsu-nûn   hangsang   nuku-lûl   p'ati-e
                Minsu-Top   always who-Acc   party-Dir
                teliko ka-ss-ni?
                take-Past-Q
                'Who did Minsu always take to the party?.'

       b.   Minsu-nûn   chachu nuku-lûl   p'ati-e
                Minsu-Top   often   who-Acc   party-Dir
                teliko ka-ss-ni?
                take-Past-Q
                'Who did Minsu often take to the party?.'

(60)   a.   Mira-ka   chachu ch'aek myôch'   kwôn-ûl
                Mira-Nom   often   book   how many   CL-Acc
                hakkyo-e   kachiko ka-ss-ni?
                school-Dir   take-Past-Q

       a'.   'For which number n: it was often the case that Mira took n books to
                school.'

       b.   Mira-ka   ch'aek myôch'   kwôn-ûl   chachu
                Mira-Nom   book   how many   CL-Acc   often
                hakkyo-e   kachiko ka-ss-ni?
                school-Dir   take-Past-Q

       b'.   'For which number n: there are n books which Mira often took to
                school.'

(60a) is grammatical, showing that *chachu* does not have a blocking effect on the movement of *myôch'*. Interestingly, there is an interpretational difference between a. and b., as indicated by the paraphrases. Linear order determines the "reading" of the *how many* phrase: (60a) only has the so-called referential reading, (60b) only a "non-referential" reading (see chapter 4 for more on the semantics of *how many*-phrases). Cf. also the semantic/pragmatic oddness of (61a).

(61)   a. ?#   Mira-ka   sakwa myôch'   kae-lûl chachu
                 Mira-Nom   apple how many   CL-Acc   often
                 môk-ôss-ni?
                 eat-Past-Q

       a'.   'For which number n: there are n apples which Mira often ate.'

b.	Mira-ka	chachu	sakwa	myôch'	kae-lûl
	Mira-Nom	often	apple	how many	CL-Acc
	môk-ôss-ni?				
	eat-Past-Q				
b'.	'For which number n: it is often the case that Mira ate n apples.'				

This concerns scope interaction between non-interrogative operators. See section 3.5 for some remarks on scope interaction of non-interrogative operators.

This section has shown that while in Korean as well as in German negation is not the only element inducing an intervention effect, and the MNSC needs to be extended for Korean, too, it is not the full class of quantified expressions that blocks LF movement. Observe in particular that the quantificational adverbs *always* and *often*, which according to definitions (52) and (53) are barrier inducing expressions, and which have a blocking effect in German, are not problematic interveners in Korean (examples (59) and (60)). In addition to negation, the focussing adverbs *only* and *also* and the universal *nukuna* are QUIB inducing expressions. Parametric variation thus comes in (concerning those languages that do observe the MQSC) via what constitutes the set of QUIB inducing expressions. This is maybe a bit unexpected: In chapter 2, the property that was held responsible for making an expression induce QUIBs was a semantic property (that of being a quantifier), which is not something we would expect to be subject to crosslinguistic variation. Hence it must be an aspect of the LF representation of a quantified expression which the MQSC is sensitive to, not just the semantic characterization whether or not we are dealing with a quantified expression. German and Korean seem to differ in what expressions have such an LF syntactic representation. At present, I have no idea what this aspect might be. Note that it would of course be possible to simply list the QUIB-building expressions for each language, but this does not seem very insightful. We would like to know which property characterizes these sets. I think that this problem had best be approached by more extensive research on other scrambling languages, which is more than I can do here. Note also that the MQSC need not be reformulated; it just needs to be fixed what expressions induce QUIBs in a given language.

3.5. Global perspective

We have found that LF *wh*-movement in Korean is constrained by the same principle as German. In fact, *wh*-movement in Korean is a much better illustration for the application of the MQSC, since in Korean, the range of *wh-in-situ* data is much wider. In German, the data are restricted to those few cases where a *wh*-expression may remain *in situ*, that is cases where S-structural *wh*-movement is taken care of by another expression. This results in some complexity, and the most straightforward cases cannot be examined directly. In Korean, we can do just that, since there is no requirement for S-structural movement. So Korean is an ideal test case for the MQSC, and indeed it looks as if the restriction were of a fairly general nature and able to cover Korean as well. Now why should it be that the MQSC extends so conveniently to Korean, a language unrelated to German and with respect to *wh*-movement completely different? English, for example, does not exhibit a corresponding restriction, cf. (62), which is supposed to be fairly good (Miriam Butt and Steve Abney, pers. comm.):

(62)   a.   Which children didn´t want to show which pictures to anybody?
       b.   Which children didn´t want to show anybody which pictures?

Korean and German are similar in that both languages have a relatively free word order. They have scrambling. So in both languages, it is possible to identify intended relative scope orderings to a large extent by S-structural linear order. Since it is possible to make the intended scope relations transparent, it is obligatory to do so. This is to my mind the intuitive insight that the MQSC captures.

English, as opposed to German and Korean, has a fairly restricted word order and thus has to be able to compensate for this at LF. So we would not expect a constraint like MQSC to hold for such a language without substantial modification.

I will not formally go beyond claiming that the MQSC holds for German and Korean and does not hold for English. Note, however, that what I have just sketched is very much reminiscent of Diesing´s (1992) proposal concerning the interpretation of bare plural subjects. With regard to stage level predicates, Diesing shows that the S-Structure position of a bare plural subject in German determines whether it is read generically or existentially. VP internal subjects receive an existential interpretation while subjects in SpecIP have a generic reading. According to Diesing, German

subjects can occur in either position at S-Structure. It is therefore possible to make the intended interpretation transparent at S-Structure, and apparently, interpretation is then fixed once and for all.

In English, on the other hand, subjects must appear in SpecIP at S-Structure because of Case assignment requirements. Accordingly, interpretation is only fixed at LF.

This idea is phrased in terms of an earliness constraint. Basically, bare plural subjects are subject to certain interpretational requirements. Following Pesetsky´s (1989) proposal, there is an Earliness Principle enforcing that these requirements must be fulfilled as early as possible in the derivation. In German, the requirements can be fulfilled at S-Structure, hence according to the Earliness Principle, they have to be. This is not possible in English, thus LF may "correct" S-Structure.

The conceptual similartiy to my suggestion is obvious. I believe that it ought to be possible to phrase my analysis in terms of the Earliness Principle as well. One would have to assume a requirement, expressed very much simplified as "relative scope must be marked", which would have to be met as early as possible: in German at S-Structure, in English at LF. This is only speculation, though, and has been included mainly to relate my proposal to Diesing´s, which I believe is very similar in spirit. Both express the conviction that German S-Structure must be to a large extent transparent with respect to intended interpretation, English S-Structure cannot be.

Note once more that obviously, my conclusion that the MQSC does not hold in English does not amount to the claim that there are no restrictions on scope interaction in English. See e.g. Liu (1990) for suggestions and an empirical survey that includes a number of different quantifier phrases. It is of course possible that ultimately, it will be useful to combine the MQSC with other restrictions proposed (making reference to syntactic configuration and the nature of the quantifiers involved, compare e.g. Liu (1990) and Aoun & Li (1993)). For the present, however, it is more useful to separate it.

In sum, I believe that the fact that we could extend a restriction designed for German so easily to Korean reflects a deeper similarity between the two languages - a similarity that might be seen to cumulate in the availability of scrambling. Since the two languages are unrelated, this is a fairly strong confirmation that a restriction like the MQSC is needed.

These considerations lead one to expect that the MQSC should be of a more general nature. On the one hand, MQSC effects should be observable in other

scrambling languages as well. Section 3.5.2. is concerned with that. Section 3.5.1. consists of some remarks on scope interaction in Korean declaratives. Both sections are somewhat speculative in nature, because they deal with issues that would really require much more careful consideration.

3.5.1. Scope interaction in Korean declaratives

The above remarks about the status of the MQSC imply that the MQSC make some prediction about scope interaction in declarative contexts in Korean. It ought to be stressed once more that scope interaction in declaratives is not the issue examined in this dissertation. I will offer some data that indicate that the MQSC restricts QR. Note that the question this section deals with is not whether the MQSC explains scope interaction in Korean, but rather, whether the restrictions on scope taking possibilities predicted by the MQSC are observed. Remember that the QUIB-inducing expressions we have found in Korean are so far limited to negation, *only, also* and *nukuna*. Hence the prediction is that QR across these expressions is prohibited.

Suh (1990) examines the interaction of universals and negation. She observes that in sentences containing a universal and an NPI, linear order unambiguously determines relative scope. This is exemplified by the following data:

(63)   a.   ônû haksaeng-ina   amu ch'aek-to   ilk-chi   anh-ass-ta.
             every student   any book   read-CHI   not do-Past-Dec
             'Every student didn't read any book.'
             ($\forall > \neg\exists$)
       b.   amu ch'aek-to$_i$ ônû haksaeng-ina   t$_i$ ilk-chi
             any book   every student   read-CHI
             anh-ass-ta.
             not do-Past-Dec
             'Any book$_i$, every student didn't read t$_i$.'
             ($\neg\exists > \forall$)

(64)   a.   nukuna-ka   amu kôs-to   po-chi anh-ass-ta.
             everyone-Nom   anything   see-CHI   do not-Past-Dec
             'Everyone didn't see anything.'
             ($\forall > \neg\exists$)

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b. amu kôs-to_i   nukuna-ka   t_i   po-chi anh-ass-ta.

anything   everyone-Nom   see-CHI   do not-Past-Dec

'Anything_i, everyone didn't see t_i.'

($\neg \exists > \forall$)

In each case, the possible interpretations are indicated below the example. All sentences are unambiguous, with relative scope corresponding to linear order. This is predicted by the MQSC. Note that this is further evidence that short quantifier scrambling (including *wh*-scrambling) may not be reconstructed.

In contrast to these data with NPIs, (65) with a simple sentential negation is ambiguous:[50]

(65) a. ta   cha-chi anh-ass-ta.

all   sleep-CHI   not do-Past-Dec

b. For every x: x did not sleep.

c. It is not the case that all slept.

This, too, follows straightforwardly from my analysis: negation can be adjoined to a position below or above *ta* ('all'), thereby yielding LF representations for both readings.

The following data provide further illustration of the same facts:

(66) Suna-ka   nuku-eke-na amu kôs-to   chuchi anh-ass-ta.

Suna-nom   everyone-dat anything   give-CHI   not do-Past-Dec

'Suna gave everyone nothing.'

($\forall > \neg \exists$)

---

[50]Here I depart again from Suh´s claims. She judges sentences with a universal subject and a sentential negation unambiguous with a wide scope reading of the universal. Her intuitions are not shared by Shin-Sook Kim. Moreover, she provides her own counterexample on page 138, footnote 7.

(67) Suna-ka   nuku-eke-na kû   ilon-ûl sôlmyôngha-chi
     Suna-nom   everyone-dat that theory-acc   explain-CHI
     anh-ass-ta.
     not do-Past-Dec
     'Suna didn´t explain that theory to everyone'
     (∀ > ¬, ¬ > ∀)

(68) amuto   nukuna-lûl   manna-chi   anh-ass-ta.
     anyoneeveryone-acc meet-CHI   not do-Past-Dec
     'Nobody met everyone.'
     (¬∃ > ∀)

In addition to these data, the MQSC applied to QR makes predictions about the interaction of *only* and negation (see (69)) and *only* and *nukuna* (compare (70)).

(69) a. ? amuto Chôlsu-man-ûl   cháeyongha-chi   anh-ass-ta.
            anyone Chôlsu-only-acc   employ-CHI   not do-Past-Dec
            'Nobody employed only Chôlsu.'
     b.   Chôlsu-man-ûl   amuto   po-chi anh-ass-ta.
            Chôlsu-only-acc   anyonesee-CHI   not do-Past-Dec
            'Only Chôlsu was not seen by anyone. '

(70) a.   nukuna-ka   Chôlsu-man-ûl   po-ass-ta.
            everyone-nom Chôlsu-only-acc   see-Past-Dec
            'Everyone saw Chôlsu and no one else.'
     b.   Chôlsu-man-ûl   nukuna-ka   po-ass-ta.
            Chôlsu-only-acc   everyone-nom see-Past-Dec
            'Only Chôlsu was seen by everyone.'

In each case, the surface linear order corresponds to the only possible scope order. Thus the predictions that the MQSC makes applied to these data are very satisfactory.

Of course, what I have said so far cannot be the whole story. Just to give an example, consider (71) and (72):

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(71) nukunka-ka   ônû kyosuna   chonkyôngha-n-ta.
      someone-Nomevery professor   respect-Pres-Dec
      'Someone respects every professor.'
      (unambiguous: someone > every professor)

(72) ônû   kyosuna$_i$ nukunka-ka   t$_i$ chonkyôngha-n-ta.
      every professor   someone-Nomrespect-Pres-Dec
      'Every professor$_i$, someone respects t$_i$.'
      (ambiguous: someone > every professor, every professor > someone)

In contrast to the examples looked at so far, these data involve indefinites. The effect that scrambling has here (in contrast to all data looked at so far) is not predicted by the MQSC. Compare Suh (1990) on the interaction of indefinites and other quantifiers (most notably universals). This illustrates once more that the MQSC is not intended as a replacement of other proposals but as a supplement. I will not make any attempt to explain (71) and (72).[51]

3.5.2. Other languages: Hindi/Urdu, Turkish

Data that are reminiscent of the Korean contrasts from section 3.2 are found in the scrambling languages Hindi/Urdu and Turkish.

    I owe the Hindi/Urdu data and judgements to Miriam Butt. Hindi/Urdu, like Korean, is a language without obligatory *wh*-movement and with optional scrambling of also *wh*-phrases. This is illustrated by (73):

(73) a.   Naadyaa-ne   kyaa   paRhaa   hai
            Nadya-Erg   what-Nom   read-Perf.M   is
      b.   kyaa   Naadyaa-ne paRhaa   hai
            what-Nom   Nadya-Erg   read-Perf.M   is

            'What did Nadya read?'

---

[51]One reason is that indefinites do not generally induce QUIBs, hence are not predicted to have a blocking effect. The other is that indefinites differ in their scope taking possibilities from quantifiers, hence it would be naive to suggest to simply QR them and expect them to obey the usual restrictions for QR. Compare e.g. Abusch (1994) on the latter issue.

(74) is an example for sentence negation. As in Korean, a negative quantifier is expressed with NPI plus negation ((75)).

(74) Naadyaa-ne vo kitaab nahiiN paRhii
Nadya-Erg that book-Nom not read-Perf.S
'Nadya didn't read that book.'

(75) a. koi nahiiN vo kitaab paRhaa
anyonenot that book read-Perf.M
'No one read that book.'
b. vo kitaab koi nahiiN paRhaa
that book anyonenot read-Perf.M
'That book, no one read.'

An interesting difference is that the negation occurs immediately after the NPI in Hindi/Urdu, while it is incorporated into the finite verb in Korean and thus has a fixed S-Structure position. Now let us consider the interaction of negation and *wh*-phrases. The following data have been kept as closely as possible to the data in section 3.2.

The basic word order NPI-subject - *wh*-object is ungrammatical, while the scrambled version is well-formed. The same holds for adverbial *wh*-phrases that normally occur after the subject ((76) and (77)).

(76) a. ?? koi nahiiN kyaa paRhaa
anyonenot what read-Perf.M
b. kyaa koi nahiiN paRhaa
what anyonenot read-Perf.M

'What did no one read?'

(77) a. ?? koi nahiiN kahaaN gayaa
anyonenot where go-Perf.M
b. kahaaN koi nahiiN gayaa
where anyonenot go-Perf.M

'Where did no one go?'

A *wh*-subject before an NPI object is fine; here, scrambling is impossible:

(78)   a.   kis-ne   kisi-ko nahiiN inviitashen   Daalaa
               who-Erg   any-Acc   not   invitation   put-Perf.M
       b.   * kisi-ko   nahiiN kis-ne inviitashen   Daalaa
               any-Acc   not   who-Erg   invitation   put-Perf.M

       'Who didn't invite anyone?'

In (79) and (80), on the other hand, scrambling rescues the sentences. In (79), *kahaaN* 'where' has to be scrambled to occur before the NPI, in (80) only configurations with both *wh*-phrases before the NPI are grammatical.

(79)   a.   ?? naadyaa   kisi-ko nahiiN kahaaN   milii
                Nadya-Erg   any-Acc   not   where   meet-
Perf.F
       b.   naadyaa   kahaaN   kisi-ko nahiiN milii
               Nadya-Erg   where   any-Acc   not   meet-
Perf.F
       c.   kahaaN   naadyaa   kisi-ko nahiiN milii
               where   Nadya-Erg   any-Acc   not   meet-
Perf.F

       'Where did Nadya meet no one?'

(80)   a.   ?? koi   nahiiN kis-ko   kahaaN   milaa
                anyonenot   who-Acc   where   meet-Perf.M
       b.   ?? kis-ko koi   nahiiN   kahaaN   milaa
                who-Acc   anyonenot   where   meet-Perf.M
       c.   ?   kahaaN   koi   nahiiN kis-ko   milaa
                where anyonenot   who-Acc   meet-Perf.M
       d.   kis-ko kahaaN   koi   nahiiN milaa
               who-Acc   where anyonenot   meet-Perf.M
       e.   kahaaN   kis-ko koi   nahiiN milaa
               where who-Acc   anyonenot   meet-Perf.M

'Where did no one meet whom?'

These data look very similar to the Korean data we have seen in this chapter. Whenever a *wh*-phrase occurs linearly behind an NPI plus negation (and would thus have to be moved across them at LF), the sentence is ungrammatical. The most important difference is the S-Structural position of the negation. In Hindi/Urdu, it seems as though a less abstract analysis of negation were desirable. Various possibilities are conceivable of what exactly this analysis should be. The choice between them will depend on issues I will not discuss here. In any case, it is obvious that all ungrammatical sentences can easily be analysed as MNSC violations.

Hindi/Urdu, like German, has a scope marking construction. An example is given in (81).

(81) jaun   kyaa   soctaa hai   meri   kis-se   baat   karegii?
      John   what   thinks is   Mary   who-with   talk   Fut-Fem-Sg
      'Who does John think Mary will talk to?'

Since Hindi/Urdu is *wh-in-situ*, neither the scope marker *kyaa* 'what' nor the *wh*-phrase are overtly moved. Now consider the data in (82) with a negation in the matrix clause of the scope marking construction:

(82) a. * koi   nahiiN kyaa   soctaa hai   ki kon vahaaN thaa
                anybody   not   what   thinks is   that who there was
      b. * kyaa   koi   nahiiN soctaa hai   ki kon vahaaN thaa
                what   anybody   not   thinks is   that who there was

      `Who does nobody think was there?'

It is not surprising that (82a) is bad, given the other *wh-in-situ* data above. It is more interesting that (82b) is bad, too. Under the analysis for scope marking presented in chapter 2, this would be expected: the *wh*-phrase in the embedded clause would be moved into the matrix SpecC at LF. Negation would block this movement, and the sentence would be excluded in the same way as the corresponding German scope marking construction. However, Dayal (1994) argues convincingly against such an analysis for Hindi/Urdu, and for what she calls an indirect dependency analysis. Her

arguments are accepted in Beck & Berman (1996), acknowledging crucial empirical differences between Hindi/Urdu and German, for example the (im-)possibility of construing scope marking with a *whether*-question and restrictions on the predicates that can participate in scope marking. Compare Dayal (1994) and Beck & Berman (1996) for discussion. Dayal´s account does not involve movement of the *wh*-phrase in the embedded clause into the matrix. Very roughly, she proposes that the construction involves two local *wh*-dependencies, one in the matrix clause with *kyaa* and one in the embedded clause with the *wh*-phrase down there. The relation between the two is an indirect one, and consists of the entire embedded sentence serving as a restriction to *kyaa*. See Dayal (1994) for the details of the proposal. Although we do not have long LF movement in this analysis, I believe that the oddness of (82b) can still be analysed as an MNSC effect, given Dayal´s analysis. One would have to assume (contrary to Dayal´s assumptions) that the embedded clause has to move at LF to become a sister of *kyaa* in order to be its restriction. This movement would have to cross the negation and induce an MNSC violation. I think this would preserve the idea underlying Dayal´s proposal. I will leave a proper analysis for another opportunity, though.

Another language that shows apparent MNSC effects is Turkish. I am greatly indebted to Beryl Hoffman for the following data and judgements. In Turkish, the negation is incorporated into the finite verb, as in Korean:

(83) Can   Jaklin'i   gör-me-di.
      John(nom)   Jaklin-Acc   see-Neg-Past.
      `John didn t see Jaklin.'

(84a) and (84b) show how a negative quantifier like *nobody* is expressed:

(84)   a.   Can   kimseyi   görmedi.
             John   anyone-Acc   see-Neg-Past.
       b.   ?Kimseyi   Can   görmedi.
             anyone-Acc John   see-Neg-Past.

             `John didn t see anyone.'

In this case, SOV order is a bit better than OSV. In (85) with an NPI subject, both

linearizations are fine.

(85) a.   kimse   Jaklin'i görmedi.

            anyoneJaklin-Acc   see-neg-past.

     b.   Jaklin'i kimse görmedi.

            Jaklin-Acc   anyonesee-neg-past.

         'Noone saw Jaklin.'

Now let´s consider the interaction of *wh*-phrases with negation. Normally, *wh*-phrases in Turkish are attracted to the immediately preverbal position. This requirement seem to be fairly strong, as the ungrammaticality of (87) shows:

(86) a.   kim   Can'i   gördü?

           who   John-Acc   see-Past

     b.   Can'i   kim   gördü?

           John-Acc   who   saw

     c.   *Can'i gördü kim?

           John-Acc   saw   who

     d.   kim   gördü   Can'i?

           who   see-Past   John-Acc

         'Who saw John?'

(87) *   neyi   Can gördü?

           what-acc   John saw

           'What did John see?'

Subject *kim* can occur *in situ* or in the immediately preverbal position. It's very hard to scramble an object *wh*-word like *neyi* out of its *in situ* position.

     Interestingly, in the interaction with NPIs, the requirement must be dropped.

(88) a.   Parti-de   kim   kimseyi   görmedi?

           Party-loc   who   anyone-Acc   see-Neg-Past?

     b. ?? Parti-de   kimseyi   kim   görmedi?

           Party-Loc   anyone-Acc   who   see-neg-past.

         'Who didn't see anyone at the party?'

(89) a. * Kimse kimi   görmedi?
              anyonewho-Acc   see-Neg-Past?

      b.   Kimi   kimse   görmedi?
             Who-Acc   anyonesee-Neg-Past

             Whom did nobody see?

Unexpectedly from the usual behaviour of *wh*-phrases, (89a) is bad and (89b) is okay. (90) and (91) are data with double objects and an adjunct *wh*-phrase:

(90) a. * Can   kimse-ye   hangi resim-ler-i   göster-me-di?
             John   anyone-Dat   which picture-Pl-Acc   show-Neg-Past

      b.   Can   hangi resim-ler-i   kimse-ye   göster-me-di?
             John   which picture-Pl-Acc   anyone-Dat   show-Neg-Past

             `Which pictures didn't John show anyone?'

(91) a. * Kimse nereye git-me-di?
             anyonewhere   go-Neg-Past

      b.   nereye kimse   git-me-di?
             Where anyonego-Neg-Past

             `Where did nobody go?'

Although the adjunct would normally occur preverbally, (91a) is bad. The obvious generalization is that in Turkish, too, we cannot have a *wh*-phrase linearly behind an NPI. In this respect, Turkish behaves just like Korean, and very similar to Hindi/Urdu.

Again, I do not claim that I have a complete analysis of these facts. I have left out a number of interesting issues (for example, NPIs seem to be attracted to the preverbal position, too, and I have not discussed linearizations involving postverbal positions at all). However, it seems fair to say that the data are likely to be subjectable to an analysis in terms of the MNSC.

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3.6. Conclusion of chapter 3

This chapter has shown that the intervention effects discussed in chapter 2 are not specific to German. Very similar effects can be observed in other languages that are unrelated to German, and which differ greatly in how they handle *wh*-constructions. A detailed analysis has been provided for Korean.

We have also seen that there is variation in what expressions induce a barrier for LF movement. Negation is always among the barrier inducing expressions, but it is not the only one. It is a desideratum for future work to find a good characterization of which expressions induce LF barriers, including room for parametric variation.

I believe that it is not an accident that we could extend a restriction designed for German so easily to Korean, and potentially to Hindi/Urdu and Turkish, but that this reflects a deeper similarity between these languages. The supposition is that the similarity is the availability of scrambling for overt marking of intended scope relations. Since the languages are unrelated, this is a fairly strong argument for the MQSC.

If my suggestion is correct that MQSC is something in the nature of a transparency requirement, this gives one a quite different perspective on scrambling from Saito's. Scrambling has the semantic function of making intended scope relations visible, and it is by no means vacuous. It thus becomes clear why my analysis is incompatible with the reconstruction of scrambling: the two views of scrambling are in principle incompatible.

4. Negative islands

4.1. Introduction to chapter 4

The empirical focus of this chapter is on data like (1) and (2) below:

(1)   Wieviele   Hunde hat   Karl   nicht   gefüttert?
        How many   dogs   has   Karl   not   fed
        'How many dogs didn´t Karl feed?'

(2)   Warum glaubt Luise   nicht, daß   Karl   entlassen   wurde?
        why   believes   Luise not   that   Karl   fired   was
        Why doesn´t Luise believe that Karl was fired?

It has been observed (e.g. Rizzi (1990) and others) that (1) only has a reading that could be paraphrased as (3a), but not the one in (3b).

(3)   a.   For which n: there are n dogs that Karl didn´t feed.
        b.   For which n: It is not the case that Karl fed n dogs.

In (2), the *wh*-phrase *why* can only be understood as part of the matrix clause, that is, it is impossible to understand (2) as a long extraction.

The non-available readings will also be referred to as the *inner* readings (cf. Ross (1984)). Various explanations have been suggested for this phenomenon, ranging from syntactic (Rizzi (1990)) to semantic (Rullmann (1995), Szabolsci and Zwarts (1993)) and pragmatic (Kroch (1989)).

Rizzi (1990) and others have analysed these effects as island effects, the island being induced by the negation. Accordingly, I will refer to (1), (2) and related data as negative island data.

I will argue in this chapter that negative island data ought to be analysed as MNSC effects. That is, I will argue that the Logical Forms that would lead to interpretations like (3b) (and the LFs of other interpretations that seem to be impossible) are correctly ruled out by the MNSC. My aim is to show that the MNSC in fact gives a complete explanation for the negative island effect. This means that

negative islands (at least of the type discussed here) are not islands at S-Structure at all. Negation is a barrier at LF and only at LF. Since the MNSC has been argued for on the basis of independent empirical evidence, this explanation is very economical.

The structure of the chapter is somewhat unorthodox: In 4.2. I will show why the MNSC should be able to account for the negative island effect. It will be argued on the basis of German data that the *wh*-phrases affected by a negation are all of a kind that involves reconstruction for semantic reasons. If reconstruction is a process that takes place in the syntax of Logical Form, the relevant LFs are structurally identical to LFs in which upward LF movement across a negation has taken place. This is just what is ruled out by the MNSC. So 4.2. argues that with the MNSC we already have everything we need to explain the negative island effect.

Section 4.3. discusses the negative island effect in Korean. Interestingly, the effect itself (the absence of certain readings) is exactly the same as in German, although Korean is a *wh*-in-situ language, and the respective S-Structures look completely different. This makes it plausible that the level at which to look for an explanation is indeed LF. In addition to the classical negative island data, the MNSC makes correct predictions about a set of data that involve long scrambling across a negation.

These sections come first because they relate most closely to the preceding chapters.

Section 4.4. is a brief discussion of negative islands in the literature, up to Rullmann (1995). I will explain why I am dissatisfied with various accounts offered for this effect.

Rullmann´s (1995) analysis, which is based on a substantial modification of a Karttunen semantics for interrogatives, is discussed separately in section 4.5. The reason is that I consider his by far the most attractive and elaborate proposal. Arguments against his analysis will be presented, but require a certain amount of semantic reasoning. The discussion will include issues of a more general relevance, like the status of exhaustivity in questions. This touches the interrogative semantics I have assumed throughout the dissertation. The Hamblin/Karttunen system I have adopted will be defended against criticisms and counterproposals, in particular Rullmann´s (1995) and Groenendijk & Stokhof´s (1982, 1984).

The conclusion (in section 4.6.) will be that there is still a need for a motivated explanation for the negative island effect, and that the MNSC might be it.

Section 4.3. of this chapter contains mainly material from Beck & Kim (1996). Section 4.5.2 stems from Beck & Rullmann (1996), with only very minor alterations.

4.2. The MNSC and negative islands

In this section, I will first give an empirical survey of the negative island effect in German. That is, I will show what types of *wh*-phrases seem to be affected in their extractability by a negation (section 4.2.1.). These are *how many*-phrases, degree *wh*-phrases, frequency *wh*-phrases and *why*. In section 4.2.2., I will present a semantic analysis of *wieviel* ('how many') questions and show that the MNSC makes correct predictions about their interpretations in negative island contexts. It excludes certain syntactic constellations derived via reconstruction that would lead to unavailable readings. I will broaden the empirical scope in section 4.2.3., looking at the other cases that exhibit a negative island effect, e.g. *why* questions. I will argue that the MNSC has exactly the desired effect for negative island data. Finally, in section 4.2.4. I give a summary of the main results and discuss an open question that I have not yet been able to resolve, namely whether the negative island effect is more general and an MQSC effect rather than an MNSC effect.

4.2.1. Negative islands in German

I will concentrate here on negation and negative quantifiers in interrogatives. A remark on topicalization will be made in section 4.2.4.

There is a general effect of negation in interrogative sentences that I assume is pragmatic in nature. Compare (4a) and (4b):

(4)   a.   Wo   ist   Goethe   gestorben?
            where is   Goethe died
            'Where did Goethe die?'
        b.   Wo   ist   Goethe   nicht gestorben?
            where is   Goethe not   died
            'Where didn't Goethe die?'

An affirmative question like (4a) typically has a very restricted set of true answers (exactly one in this case). Again typically, the corresponding negated question has a

huge number of true answers, which nobody is normally likely to be interested in. This apparently makes many negated questions pragmatically odd. Accordingly, most of them improve significantly in a good context. This is illustrated in (5).

(5)   Wen   verdächtigt   die   Polizei   nicht?
        whom   suspects   the   police   not
        'Who don't the police suspect?'

(5) sounds odd in isolation. If the number of potential suspects is severely restricted by context, however (imagine a murder in an isolated country house, for which only 5 people could possibly be responsible), the sentence is acceptable.

I will try to ignore this pragmatic effect in what follows and attempt to find out whether there is an additional effect of negation in interrogative sentences that cannot be so easily explained. Not surprisingly, this question will be answered positively, in accordance with the recent literature.

Let´s consider argument *wh*-phrases first:

(6)   a.   Welche   Hunde hat   Karl   nicht   gefüttert?
                which dogs   has   Karl   not   fed
                'Which dogs didn´t Karl feed?'
        b.   Wieviele   Hunde hat   Karl   nicht   gefüttert?
                how many   dogs   has   Karl   not   fed
                'How many dogs didn´t Karl feed?'
        c.   Wessen   Hunde hat   niemand   gefüttert?
                which dogs   has   nobody   fed
                'Whose dogs did nobody feed?'
        d.   Wem   ist   niemand   begegnet?
                who(dat)   is   nobody   met
                'Whom did nobody meet?'

All these sentences are grammatical. However, I agree with the frequently made observation that (6b) has only one of the two theoretically possible readings in (7), namely (7a) (compare e.g. Frampton (1990), Heim (1992)):[52]

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[52]The difference between the two readings is not quite obvious. I will provide an example for convenience: suppose there are 5 dogs altogether; Karl has fed 3 of them, but he has not fed the other two. If someone asked (6b), the only possible true answer to the question would be "two", meaning: there are two dogs that Karl hasn´t fed. It would not be possible to truthfully answer "four", meaning:

(7)   a.   For which n: there are n dogs that Karl didn´t feed.

        b.   For which n: It is not the case that Karl fed n dogs.

So as far as I can see, *how many*-phrases are affected by a negation, and are in fact the only type of argument *wh*-phrase that is so affected. Let´s now turn to adjuncts and adverbials:

(8)   a.

Wo	würde	dieses	Jahr	niemand		Urlaub	machen?
where	would	this	year	nobody		vacation	make

'Where would nobody go on vacation this year?'

        b.

Wann	hat	Otto	das	Geschirr		nicht	gespült?
when	has	Otto	the	dishes		not	cleaned

'When did Otto not do the dishes?'

        c.

Wohin		ist	Karl	nicht	mitgegangen?
where (dir)		is	Karl	not	come along

'Where didn´t Karl come along?'

        d. (?)

Womit		ist	Graf	Eutin	nicht	umgebracht	worden?
what with		is	duke	Eutin	not	killed	been

'What has duke Eutin not been killed with?'

(9)   a. (?)

Wie	wurden		die	Eier	nicht	zubereitet?
how	were		the	eggs	not	cooked

'How weren´t the eggs cooked?'

        b. ?

Wie	hat	Karl	sich	nicht	benommen?
how	has	Karl	refl.	not	behaved

'How didn´t Karl behave?'

        c.

Wie	sollte		man	ein	Papier	nicht	schreiben?
how	should	one	a	paper		not	write

'How shouldn´t you write a paper?'

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it is not the case that Karl has fed four dogs. This should be possible if (6b) had reading (7b) in addition to (7a).

(10) a. * Wie   gut   spielt Thilo nicht Tischtennis?[53]
              how   well   plays   Thilo not   table tennis
              'How good a table tennis player isn´t Thilo?'

      b. ?? Wie   gern   hört   Karl   nicht Musik?
              how   gladly listens Karl   not   music
              'How much doesn´t Karl like listening to music?'

      c.   Wie   oft   war   niemand   verfügbar?
              how   often   was   nobody   available
              'How often was nobody available?'

      d.   Warum hat   niemand   Kartoffelsalat mitgebracht?
              why   has   nobody   potato salad   brought
              'Why didn´t anybody bring potato salad?'

I think that local, temporal, instrumental adverbials etc. are fine in negative questions as long as the question is contextually restricted, so that the negated question makes sense. *How*-questions ((9)) are a bit difficult to judge. Some certainly sound funny ((9b)), but I agree with Kiss (1991) that well-formed examples like (9a) and (9c) can be found. I don´t know why *how*-questions should be worse than other adjunct *wh*s, but I am inclined to think that they are not ungrammatical. A tentative explanation for their lessened acceptablity would be that they are more difficult to d-link: *how* denotes (presumably) a quantifier over predicate modifiers. What ought to be contextually provided is thus a set of predicate modifiers - a fairly complex semantic object, which is not generally around as a set of alternatives in discourse.

(10a)-(10d) are to my judgement quite different in nature. I believe that here, as in the case of *how-many*-questions, we have a genuine negative island effect. Degree questions with manner adverbials are very bad, and not rescueable by a good context. Degree questions with frequency adverbials, like *how many*-questions, have only one of two potential readings. For example (10c) can only mean (11a), not (11b):

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[53]Marga Reis and Tilman N. Höhle have pointed out to me (pers. comm.) that examples (10a,b) as well as several others to come later are what is traditionally called exclamatives. Although I will not address the question of what exactly exclamatives are, nor provide an analysis, I think that using these examples is perfectly legitimate. I am convinced that these "exclamatives" share with ordinary interrogatives the same basic question semantics - that is to say, additional semantic/pragmatic properties they might have ought to be derived on the basis of this underlying question meaning. Since this is what counts for the present concerns, I use such examples without further comment.

(11)　a.　　For which n: n times there was nobody available.

　　　b.　　For which n: There is nobody who was available n times.

The same holds for *why*-questions. (10d) can only mean (12a).

(12)　a.　　What is the reason for the fact that nobody has brought potato salad?

　　　b.　　For which reason: nobody who has brought potato salad has brought potato salad for that reason.

I think that if the pragmatic effect of negation in interrogatives is abstracted away from, the types of *wh*-phrases discussed so far (*how many*, degree, frequency and *why*) are in fact the only ones that <u>seem</u> to be affected by a negation when extracted across it at S-structure (this will be explained here as a reconstruction effect). In German, good examples of S-structural extraction across a negation can be found for all other types of *wh*-phrases. The negative island effect lies in the unavailablity of a semantically possible reading (the inner reading), which will turn out to be a reading in which part of the *wh*-phrase would have narrow scope with respect to the negation.

4.2.2. *wieviel (how many)* **and negation**

In this section, I will relate the availability or unavailability of certain readings of *how many*-questions in negative island contexts to the MNSC. The effect will be that those readings are excluded that would necessitate reconstruction of part of the *how many*-phrase into the scope of negation. That it is this kind of reconstruction that is responsible for the negative island effect with *how many*-questions has to my knowledge first been suggested by Irene Heim (see Heim (1992)).

　　　As we have seen, the sentence in (13) intuitively has the reading paraphrased in (14a), but lacks reading (14b).

(13)　Wieviele　　Hunde hat　Karl　nicht　gefüttert?
　　　how many　　dogs　　　has　Karl　not　　fed
　　　'How many dogs didn´t Karl feed?'

(14)　a.　　For which n: There are n dogs that Karl hasn't fed.

b. # For which n: It is not the case that Karl has fed n dogs.[54]

Reading (14a) is what is usually called the referential reading of the *wieviel*-phrase, while (14b) is the so-called non-referential reading (see e.g. Rizzi 1991). The unavailability of reading (14b) is what I will call the negative island effect exhibited by (13).

In (15) I have given the Hamblin/Karttunen denotations of readings (14a) and (14b) respectively.[55]

(15)   a. $\lambda p \exists n[R(w)(n) \ \& \ p= \lambda w'[\exists \mathbf{X}[\mathbf{dogs'_{w'}(X)} \ \& \ \mathbf{|X|=n} \ \& \ \neg[\text{fed'}_{w'}(k,X)]]]]$

        b. # $\lambda p \exists n[R(w)(n) \ \& \ p= \lambda w'[\neg \exists \mathbf{X}[\mathbf{dogs'_{w'}(X)} \ \& \ \mathbf{|X|=n} \ \& \ [\text{fed'}_{w'}(k,X)]]]]$

Before looking at these readings in more detail, I will introduce some semantic properties of *wieviel*-phrases using the simpler example (16).

It has been observed that *how many* phrases are semantically more complex than, for instance, *which* phrases, in that they involve two independent scope bearing elements (see e.g. Heim (1992), Stechow (1993b), Cresti (1995), Rullmann (1995); in this they are similar to the *was für*-phrases discussed in chapter 2). The semantics I will assume for (16) is given in (17):

(16)   Wieviele   Hunde hat   Karl   gefüttert?
        How many   dogs   has   Karl   fed
        'How many dogs did Karl feed?'

(17)   a.   For which n: Karl fed n dogs.

        b. $\lambda p \exists n[R(w)(n) \ \& \ p= \lambda w'[\exists \mathbf{X}[\mathbf{dogs'_{w'}(X)} \ \& \ \mathbf{|X|=n} \ \& \ [\text{fed'}_{w'}(k,X)]]]]$

(17b) denotes a set of propositions of the form "Karl fed n dogs". In a Hamblin/Karttunen semantics, this corresponds to the interpretation "For which n: Karl fed n dogs", which is the intuitive meaning of (16). The semantically interrogative part "for which n" has to be separated from the indefinite part "n dogs". The indefinite part occurs within the scope of the interrogative operator, while the interrogative part does not. Since the interrogative operator is associated with the C^0 position and the indefinite part occurs above that at S-Structure, this separation is

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done via reconstruction. This will be called semantically motivated reconstruction (as opposed to reconstruction motivated by binding).

Suppose the expression "dogs(X) ∧ |X|=n" which occurs in (17b) within the scope of the interrogative operator were interpreted outside the scope of that operator, as interrogative *wh*-phrases are. That would give us the interpretation denoted by the formula (18),

(18)   λp∃n[R(w)(n) & **∃X[dogs'_w(X) & |X|=n** & p= λw'[fed'_{w'}(k,X)]]]

which denotes a set of propositions of the form "Karl fed X", where X are dogs and the set X has some cardinality. In the Karttunen system, that corresponds to the question *Which dogs did Karl feed?* - which is clearly not the desired interpretation. So, in order to obtain the interpretation we want, part of the *wh*-phrase has to be interpreted in a position lower than its S-structure position, in other words, has to be reconstructed. The term reconstruction will be used for the phenomenon that the semantic scope of an expression is smaller than its syntactic c-command domain. This is neutral with respect to how reconstruction actually comes about.

Rullmann and Cresti introduce a type raising mechanism for this reconstruction process. Essentially, they suggest that the LF structure for (16) is interpreted as indicated in (19), translating a trace of the *wh*-phrase with an NP-type variable (but see Cresti (1995) and Rullmann (1995) for details and discussion).

(19)

$$\lambda p\exists n'[R(w)(n') \ \& \ \lambda n[\ \lambda\wp \ [p=\lambda w'[\ \wp(w')(\ \lambda w\lambda x[fed_w(karl,x)])]]$$
$$(\lambda w\lambda Q\exists X[dogs_w(X) \ \&card(X)=n \ \& \ Q(w)(X)])](n')]$$

CP

wieviele $_i$
$\lambda Q\exists n'[R(w)(n') \ \& \ Q(n')]$

$\lambda n[\lambda\wp \ [p=\lambda w'[\ \wp(w')(\ \lambda w\lambda x[fed_w(karl,x)])]]$
$(\lambda w\lambda Q\exists X[dogs_w(X) \ \&card(X)=n \ \& \ Q(w)(X)])]$

CP

$[t_i^{LF} \ Hunde]_k$
$\lambda Q\exists X[dogs_w(X)$
$\& \ card(X)=n$
$\& \ Q(w)(X)]$

$\lambda\wp \ [p=\lambda w'[\ \wp(w')(\ \lambda w\lambda x[fed_w(karl,x)])]]$

C'

C^0
$\lambda q[p=q]$

$\lambda w'[\ \wp(w')(\ \lambda w\lambda x[fed_w(karl,x)])]$

IP

t'_k
$\wp$

IP

Karl hat t_k gefüttert
$\lambda x[fed_w(karl,x)]$
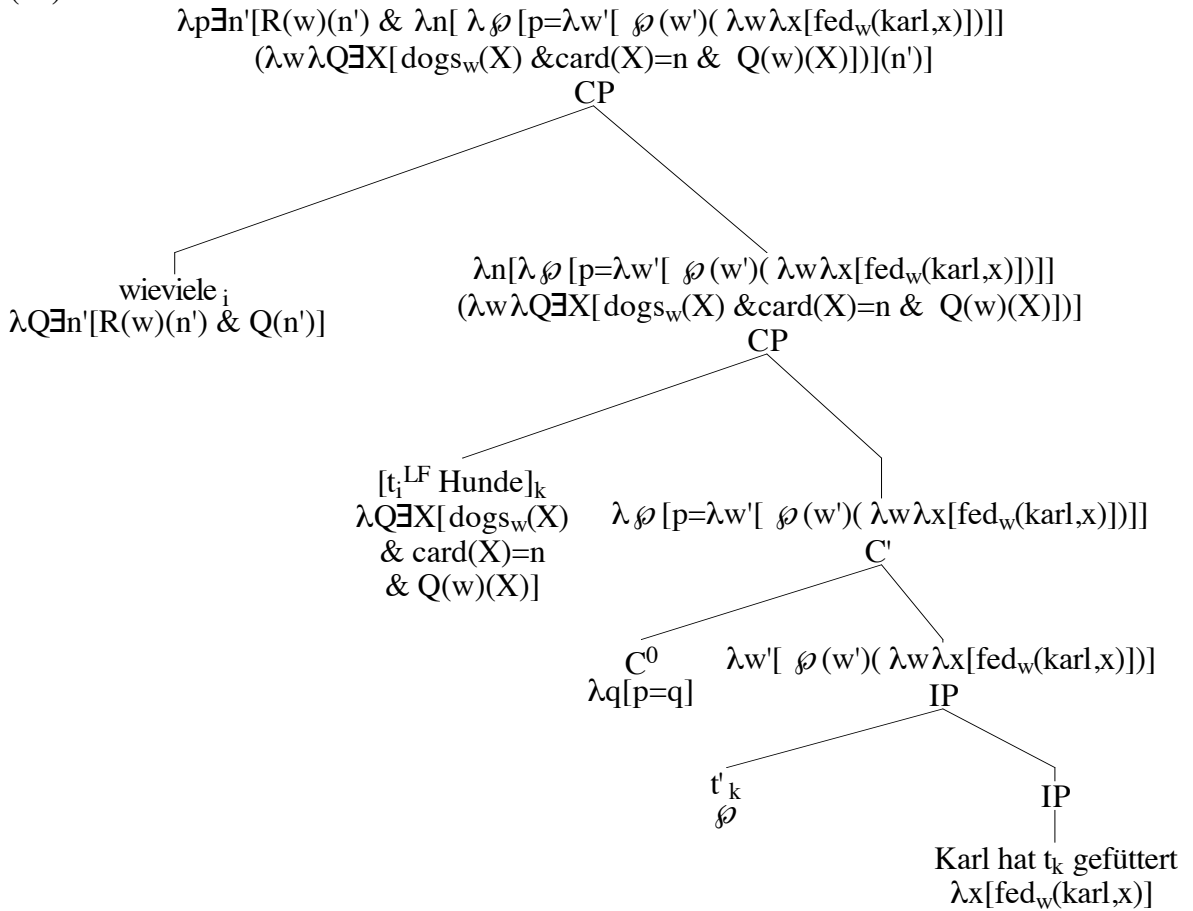
The result can be reduced via lamda conversion to (20), which is the desired interpretation for (16).

(20) $\lambda p\exists n'[R(w)(n') \ \& \ \lambda n[\lambda\wp \ [p=\lambda w'[\ \wp(w')(\lambda w\lambda x[fed_w(karl,x)])]]$
$(\lambda w\lambda Q\exists X[dogs_w(X) \ \& \ card(X)=n' \ \& \ Q(w)(X)])](n')$

iff $\lambda p\exists n'[R(w)(n') \ \& \ \lambda\wp \ [p=\lambda w'[\ \wp(w')(\lambda w\lambda x[fed_w(karl,x)])]]$
$(\lambda w\lambda Q\exists X[dogs_w(X) \ \& \ card(X)=n' \ \& \ Q(w)(X)])]$

iff $\lambda p\exists n'[R(w)(n') \ \& \ p=\lambda w'[\ \lambda w\lambda Q\exists X[dogs_w(X) \ \& \ card(X)=n' \ \& \ Q(w)(X)] \ (w')$
$(\lambda w\lambda x[fed_w(karl,x)])]$

iff $\lambda p\exists n'[R(w)(n') \ \& \ p=\lambda w'[\exists X[dogs_{w'}(X) \ \& \ card(X)=n'$
$\& \ \lambda w\lambda x[fed_w(karl,x)](w')(X)]$

iff $\lambda p\exists n'[R(w)(n') \ \& \ p=\lambda w'[\ \exists X[dogs_{w'}(X) \ \& \ card(X)=n' \ \& \ fed_{w'}(karl,X)]]]$

This is clearly a very elegant way to capture the reconstruction effect.

Note, however, that type raising of this sort is prohibited by the restriction on semantic types from chapter 1. This issue will be discussed some more in chapter 5.

I will pursue a different course: reconstruction is done in the syntax of logical form. (21) is the transparent LF that I will assume for (16), that is, the LF that will give us interpretation (17).

(21)

$$\lambda p \exists n[R(w)(n) \ \& \ p=\lambda w'[\ \exists X[\ dogs_{w'}(X) \ \& \ card(X)=n \ \& \ fed'_{w'}(karl,X)]]$$
CP

wieviele $_i$
$\lambda P \exists n[R(w)(n) \ \& \ P(n)]$

$\lambda n[p=\lambda w'[\ \exists X[\ dogs_{w'}(X) \ \& \ card(X)=n \ \& \ fed'_{w'}(karl,X)]]$
C'

C^0
$\lambda q[p=q]$

$\lambda w'[\ \exists X[\ dogs_{w'}(X) \ \& \ card(X)=n \ \& \ fed'_{w'}(karl,X)]]$
IP

NP

$\lambda x[fed'_{w'}(karl,x)]$
IP

$[t_i \ Hunde]_j$
$\lambda P \exists X[\ dogs_{w'}(X) \ \& \ card(X)=n \ \& \ P(X)]$

Karl hat t_j gefüttert
$fed'_{w'}(karl,x)$
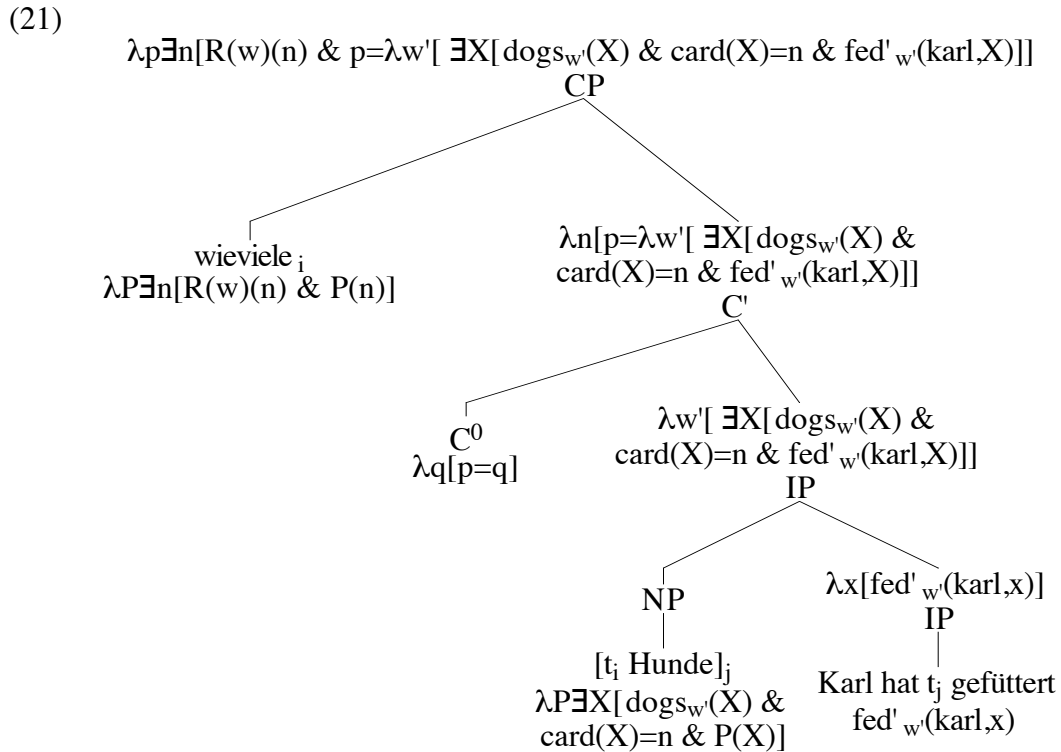
Wieviele has to be raised out of the *wh*-phrase as indicated in (22). The remainder *[t$_i$^{LF} Hunde]* is reconstructed into the scope of the interrogative operator.

(22)

NP

wieviele $_i$　　NP

t_i Hunde
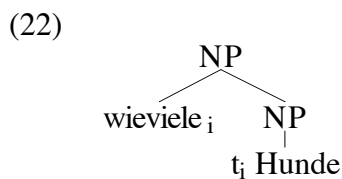
I am assuming here that *[t$_i$^{LF} Hunde]* occurs at LF in the position where it semantically takes scope, i.e. reconstruction is syntactic. This could for instance be achieved with the copy theory of movement (cf. Chomsky (1993)): every movement step leaves behind a copy; the interpretationally irrelevant copies or parts of copies are deleted. Unfortunately, I am not aware of any detailed formalization of this proposal. I will presuppose that there are (parts of) copies where I need them for interpretational purposes without discussion of how exactly they get there. The

actual LFs I propose will often be one possible configuration that would yield the desired interpretation; others are also possible. Discussion of the variety of options is irrelevant for my point. See for instance Kang & Müller (1993) for some considerations.

Back to sentence (13): here also, of course, we have to reconstruct part of the *wh*-phrase. There are two options available: the reconstructed part can end up outside or inside the scope of the negation. The LFs (23a) and (23b), respectively, correspond to these two possibilities.[56]

(23)   a.

$\lambda p \exists n[R(w)(n)\ \&\ p=\lambda w'[\ \exists X[\ dogs_{w'}(X)\ \&$
$card(X)=n\ \&\ \neg[\ fed'_{w'}(karl,X)]]]$
CP

wieviele $_i$
$\lambda P \exists n[R(w)(n)\ \&\ P(n)]$

$\lambda n[p=\lambda w'[\ \exists X[\ dogs_{w'}(X)\ \&$
$card(X)=n\ \&\ \neg[\ fed'_{w'}(karl,X)]]]$
C'

C^0
$\lambda q[p=q]$

$\lambda w'[\ \exists X[\ dogs_{w'}(X)\ \&$
$card(X)=n\ \&\ \neg[\ fed'_{w'}(karl,X)]]]$
IP

$[t_i^{LF}\ Hunde]_k$
$\lambda P \exists X[\ dogs_{w'}(X)\ \&$
$card(X)=n\ \&\ P(X)]$

$\lambda x \neg[\ fed'_{w'}(karl,x)]$
IP

nicht

IP

Karl hat t_k gefüttert
$fed'_{w'}(karl,x)$
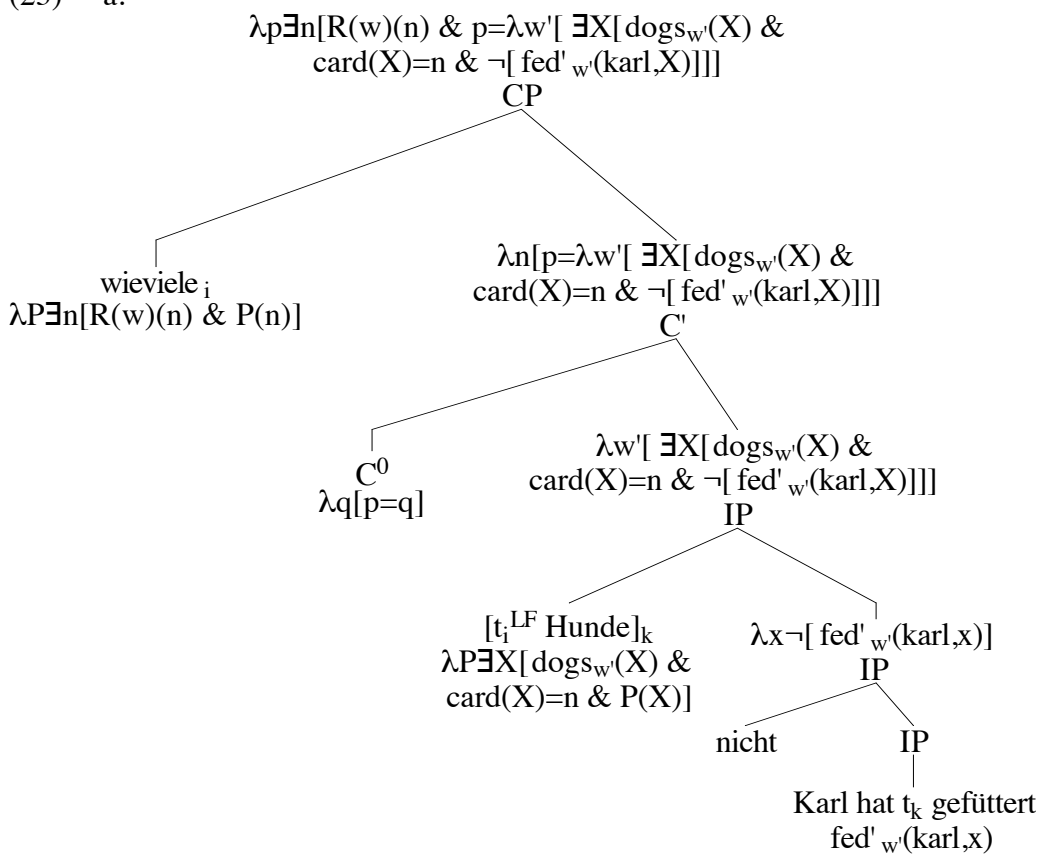
For which n: There are n dogs that Karl hasn't fed

(23)   b.

---

[56]While I have adjoined *nicht* and *[t_i^{LF} Hunde]* to IP in the following LFs, nothing hinges on this. Other LF positions are compatible with my analysis and might in fact be preferable. What matters here is the positions of *nicht* and *[t_i^{LF} Hunde]* with respect to each other.

$$\lambda p \exists n[R(w)(n) \& p = \lambda w'[\neg \exists X[\text{dogs}_{w'}(X) \& \text{card}(X) = n \& \text{fed}'_{w'}(\text{karl}, X)]]]$$

CP

wieviele $_i$
$\lambda P \exists n[R(w)(n) \& P(n)]$

$\lambda n[p = \lambda w'[\neg \exists X[\text{dogs}_{w'}(X) \& \text{card}(X) = n \& \text{fed}'_{w'}(\text{karl}, X)]]]$

C'

C^0
$\lambda q[p = q]$

$\lambda w'[\neg \exists X[\text{dogs}_{w'}(X) \& \text{card}(X) = n \& \text{fed}'_{w'}(\text{karl}, X)]]$

IP

nicht

$\exists X[\text{dogs}_{w'}(X) \& \text{card}(X) = n \& \text{fed}'_{w'}(\text{karl}, X)]$

IP

$[t_i{}^{LF} \text{Hunde}]_k$
$\lambda P \exists X[\text{dogs}_{w'}(X) \& \text{card}(X) = n \& P(X)]$

$\lambda x[\text{fed}'_{w'}(\text{karl}, x)]$

IP

Karl hat t_k gefüttert
$\text{fed}'_{w'}(\text{karl}, x)$
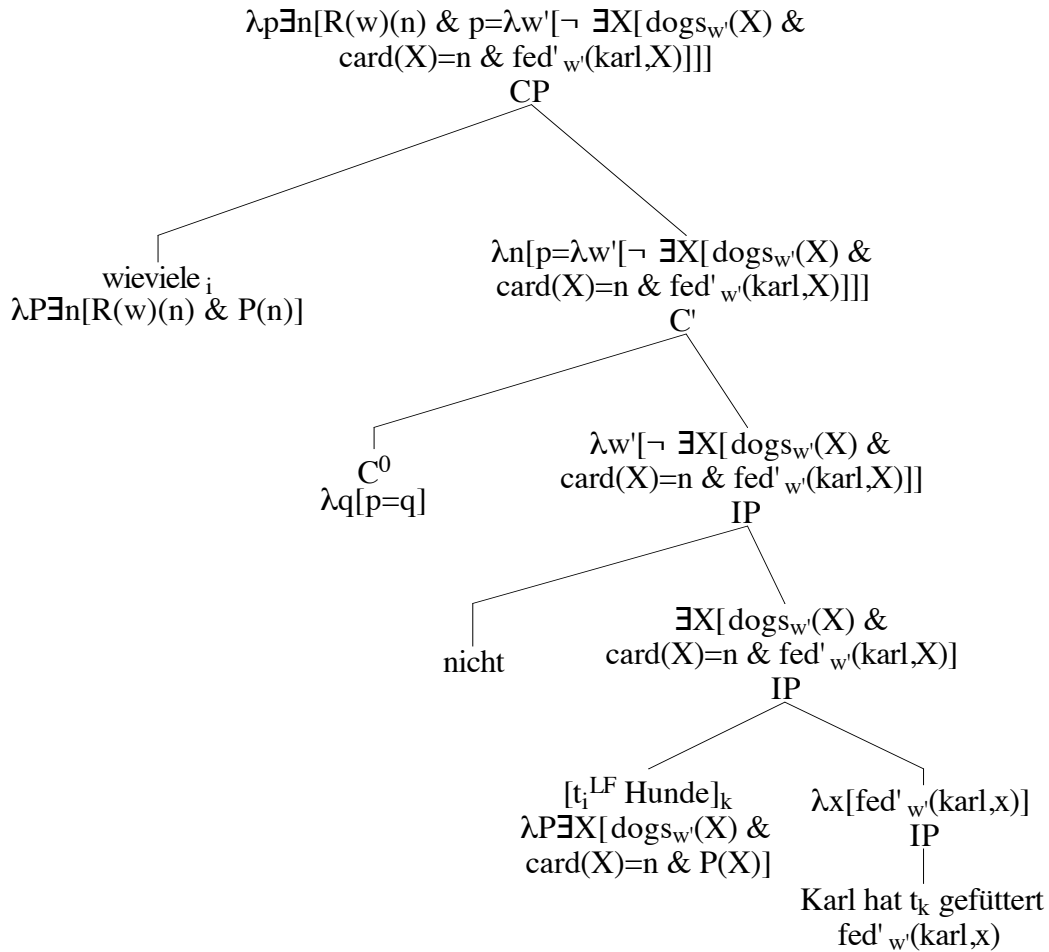
For which n: It is not the case that Karl has fed n dogs)

(23a) will lead to the interpretation (15a), the intuitively available reading of (13) (corresponding to paraphrase (14a)). (23b) would give us the reading (15b) (corresponding to the paraphrase given in (14b)), which is not an available reading of (13). In order to predict that (13) only has reading (15a), we have to allow (23a) as a grammatical LF of (13), while ruling out (23b).

This is where the MNSC comes in. Remember that the MNSC excluded data like (24):

(24) * Wen   hat   keine Studentin   <u>von den Musikern</u>   getroffen?
         whom has   no   student   of the musicians   met
         'Which of the musicians did no student meet?'

because the only possible LF for the sentence involved binding of an LF trace across a NIB. The LF of (24) and the definition of NIB and MNSC are repeated below for convenience.

(25) $[_{CP}$ [wen$_j$ [von den Musikern$_k$]] $[_{C'}$ C^0 $[_{IP}$ keine Studentin$_i$

$[_{I'}$ t$_i$ t$_j$ t$_k^{LF}$ getroffen hat]]]]

(26)   Negation Induced Barrier (NIB):
        The first node that dominates a negative quantifier, its restriction and its nuclear scope is a negation induced barrier.

(27)   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.

The negative quantifier *keine Studentin* induces a NIB, the boldface IP, which dominates t$_k^{LF}$. The binder of that trace, *[von den Musikern]$_k$* is not dominated by the NIB, thus violating MNSC. The LF is ruled out, and the sentence ungrammatical.

Back to the *how many*-phrases: (28a) and (28b) are the same LFs as (23a) and (23b) in bracket notation. Again, the negation induces a NIB, which is printed in boldface.

(28)   a. $[_{CP}$ wieviele$_i$ $[_{C'}$ $[_{IP}$ [t$_i^{LF}$ Hunde]$_k$ $[_{\mathbf{IP}}$ nicht $[_{IP}$ Karl hat t$_k$

gefüttert]]]]]
        b.   * $[_{CP}$ wieviele$_i$ $[_{C'}$$[_{\mathbf{IP}}$ nicht $[_{IP}$ [t$_i^{LF}$ Hunde]$_k$ $[_{IP}$ Karl hat t$_k$

gefüttert]]]]]

In (28a), the LF trace left by *wieviele* is not contained in this NIB (nor is any other), so (28a) is an admissible LF. (28b), on the other hand, violates MNSC: the LF trace of *wieviele*, t$_i$, is contained in the NIB induced by *nicht*, while the binder of t$_i$ is not. (28b) is completely parallel to (25) and correctly ruled out.

This account hinges on the fact that, for semantic reasons, part of *wieviele Hunde* has to be reconstructed at LF. The phrase to be reconstructed contains an LF trace. The MNSC thus makes it impossible for that expression to be reconstructed

into a NIB, and consequently, to be interpreted within the scope of a negation. Obviously, the same will happen whenever we reconstruct the indefinite part of a *wieviel*-phrase into the scope of a negative operator. Thus we can never get a narrow scope reading of that part with respct to negation.[57]

(25) and (28b) are structurally similar because the material that is reconstructed contains an LF trace. The result of reconstructing that material into the scope of a negative operator is in the relevant aspects identical to one resulting from LF upward movement across a negation - which is prohibited by the MNSC. So, for the interaction of *wieviel*-phrases and negation, the MNSC makes the correct predictions. Thus, under the assumption that semantically motivated reconstruction occurs at LF, the MNSC derives the negative island effect. It should be mentioned that applying the MNSC to negative island data makes a representational formulation of the constraint necessary. Derivationally, upward movement and negative island reconstruction data look quite different. Thus I don´t see how it would be possible to give a unified account in derivational terms.

Note that my analysis doesn't make any reference to extraction on S-structure (i.e. the unavailable reading is ruled out without reference to the trace left by *wieviele Hunde* on its way to SpecC at S-Structure). Note also that the referential/non-referential distinction is analysed simply as a scope ambiguity, coming about through the interaction of the indefinite expression contained in the *wieviel*-phrase with another operator in the sentence. Thus referentiality is not an inherent property of *wieviel*-phrases, but a scope effect. The other negative island effects from section 4.2.1. will be analysed in a parallel way.

4.2.3. Further negative island effects

We have seen that *wieviel*-phrases are not the only type of *wh*-phrase to show a negative island effect. A similar effect can be observed with several kinds of adverbials, e.g. causals as in (29).

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[57]Note that if my observation in chapter 2 is correct that in the *was für*-construction, the existential part can have narrow scope with respect to negation, there is an interesting difference between *was für* and *how many*. The narrow scope reading of the existential part would be excluded by the MNSC under the property analysis in a way completely parallel to the *how many* case. On the kind analysis, it is predicted to be possible.

(29) Warum   hat   niemand   Kartoffelsalat mitgebracht?
     why   has   nobody   potato salad   brought
     'Why didn´t anybody bring potato salad?'

As we saw in 4.2.1, (29) can receive the interpretation paraphrased in (30a), but not the one in (30b).

(30) a.   What is the reason for the fact that nobody has brought potato salad?
      b. # For which reason: Nobody who has brought potato salad has brought potato salad for that reason.

So here again, one reading is absent that we would expect to be available. The same applies to frequency adverbials as in (31a), which can only be understood as (31b), but not as (31c).

(31) a.   Wie   oft   war   niemand   verfügbar?
             how   often   was   nobody   available
             'How often was nobody available?'
      b.   For which n: It was n times that nobody was available.
      c. # For which n: There is nobody who was available n times.

Finally, there are examples with degree adverbials like (32) which are ungrammatical:[58],[59]

(32) *   Wie   laut   hat   Luise nicht Musik gemacht?
             how   loudly   has   Luise not   music made
             'How loudly didn't Luise play music?'

---

[58]Frequency adverbials are, of course, just a special case of degree adverbials. I have introduced them separately because with frequency adverbials, in contrast to other degree adverbials, a reasonable reading survives.

[59]Some speakers seem to accept degree adverbials in a modal context (as in (i)); others (including myself) don´t. I will not go into this here.

(i)   Wie oft darf niemand fehlen, wenn er nicht riskieren will, nicht zur Prüfung zugelassen
        How often may nobody be absent, if he not risk wants not for the exam accepted
        zu werden?
        to be
        "How often may nobody miss class, if he doesn´t want to risk not being allowed to take
        the exam?"

(32) is bad; in particular, it cannot be understood as in (33b), which is the reading that would be semantically reasonable. The other reading (33a) is out for independent reasons, since it simply doesn't make sense in almost all contexts. As this is the reading that is parallel to the available reading in (29) and (31), (32) in fact shows the same effect as those examples: a reading is (unexpectedly) missing in which the adverbial would have narrow scope with respect to the negation.

(33)   a.   For which degree: Luise´s not playing music was loud to that degree.
        b. #   For which degree: It is not the case that Luise's playing music was
                loud to that degree.

Not only does negation have a parallel effect in *wieviel*-phrases and the three types of adverbials discussed, it can also receive a parallel explanation: with causal, frequency and degree adverbials, the missing reading is again one in which an expression containing an LF trace would have to be reconstructed into the scope of a negation. I will substantiate this claim by providing interpretations for (29), (31a) and (32).

(26a,b,c) are formalizations of the grammatical readings of (29), (31a) and (32), that is, of the paraphrases (30a), (31b) and (33a) ((34c), corresponding to (33a), is bracketed because that reading is impossible for independent reasons). In each case, something corresponding to the boldface expression in the formula occurs in SpecCP at S-structure, but has to be interpreted in the scope of the interrogative operator. In the case of the grammatical readings, that expression occurs outside the scope of negation.[60]

(34)   a. $\lambda p \exists d[R(w)(d) \ \& \ p=\lambda w'[\textbf{d-often} \ (t<t^{now}) \ (\lambda t[\neg\exists x[person_{w'}(x) \ \&$
                        $available'_{w',t}(x)]])]]$
        b. $\lambda p \exists q[R'(w)(q) \ \& \ p=\lambda w'[\textbf{CAUSE}_{\textbf{w'}} \ (q, \lambda w''[\neg\exists x[person_{w''}(x) \ \&$
                        $brought\_potato\_salad'_{w''}(x)]])]]$
        (c. $\lambda p \exists d[R(w)(d) \ \& \ p=\lambda w'[\textbf{d-loudly}(\lambda x\neg[music\_played_{w'}(x)]) \ (luise)]]]$

---

[60]."d-often" is an abbreviation for "often to degree d", that is, a *wie oft* question is a query for the degree argument of *oft*. The same applies to "d-loudly". See e.g. Klein (1991) for the degree argument of adjectives and adverbials.
No interpretation is provided for *CAUSE* because nothing hinges on that.
Again, *R* and *R'* are restrictions of the appropriate types for *d* and *q*, respectively.

(34a-c) formalize the readings in which the adverbial takes scope over the negation. (35a-c) are formalizations of the unavailable inner readings of (29), (31a) and (32) (the paraphrases given in (30b), (31c) and (33b)). Here, the boldface expression occurs within the scope of negation.

(35)   a.   # $\lambda p\exists d[R\{w\}(d)$ & $p= \lambda w'[\neg\exists x[person_{w'}(x)$ & **d-often** $(t<t^{now})$
$$(\lambda t[available'_{w',t}(x)])]]]$$

       b.   # $\lambda p\exists q[R'\{w\}(q)$ & $p= \lambda w'[\neg\exists x[person_{w'}(x)$ &
$$\mathbf{CAUSE_{w'}}\ (q, \lambda w''[brought\_potato\_salad'_{w''}(x)])]]]$$

       c.   # $\lambda p\exists d[R(w)(d)$ & $p= \lambda w'[\neg[\mathbf{d\text{-}loudly}(\lambda x[music\_played_{w'}(x)])$
$$(luise)]]]$$

In order to obtain (35c), for example, we should have an LF like (36).

(36)   [$_{CP}$ wie$_i$ [$_{C'}$ [$_{IP}$ Luise [$_{VP}$ nicht [$_{VP}$ [t$_i^{LF}$ laut] [$_{VP}$ Musik gemacht hat]]]]]]

wie is extracted from *wie laut* and '[t$_i^{LF}$ *laut*]' is reconstructed. For this reading, it is reconstructed structurally below *nicht*. The LF trace of *wie* is thus dominated by the NIB induced by *nicht*, while its binder is not. MNSC correctly rules out (36) as an LF of (32).

(31) is completely parallel; for (29), I have to assume that *warum* is decomposed into something like *because of what*, the *what* being extracted on LF (leaving behind a constituent '[*because of* t$_i^{LF}$]') and receiving a propositional interpretation. '[*because of* t$_i^{LF}$]' is reconstructed and translated as "$\lambda qCAUSE_w(p,q)$".

In summary, then, what I have called the negative island effect is exhibited by *wieviel*-phrases and causal, frequency and degree adverbials. It consists of the systematic lack of a semantically possible reading. The MNSC derives the data, the common feature being that the missing readings are just those that would necessitate reconstruction of an expression containing an LF trace into the scope of negation.

4.2.4. Discussion

I have argued that applying the MNSC to negative island data gives us just the desired result. Those LFs that would lead to unavailable readings are excluded. This is satisfactory in so far as no additional mechanism is needed to explain the absence

of the readings concerned. Moreover, it becomes clear why negative islands differ from some other weak islands: they reflect a restriction on the binding of LF traces, not S-structural traces. The effect is explained without reference to the trace left by the S-structural extraction of the *wh*-phrase.

While this is a satisfactory result, it is obvious that a number of open questions remain. Some concern the nature of the reconstruction mechanism and are beyond the scope of this thesis. Reconstruction has to be a syntactic process for my analysis to work (see e.g. Cresti (1995) and Rullmann (1995) for a different analysis), raising questions as to how it is realized and what its trigger is.

Most importantly, however, there is an empirical question. I have concentrated here on the interaction of reconstruction with negative operators. Of course, this is just a subcase of interaction with scope bearing elements in general. Unfortunately, the picture is less clear with other operators. It seems to me that in some cases the reconstructed expression might allow narrow scope with respect to a quantifier in the question, e.g. (37a) in reading (37c):

(37) a. Warum   ist   fast jede   Pflanze   eingegangen?
          why   is   almost every   plant   died
          'Why did almost every plant die?'
      b. What is the reason for the fact that almost every plant died?
      c. For which reason: almost every plant that died died for that reason.

If it is true that (37a) can have reading (37c) as well as (37b), this indicates that the effect discussed above might indeed be negation specific. The same point is made by (38), which seems fairly good.

(38) Katrin hat mich daran erinnert,   wie   ungern   fast   jeder
      Katrin has me thereof reminded   how   unwillingly almost every
      Teenager   spazierengeht.
      teenager   hikes
      'Katrin has reminded me of how much almost every teenager dislikes hiking.'

The case of (39a) is more complicated:

(39) a.   Wieviele   Referate   hat   jeder   gehalten?
            how many   presentations has   everyone   given
            'How many presentations did everyone give?'
      b.   For which n: There are n presentations such that everyone gave them.
      c.   For which n: Everybody gave n presentations.
      d.   For everyone, tell me how many presentations s/he has given.

In addition to the normal ambiguity that could arise due to the reconstruction of the indefinite expression *n presentations* (readings (39b) and (39c)), *everyone* induces the pair list reading (39d). Now, reading (39d) is consistent with an answer like (40) if in fact everyone has given the same number of presentations.

(40)   Everyone has given four presentations.

Unfortunately, this is identical to the type of answer we would expect for (39a) in reading (39c). So the fact that this type of answer is possible is not conclusive evidence for the existence of reading (39c). How could we make sure that we don´t have a distributive reading? Stress on *jeder* apparently excludes the pair-list reading (Pafel (1991)). If *jeder* is stressed in (39a), the question for me has only the (pragmatically odd) reading (39b). But then, since it is unclear what stress on the quantifier actually does, this might not be a fair test.
A distributive reading is usually impossible when *every* is in object position.

(41)   Wieviele   Kinder haben jeden   getroffen?
        how many   children   have   everyone (acc)   met
        'How many children met everyone?'

(41) does not seem to have a distributive reading (42c). (42b) would be the narrow scope reconstructed reading.

(42) a.   For which n: There are n children that met everyone.
      b.   For which n: Everybody was met by n children.
      c.   For everyone, tell me by how many children s/he was met.

If (41) is indeed ambiguous between (42a) and (42b), i.e. if reading (42b) exists, then that would be additional evidence that reconstruction across a non-negative

quantifier is sometimes possible. Such readings are claimed to be possible for (43a,b) in Rullmann (1995) (examples taken from Rullmann (1995), p. 32):

(43) a. How much does the coach want every player on the team to weigh?
      b. How much do most choaches$_i$ want every player on their$_i$ team to weigh?

Unfortunately, it is something of a mystery to me under what circumstances such readings are available. In (44), for instance, the narrow scope readings seem unavailable, just like they are in the case of negation.

(44) a. Warum   hat   fast   jeder   geheiratet?
          why   has   almost everyone   married
          'Why did almost everyone marry?'
      b. # For which reason: almost everyone that married married for that reason.
      c. ?? Wie   gern   sind   wenige dahin gegangen?
              how   willingly   are   few   there   gone
              'How willingly did few people go there?'
      d. ?? Wie   gern   fährt fast   jeder   nach   Berlin?
              how   willingly   goes   almost everyone   to   Berlin
              'How much does almost everyone like going to Berlin?'

Also, intuitions vary from speaker to speaker, making a conclusive judgement difficult to arrive at (quite a few people don´t get reading (37c), for example).

This issue is important with respect to the formulation of the MNSC. In chapter 2 I did not argue for a negation specific constraint like the MNSC for German, but rather, for a constraint concerning quantified structures in general, the MQSC. This was motivated by data like (45).

(45) a. * Wen   hat   Karl zweimal von den Musikern   getroffen?
             whom has   Karl twice   of the musicians   met
             'Which of the musicians did Karl meet twice?'
      b. * Wen   haben wenige wo   getroffen?
             whom have   few   where met
             'Who did few meet where?'

Other quantifiers seem to have an effect very similar to negation in these *wh-in-situ* constructions. Accordingly, the MNSC is a subcase of the constraint MQSC. As has been demonstrated in detail above, the reconstruction data that are the main issue of this chapter and the *wh-in-situ* data that motivated the MQSC are representationally identical in the relevant respects. Should it be confirmed that empirically the two cases differ, this would constitute a problem for the formulation of the MQSC, as additional aspects of the respective structures would have to be taken into account. Further empirical research is necessary on these matters before anything conclusive can be claimed about the precise formulation of the MNSC/MQSC.

For the rest of this chapter, I will ignore this empirical question and only talk about the MNSC.

4.3. Korean negative islands

It has been argued in section 4.2. that the negative island effect is captured by the MNSC. We have seen that the LF for the inner reading in negative island contexts is structurally identical to LF upward movement across a negation. So if in a language the latter seems to be excluded by the MNSC, it is to be expected that the language exhibits a negative island effect as well. We have argued that Korean observes the MNSC. Accordingly, we make the prediction that Korean exhibit a negative island effect, in the same way as German. This prediction is borne out. Moreover, Korean offers data that have a bearing on the issue of reconstruction and on the way MNSC excludes the relevant structures.

I owe the data and judgements in this section once more to Shin-Sook Kim. Much of this section is taken from Beck & Kim (1996).

(46a) has got the interpretation given in (46b), but not the one in (46c).

(46)   a.   Suna-ka   ch'aek myôch'   kwôn-ûl   tosôkwan-e
            Suna-Nom   book   how many   CL-Acc   library-Dir
            pannapha-chi anh-ass-ni?
            bring back-CHI   not do-Past-Q
            How many books didn´t Suna bring back to the library?

b. 'For which number n: there were n books which Suna did not bring back to the library.'

c. # 'For which number n: It is not the case that Suna brought n books back to the library.'

If we have an NPI subject and a *wh*-phrase following it, the sentence is bad, cf. chapter 3:

(47) * amuto   ch'aek myôch'   kwôn-ûl   ilk-chi
      anyone book   how many   CL-Acc   read-CHI
      anh-ass-ni?
      not do-Past-Q
      'How many books did nobody read?'

If we scramble the *wh*-phrase over the NPI subject, the sentence becomes grammatical (with the meaning given in (48b)):

(48) a. [ch'aek   myôch'   kwôn-ûl]$_i$ amuto t$_i$ ilk-chi
        book   how many   CL-Acc   anyone read-CHI
        anh-ass-ni?
        not do-Past-Q
     b. 'For which number n: there are n books which no one read.'
     c. # 'For which number n: there is nobody who read n books.'

The negation-sensitive adjunct *wh*-phrases behave in a similar way. (49) can only mean (50a), but not (50b).

(49) Hans-ka   wae   ka pôli-chi   anh-ass-ni?
     Hans-Nom   why   go away-CHI not do-Past-Q
     'Why didn´t Hans go away?'

(50) a. For which reason: it is for that reason that Hans didn´t go away.
     b. # For which reason: it is not the case that Hans went away for that reason.

(51), too, has only a reading in which the adverbial has wide scope with respect to the negation, the one in (52a).

(51)   Hans-ka   ôlmanachachu hakkyo-e   ka-chi
        Hans-Nom   how   often   school-Dir   go-CHI
        anh-ass-ni?
        not do-Past-Q
        'How often didn´t Hans go to school?'

(52)   a.   For which n: it was n times that Hans didn´t go to school.
        b.   #   For which n: it is not the case that Hans didn´t go to school n times.

Finally, ordinary degree adverbials like *how loudly* in (53) are ungrammatical, that is, cannot have the only reasonable reading indicated in (54).

(53)   ??   Luise-ka   ôlmanassikkûlôpke   ûmak-ûl   tût-CHI
              Luise-Nom   how   loudly music-Acc   hear-CHI
              anh-ass-ni?
              not do-Past-Q
              'How loudly didn´t Luise hear music?'

(54)   #   For which degree: It is not the case that Luise's listening to music was loud to that degree.

So, in Korean we have the same limited range of interpretational possibilities that we have in German. Consider the LFs (55) and (56), which lead to the interpretations (46b) and (46c) respectively of (46a).

(55)

CP
  myôch'$_j$
  how many
  C'
    VP
      Suna
      V'
        [ch'aek t$_j^{LF}$ kwôn-ûl]
        book CL
        V'
          V'
            tosôkwan-e pannapha-chi
            library bring back
          Neg
    C^0
    ni

(56)

CP
  myôch'$_j$
  how many
  C'
    VP
      Suna
      V'
        V'
          [ch'aek t$_j^{LF}$ kwôn-ûl]
          book CL
          V'
            tosôkwan-e pannapha-chi
            library bring back
        Neg
    C^0
    ni
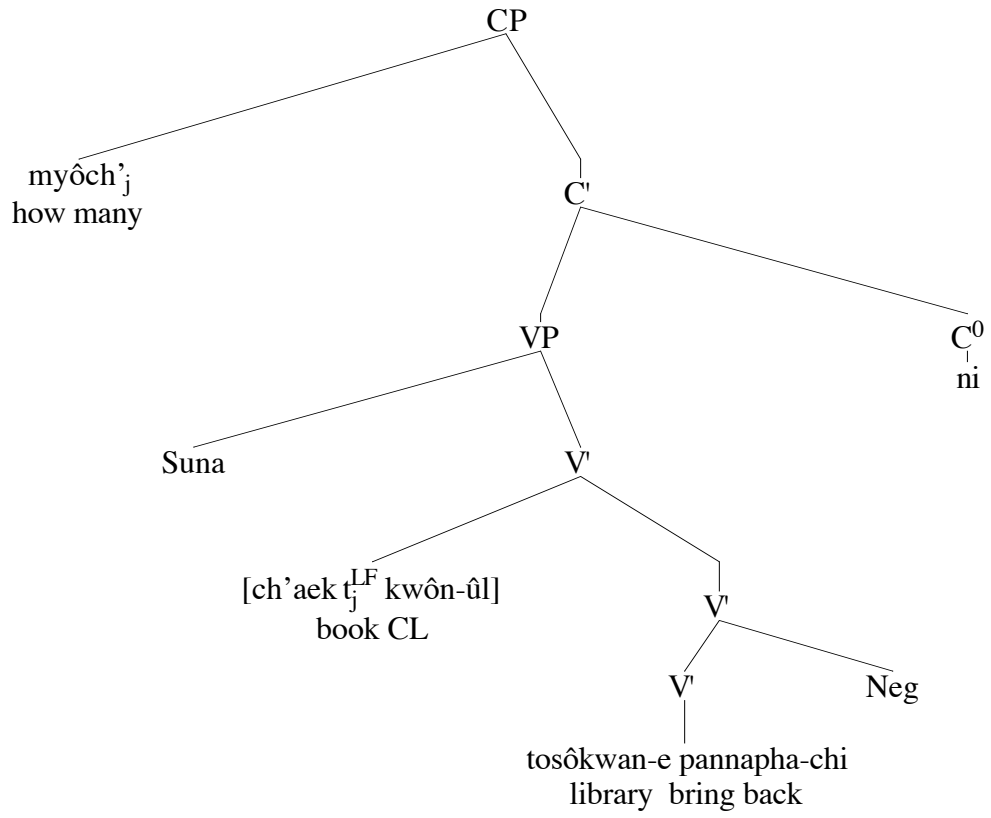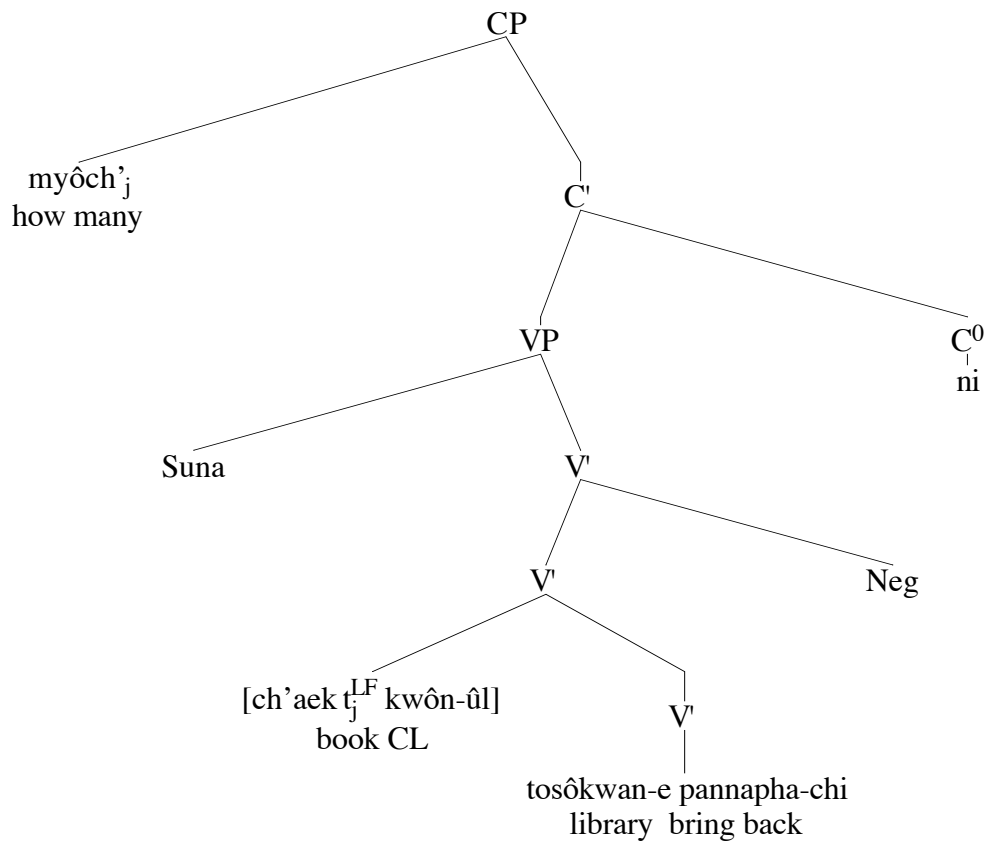
(55) is unproblematic, while (56) is parallel to the LF (23b) of the German example, and accordingly is excluded by the MNSC. The other examples are parallel.

So the MNSC together with our assumptions about Korean negation makes the correct predictions about the interpretational possiblilities of *how many* questions and related data. Thus we have a unifying analysis for the fact that scopal interaction in these interrogatives is restricted in the same way in German and Korean, although the S-structures look remarkably different: the common factor is that the indefinite (non-interrogative) part of the *wh*-phrase may not have narrow scope w.r.t. negation. Note that in the Korean data (46) and (48), neither S-Structural extraction nor reconstruction enter the picture, since we do not have overt *wh*-movement. Presumably, the LFs in (55) and (56) are derived by simply raising the interrogative part *myôch'* of the *how many* phrase to SpecC. The indefinite part may remain in its S-structure position. The MNSC then prohibits certain LF positions of the negation, thus making the right predictions about scope.

Since scope bearing elements normally interact with sentential negation in Korean (cf. (57) below), we would have expected negation to interact with the indefinite part of the *how many*-phrase in the same way.

(57)   a.   ta   cha-chianh-ass-ta.

              all   sleep-CHI   not do-Past-Dec

        b.   For every x: x did not sleep.

        c.   It is not the case that all slept.

Thus, if no further restriction were at work, (46a) should be ambiguous between the two paraphrases (46b) and (46c). The contrast between (46) and (57) hinges on the fact that in (46), part of the wh phrase *how many books* has to be extracted at LF, leaving a trace sensitive to the MNSC.

Note, moreover, that S-structural extraction is not involved. Thus, S-Structure extraction accounts of negative islands would not lead one to expect this effect.

It might have been supposed that the problem with the German negative island data is the reconstruction process itself, i.e., that we could assume a restriction that could be informally phrased as in (58) (this is in fact what has been proposed as

an empirical generalization for the negative island effect in German in Beck (1993b)).[61]

(58)   A scope bearing element may not be reconstructed across a negation.

Note that while this strategy would be able to account for the German negative island effect, it would not account for Korean negative island data (e.g. (46)), simply because we do not have reconstruction. Moreover, Korean gives us the chance to show that what is problematic with the inner reading cannot be the reconstruction process itself (this issue is independent of how reconstruction is actually formalized). As mentioned before, Korean allows long scrambling of *wh*-phrases, as in (59).

(59)   nuku-lûl$_i$ Suna-nûn   [Mira-ka t$_i$ po-ass-nûnchi] mul-ôss-ta.
        who-Acc   Suna-Top   Mira-Nom   see-Past-Q   ask-Past-Dec
        'Suna asked whom$_i$ Mira saw t$_i$.'

The only possible interpretation of the *wh*-phrase in (59) is in the embedded clause, since the embedded clause is marked interrogative, while the matrix clause is marked as declarative. We might say that the *wh*-phrase has been moved too far.

This is possible in (60) also, across a negation in the matrix clause:

(60)   nuku-lûl$_i$ amuto   [Mira-ka t$_i$ po-ass-nûnchi]   mut-chi
        who-Acc   anyone Mira-Nom   see-Past-Q   ask-CHI
        anh-ass-ta.
        not do-Past-Dec
        'No one asked whom$_i$ Mira saw t$_i$.'

The only possible interpretation for (60) is (61), a simplified LF is indicated in (62).

(61)   No one asked whom Mira saw.

---

[61]A restriction along these lines has been argued for in Cresti (1995) for *wh*-islands. The scope taking possibilities of the indefinite part of *how many* phrases are restricted to scope positions outside the *wh*-island by blocking reconstruction of that part into the *wh*-island. Reconstruction comes about via type raising and lambda conversion, as discussed in section 4.2. It should be stressed that Cresti´s analysis is intended to cover *wh*-islands only, and that no claim is made about negative islands. Hence the following remarks are not to be understood as a criticism of her analysis.

(62)

VP
VP Neg
amuto
anyone
V'
CP mut-chi
ask
nuku-lûl$_i$
who-Acc
C'
VP nûnchi
Mira-ka V'
t$_i$ po
see
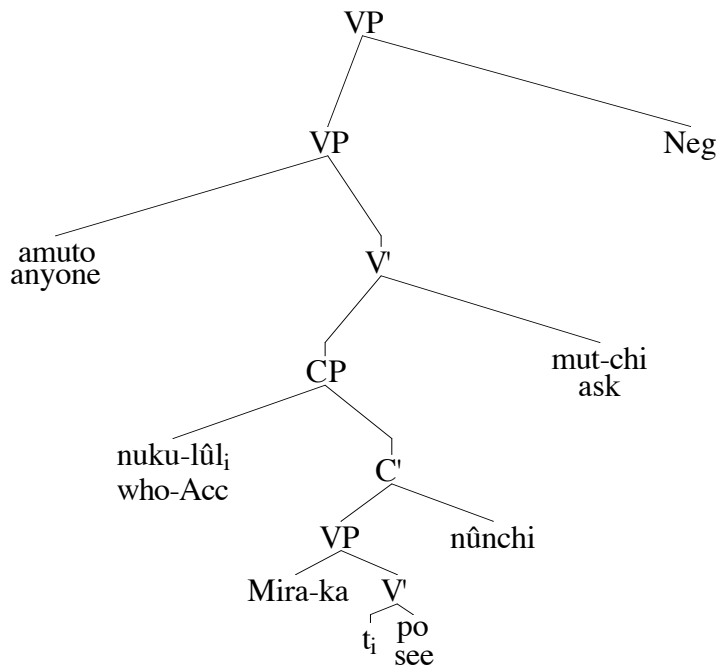
Here, we have reconstructed the entire *wh*-phrase into the embedded SpecCP. The MNSC does not predict the sentence to be out, in this case, since the material to be reconstructed does not contain an LF trace. The sentence is correctly predicted to be grammatical although here, too, we reconstruct a scope bearing element across a negation. This is an interesting confirmation of the way we exclude the nonavailable readings of (46) and (48). The same point can be made by (63).

(63) nuku-lûl$_i$ Mira-nûn   [Suna-ka   [Minsu-ka t$_i$ salangha-nûnchi]
      who-Acc   Mira-Top   Suna-Nom   Minsu-Nom   love-Q
      mut-chi   anh-ass-ta-ko] malha-ôss-ta.
      ask-CHI   do not-Past-Dec-C   say-Past-Dec
      'Mira said that Suna didn't ask whom$_i$ Minsu loves t$_i$.'

These Korean data indicate that what seems to be the problem is not reconstruction *per se*, but reconstruction of part of a *wh*-phrase, i.e., reconstruction of something that contains an LF trace. Reconstruction of intact material does not seem to face any problems across a negation. If the ambiguity of topicalized structures in German is accounted for as sketched in chapter 2, they make the same point: we would have to reconstruct the entire constituent in the Vorfeld position, which is unproblematic (see also section 4.4 on this).

This is captured by my account of negative islands: I do not suggest to block reconstruction; in our representations the fact that reconstruction is involved is irrelevant (maybe it is not represented at all). The problematic LFs are excluded via the presence of the LF trace. A suggestion like (58) would thus be inadequate for Korean for two reasons: It could not correctly describe the interpretational possibilities of data like (46) since no reconstruction is involved here. On the other hand, it would wrongly lead us to expect data like (60) and (63) to be out, since here, we do have reconstruction across a negation.

I conclude that the possibility of long scrambling across a negation in Korean indirectly confirms our explanation for the negative island effect.

One final remark: unfortunately it is difficult to test in Korean whether the negative island effect is specific for negation or more general, since we simply test scope interaction in the declarative part of the sentence.

4.4. Negative islands in the literature

In this section, I will argue that my reconstruction analysis captures the negative island effect more naturally than an analysis restricting extraction across a negation. I will not discuss any of the proposals mentioned extensively; see for instance Rullmann (1995) for a more detailed discussion. I will present various criticisms of extraction accounts (in particular Rizzi (1990), (1992), but partly also Szabolsci & Zwarts (1993)). It should be stressed, however, that my critcism concerns only their account of negative islands. Although I will restrict the discussion of those theories to what they have to say about negative island effects, or even more narrowly, about the subset of negative island data discussed in this chapter, it is clear that their empirical and theoretical scope is much wider than that. I don´t intend any general criticism of the theories concerned. Rather, I want to argue that the set of data I´m interested in does not fall into their scope.

Rizzi's (1990,1991) analysis is maybe the most widely known extraction account of negative islands. He basically says that extraction across a negative category is only possible for referential expressions. Applied to the data I´m concerned with, what is affected by a negation, according to Rizzi, is the relation between the *wh*-phrase in SpecCP and one of its traces left on its way to its S-

structural position. Antecedent government of the trace is blocked, negation being an intervening A' specifier. Thus chain formation can only proceed via binding, which in turn is only possible for referential expressions (viz. inherently referential arguments). Binding is impossible for adjuncts and nonreferential arguments.

Szabolsci & Zwarts (1993) present a semantic analysis of weak islandhood. According to them, problems arise when an expression should take scope over another expression, but is unable to do so for semantic reasons. I will not discuss their proposal in detail, because several aspects of it (and accordingly several empirical predictions) are unclear to me.[62]It will come up at some points in the discussion, however.

There are crucial differences between *wh*-movement and topicalization across a negation. In general, the narrow scope readings that are unavailable with *wh*-phrases are possible with topicalized phrases. (64a) can have both reading (64b) and (64c) and (65a) is grammatical (in contrast to (65b)) and has the reasonable reading. Unlike the indefinite part of *how many*-phrases, the indefinite in (66) can have narrow scope with respect to the negative quantifier *niemand*.

(64) a.   Oft   hat   Karl   die   Hunde nicht   gefüttert.
           often   has   Karl   the   dogs   not   fed
           'Karl didn´t feed the dogs often.'
      b.   It was often the case that Karl hadn't fed the dogs.
      c.   It is not the case that Karl has often fed the dogs.

(65) a.   Besonders   günstig   liegt   Ottos Wohnung
           very   conveniently is-located   Otto's flat
           nicht.
           not
           'Otto's flat isn't located very conveniently.'
      b. * Wie   günstig   liegt   Ottos Wohnung   nicht?
           how   conveniently is-located   Otto's flat   not
           'How conveniently isn't Otto's flat located?'

---

[62]This includes the semantic properties of the *wh*-phrases *when, why* and *how many* on the so called amount reading.

(66) Einen Apple glaubt niemand daß Karl gekauft hat.
an Apple believes nobody that Karl bought has
'Nobody believes that Karl has bought an Apple.'

While it is in principle possible to distinguish topicalization from *wh*-movement for extraction purposes, neither Rizzi nor Szabolsci & Zwarts have done so yet in this context. Rizzi, in particular, would expect both cases of movement to be equally sensitive to an intervening negation, both being instances of A' movement. Accordingly, he would predict (65b) to be out along with (65a). In any case, one would have to offer some additional motivation for making the distinction between *wh*-movement and topicalization, while it follows naturally from the analysis suggested here: only in the case of interrogatives has an expression to be reconstructed that contains an LF trace. That is not necessary in the case of topicalization. If reconstruction is involved (as suggested in chapter 2), the material to be reconstructed does not contain an offending trace.

Quite generally, I am not convinced that the set of "problematic extractees" can be characterised in a natural way in extraction terms. There are problematic and unproblematic arguments as well as adjuncts. The referential/nonreferential distinction alone is unable to capture this fact. In particular, some types of adjunct extractions are well formed in good contexts. Some further examples are given in (67) and others are provided by Kiss (1991). The sentences should be provided with a contextual restriction, e.g. (67b) should be interpreted in a situation where times are discussed when Hans should have done the dishes.

(67) a. Wo würde dieses Jahr niemand Urlaub machen?
where would this year nobody vacation make
'Where would nobody go for their holidays this year?'

b. Wann hat Hans das Geschirr nicht gespült?
when has Hans the dishes not cleaned
'When did Hans not do the dishes?'

c. Wo glaubt niemand daß Karl wohnt?
where believes nobody that Karl lives
Where does nobody believe that Karl lives?'

d. Womit hat Luise die Dose nicht aufgekriegt?
what with has Luise the can not opened
'What could Luise not open the can with?'

Negative islands thus don't have the properties that one would expect if extraction at S-structure was the problem. The point is that the problematic cases don't form a natural class for extraction purposes; my generalization via reconstruction, on the other hand, provides us with an explanation as to why just these types of phrases are affected by negation.

Another problem concerns simple manner adverbials as in (68a) vs. degree adverbials as in (68b).

(68) a. Das   ist   ein   Beispiel   dafür, wie   man
          this   is   a   example   for this how   one
          einen Artikel nicht schreiben   sollte.
          a   paper   not   write   should
          'This is an example of how not to write a paper.'

      b. * Das   ist   ein   Beispiel   dafür, wie   inkohärent
          this   is   a   example   for this how   incoherently
          man   einen Artikel   nicht schreiben   sollte.
          one   a   paper   not   write   should
          'This is an example of how incoherently not to write a paper.'

(68a) is incorrectly predicted to be out by Rizzi (as well as Szabolsci & Zwarts). Moreover, while (68a) with a simple manner adverbial is acceptable, (68b) with a degree adverbial is out. From the point of view of a syntactic theory of extraction[63], there should be no difference between the two, as the syntactic status of the *wh*-phrase should be the same. In a reconstruction approach, the difference is obvious: only the second case involves reconstruction of an expression containing an LF trace.[64]

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[63]I am not sure what Szabolsci & Zwarts would be able to say about this contrast.

[64](ii) is the denotation I suggest for a question involving a manner adverbial for the simpler case (i):
    (i)   how Luise smiles
    (ii) $\lambda p \exists P[R(w)(P) \& p = \lambda w'[P(\lambda x[smiles'(w')(x)])(luise)]]$
An appropriate LF would be (iii):
    (iii) $[_{CP}$ how$_i$ $[_{C'}$ C[+WH] $[_{IP}$ Luise $[_{VP}$ t$_i$ [smiles]]]]]$
Clearly, reconstruction is not involved in the case of *how* in this use.

Finally, consider (69):

(69) a. Wieviele Esel haben keinen Semantiker gebissen?
how many donkeys have no semanticist bitten
'How many donkeys have bitten no semanticist?'
 b. For which n: There are n donkeys that have bitten no semanticist.
 c. For which n: There is no semanticist that was bitten by n donkeys.

(69a) is unambiguous just like the examples with *how many*-questions we saw in section 4.2, that is, it can only have the reading paraphrased in (69b). Clearly, this is the same phenomenon as that observed in section 4.2. It is unclear, however, whether the negation intervenes between *wieviele Esel* and its trace, since the *wh*-phrase is the subject in (69a). Under the syntactic assumptions that Rizzi (1991) actually makes, this is not the case. Accordingly, he falsely predicts the sentence to have the 'nonreferential' as well as the 'referential' reading. The importance of this type of example was also observed by Szabolsci & Zwarts.

Not only does this shed some doubt on the theory that the phenomenon reflects S-structural islandhood, it also reveals the referential/nonreferential distinction to be unsatisfactory. It should be viewed as a scope interaction phenomenon, and as such should not affect extractability the way it is claimed to do.

Remember moreover that it is unclear what an S-Structure extraction account would be able to say about the negative island effect in Korean, where there is no overt extraction at all.

I agree with Kiss (1993) that there is no evidence that negation in German induces a functional projection.[65] I propose to treat it as an adverb. Its special syntactic role comes into play only at LF. The same holds for the semantic negation in Korean. I conclude that the MNSC suffices to capture the negative island effect at least as exhibited by German and Korean.

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[65]This does not mean that I want to disregard evidence from other languages that negation plays a more purely syntactic role, which might be captured in terms of functional categories. It merely means that I don´t see any reason for doing so in the case of German.

4.5. Contra maximality

In this section I will introduce Rullmann´s (1995) analysis of the negative island effect (4.5.1.). It hinges on the assumption of a maximality operator in the semantics of questions. The operator is argued to be motivated independently of negative islands.

This assumption will be criticized on general grounds, i.e. independently of the negative island data (section 4.5.2). It will be argued, following Beck & Rullmann (1996), that there is no maximality operator in the semantics of questions, and an alternative analysis is suggested of the effects, other than the negative island effect, that this operator is supposed to capture. In the course of doing that, we will reenter the longstanding discussion about exhaustivity in questions. Strong exhaustivity is one of the effects that the maximality operator is suggested to account for. The section ends up being a defense of a Hamblin/Karttunen semantics of questions against any semantics for interrogatives which incorporates strong exhaustivity into the basis question denotation. Although this leads us rather far afield from negative islands, the long discussion should be justified because it strengthens the semantic foundation this entire thesis is built upon.

Section 4.5.3. returns to negative islands. It is argued that maximality cannot be the reason for the negative island effect, even if there weren´t such general problems with it.

4.5.1. Rullmann (1995)

4.5.1.1. Degree questions and maximality

Rullmann (1995) observes that degree questions like (70a) and (70b) require an answer that is in some sense maximal:

(70) a.   How many books did John read?
      b.   How high can John jump?
      c.   Jill knows how high John can jump.

Someone who utters (70a) wants to know the maximal number n such that John read n books. Similarly, (70b) asks for the maximal (degree of) height d such that John can jump d-high. Note that if John read five books and not more than five books,

then the only possible true answer to (70a) will be "five", even though the proposition that John read four books is literally speaking true in that situation. The embedded case (70c) is parallel: Jill has to be aware of the maximal height John can jump. This effect will be called maximality.

Rullmann´s idea is that (70a) and (70b) really mean something like (71a,b):

(71) a. Which number n is such that n is the greatest number of books that John read?

b. Which degree d is the greatest degree such that John can jump d-high?

Quasi-formally, the interpretations of (70a) and (70b) can be represented as in (72a) and (72b), where *max* is an operator that picks out the maximum from a given set (of degrees, or numbers etc.)[66] and *?* is a question-operator whose semantics is spelled out below:

(72) a. ?n: n=max(λn'[John read n' books])

b. ?d: d=max(λd'[John can jump d'-high])

This basic idea can be implemented in a Karttunen-style semantics of questions as follows:

(73) a. λp∃n[p(w) & p=λw'[n= max(λn'[John read n' books in w'])]]

b. λp∃d[p(w) & p=λw'[d= max(λd'[John can jump d'-high in w'])]]

(73a,b) are basically the Karttunen denotations of the paraphrases in (71a,b). Note that Rullmann uses a genuine Karttunen framework, in which the propositions in the question sets are required to be true (this is the condition "p(w)" on the propositions in these sets). Apart from this trivial difference, Rullmann´s denotations for (70a,b) differ from the denotations assumed so far in the presence of the maximality operator. (74a,b) specify the ordinary Hamblin/Karttunen denotations of (70a,b) for comparison.

(74) a. λp∃n[R(w)(n) & p=λw'[John read n books in w']]

b. λp∃d[R(w)(d) & p=λw'[John can jump d-high in w']]

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[66]In this Rullmann follows a suggestion in Stechow (1984), which deals with the semantics of the comparative.

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Note that (73a,b) (in contrast to these formulas) will always denote a singleton set (or the empty set), because there is at most one actual maximal degree or number. The single element is the maximum answer, so Rullmann´s theory accounts for the maximality effect. (74a,b), as such, do not capture this effect.

4.5.1.2. Individual questions and exhaustivity

Rullmann (1995) proposes that the maximality operator is part of interrogative semantics quite generally (i.e., not only in degree questions). The effect it is supposed to capture in questions involving individuals (rather than degrees or numbers) is called strong exhaustivity. The property of strong exhaustivity is argued for by Groenendijk & Stokhof (henceforth: G&S) (1982, 1984). G&S distinguish two kinds of exhaustivity in questions, weak and strong exhaustivity. Weak exhaustivity is the property which licenses inferences of the following form:

(75)　　　John knows who was at the party.
　　　　　Mary was at the party.
　∴　　John knows that Mary was at the party.

That is, for any person who was in fact at the party, John knows that s/he was at the party. Strong exhaustivity is the property of questions which makes it possible to draw inferences of the following type (in addition to ones like (75)):

(76)　　　John knows who was at the party.
　　　　　Mary was not at the party.
　∴　　John knows that Mary was not at the party.

G&S (1982) argue that we would not say that John is fully informed as to who was at the party if he holds false beliefs about people who were not in fact at the party. They propose a semantics for questions which (unlike Karttunen's analysis, which captures only weak exhaustivity) accounts for both weak and and strong exhaustivity. Karttunen´s semantics is criticised for being unable to capture inferences like (76).

　　　Rullmann shows that his analysis can be extended to questions involving individuals if we adopt an analysis in which the domain of discourse contains not

only atomic individuals, but also their mereological sums, or groups. Maximality should then be interpreted with respect to the part-of relation on groups. A question like (77) can be analyzed as asking for the maximal group of individuals such that this group was at the party:

(77)   a.   Who was at the party?
       b.   Which x is such that x is the largest group that was at the party?
       c.   ?x: x=max(λx'[x' was at the party])
       d. λp$\exists$x[p(w) & person$_w$(x) & p =
                           λw'[x = max(λx'[x' was at the party in w'])]]

Following a suggestion by Jacobson (1995), Rullmann (1995) argues that by introducing maximality into the Karttunen-semantics of questions we get a theory that like G&S's theory accounts for both weak and strong exhaustivity. First, as noted above, maximality guarantees that a question will always denote a singleton set of propositions. Because there is a one-to-one relation between singleton sets and their elements, we may therefore in cases like (76) as well identify the denotation of a question with the proposition that is the unique member of this set. This means that the denotation of (77a) can be identified with the proposition in (78):

(78) ιp$\exists$x[p(w) & person$_w$(x) & p = λw'[x = max(λx'[x' was at the party in w'])]]

Now suppose that in the actual world w, Mary, Sue and Jane were at the party and no one else was. Then the proposition denoted by (78) will be:

(79) λw'[Mary+Sue+Jane = max(λx'[x' was at the party in w'])]

This proposition contains all and only those worlds in which Mary, Sue and Jane were at the party and no one else was. Now if John stands in the know-relation to this proposition this will imply that (i) for every x such that x is a member of {Mary, Sue, Jane}, John knows that x was at the party, and that (ii) for every x such that x is not a member of {Mary, Sue, Jane}, John knows that x was not at the party (assuming that knowing p entails knowing every proposition entailed by p). Hence, maximality accounts for both weak and strong exhaustivity. Thus, by adding maximality to Karttunen's theory of questions, we end up with a theory that - though

not formally equivalent to it - is able to account for the intuitions that motivate G&S's theory.

Note that strong exhaustivity plays a role in degree questions in just the same way that it does in individual questions. If John knows how many books Bill read, and in fact Bill read five books and not more than five, then by strong exhaustivity, John knows that Bill did not read n books, for any n>5. Rullmann's (1995) analysis of degree questions accounts for this implication in the same way that it does for individual questions.

Thus, there are good reasons to assume that we generally have a maximality operator in the semantics of *wh*-questions. It should be noted at this point that in Rullmann´s dissertation, the maximality operator is argued to play a role not only in the semantics of interrogatives, but in the semantics of *wh*-constructions in general. This includes comparatives and free relatives besides *wh*-questions, and there are a number of further reasons to have such an operator in the other types of *wh*-constructions.

4.5.1.3. Negative islands and the maximality operator

Now let us consider the effect that the maximality operator has in negative island data like (80):

(80)   *   Wie   groß   ist   niemand?
                how   tall   is   nobody
                'How tall is nobody?'

Rullmann´s semantics for (80) will be (81):

(81) $\lambda p \exists d[p(w) \ \& \ p = \lambda w'[d = max(\lambda d[\text{nobody is d-tall in w'}])]]$

The formula contains (82) as a subexpression:

(82) $max(\lambda d[\text{nobody is d-tall in w'}])$

It is generally assumed that the set of degrees in non-finite, i.e., there is no absolute greatest degree of tallness. Then, the maximum of the set of degrees d such that nobody is d-tall is undefined: suppose that there is nobody who is as tall as 4m. Then

there is nobody who is 4.1m tall, nobody who is 4.2m tall etc., indefinitely. If the denotation of (82) is undefined, the denotation of (81) is likewise undefined. The question (80) is predicted to be ungrammatical because its semantic interpretation is not defined.

The maximality operator will have a similar effect in (83):

(83)　　Wieviele Hunde hat niemand gefüttert?

(84a) and (84b) are the two potential readings of (83) in Rullmann´s semantics:[67]

(84)　　a.　$\lambda p \exists n[p(w) \ \& \ p=\lambda w'[n = max(\lambda n[\exists X[dogs_{w'}(X) \ \& \ card(X) =n \ \&$
$$nobody \ fed \ X \ in \ w']])]]$$
　　　　b.　$\lambda p \exists n[p(w) \ \& \ p=\lambda w'[n=max(\lambda n[\neg \exists y[person_{w'}(y) \ \& \ y \ fed \ n \ dogs \ in \ w']])]]$

(84a) will be defined, because the subexpression (85a) is defined, the argument set of the maximality operator having a greatest element: there is a greatest number of dogs fed by nobody. In (85b), by contrast, there is no greatest element in the set that is the argument of the maximality operator - there is no greatest number n such that nobody fed n-many dogs - hence (84b) is undefined. This captures the fact that (83) only has a reading that can be formalized by (84a), but not the reading in (84b).

(85)　　a.　　　$max(\lambda n[\exists X[dogs_{w'}(X) \ \& \ card(X) =n \ \& \ nobody \ fed \ X \ in \ w']])$
　　　　b.　　　$max(\lambda n[\neg \exists y[person_{w'}(y) \ \& \ y \ fed \ n \ dogs \ in \ w']])$

The assumption of a maximality operator will thus explain the negative island effect in degree questions: the unavailable readings are those in which the presence of a maximality operator leads to an undefined semantic interpretation. If this is the only possible interpretation, the sentence is ungrammatical.

This is obviously a very attractive explanation: in contrast to several of the other proposals, it is semantically explicit. Moreover, it seems as though the maximality operator were well motivated on general grounds. If this is the case, we basically get the negative island effect for free. The unavailablity of the readings in question follows automatically from the semantics. This would make a syntactic account superfluous. Moreover, a semantic explanation would lead one to expect that

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[67]I use a slightly different semantics for indefinites from Rullmann´s, but this is irrelevant here.

the effect is fairly universal. Since many languages exhibit a negative island effect, this seems another bonus.

The elegance of this explanation lies in the assumption that the maximality operator is needed in questions anyway. It is motivated by maximality in degree questions, and by exhaustivity in questions in general.

Both these assumptions will be challenged in section 4.5.2. There are counterexamples to maximality in degree questions, and there is an alternative view of exhaustivity in questions that will be argued to be more attractive than the view that underlies the maximality operator. I will come back to the consequences these considerations have for negative islands in section 4.5.3. It should be stressed that the subsequent discussion concerns *wh*-questions only, and does not challenge Rullmann´s claim that there is a maximality operator in the other types of *wh*-constructions.

4.5.2. Maximality and Exhaustivity - an alternative analysis

In this section, certain empirical problems for a maximality operator will be presented. This includes examples like (86), which requires naming the minimal number of eggs that are sufficient.

(86)   How many eggs are sufficient to bake this cake?

On the basis of such examples it will be argued that there cannot be a maximality operator in the semantics of questions (section 4.5.2.1.). The problem then is to present a satisfactory analysis of degree questions including the fact that they require an answer of a certain type. Rullmann´s idea that maximality in degree questions is one and the same thing as exhaustivity, which I think is an important insight, will be adopted; however, a different implementation of this idea is chosen. The suggestion is that the various data should receive a uniform explanation in terms of maximal informativeness. I will propose with Beck & Rullmann (1996) that a notion of answerhood due to Heim (1994) already captures the maximality effect without running into the same trouble as the maximality operator does with respect to (86) (section 4.5.2.2.). It will be shown how Heim´s proposal relates to Rullmann´s (1995) analysis as well as to a G&S analysis.

This leads to a more general discussion of exhaustivity in questions, in which I argue (following Beck & Rullmann (1996)) for a flexible approach to exhaustivity

(section 4.5.2.3.). Heim (1994) reanalyzes exhaustivity not as a property of the semantics of a question itself, but as a property of the notion of answerhood. Her analysis can in a sense remodel G&S´s and Rullmann´s results, which build strong exhaustivity into the basic question denotation. However, the differences between this proposal and the ones that incorporate strong exhaustivity into the basic question denotation are not merely a matter of implementation. The section is devoted to the differences between the two proposals and their potential empirical implications. This includes discussion of well-known phenomena (like different kinds of question embedding verbs and mention-some interpretations) as well as some new data (in particular a type of degree question that involves *at least* and *at most*). We will see that by adopting Heim´s perspective on the question-answer relation we get a theory which allows for a more flexible approach to weak and strong exhaustivity than the one defended by G&S or Rullmann (1995).

Finally (section 4.5.2.4.), two ways will be discussed in which flexible exhaustivity could be implemented. I will conclude that this leaves us with a satisfactory analysis of degree questions in a Hamblin/Karttunen framework which does not involve a maximality operator. Moreover, these considerations show that an alternative, flexible approach to exhaustivity ought to be considered.

Apart from minor changes, this section consists of work co-authored with Hotze Rullmann (Beck & Rullmann (1996)).

4.5.2.1. Problems with the maximality operator

4.5.2.1.1. Degree questions requiring a minimal answer

Consider a question like (87):

(87)   How many eggs are sufficient (to bake this cake)?

Intuitively, if you ask (87), you want to know the smallest number n, such that n eggs would be enough. The interpretation we would get for (87) according to Rullmann (1995), however, is given in (88):

(88)   ?n: n=max(λn'[n' eggs are sufficient to bake this cake])

This is not a satisfactory interpretation for (87), for two (related) reasons. Firstly, the maximum is likely to be undefined in this case: Suppose that in fact, three eggs are sufficient to bake the cake, but fewer than three eggs are not. Then four eggs are also sufficient, and so are five, six etc. So there is no largest number of eggs that would be sufficient. Let us ignore this problem for a moment, though. Maybe the set of numbers is contextually restricted in some way, so that a largest element is defined. Even then, we do not end up with the desired interpretation for the question, because this gives us the largest number of eggs sufficient, while we intuitively want the smallest such number, namely three.

So if we formalize (87) in a way analogous to Rullmann´s proposal, a more appropriate solution would be (89):

(89)   ?n: n=min(λn'[n' eggs are sufficient to bake this cake])

There are a few other predicates that behave in the same way as *be sufficient*:

(90)   a.   Mit   wievielGeld   kann   ein   Professor auskommen?
                With   how much   money can   a   professor make do
                "On how much money can a professor live?"
        b.   Wie   weit   zu   schwimmen   ist   ausreichend?
                How   far   to   swim   is   sufficient
                "How far is it sufficient to swim?"
        c.   Wieviel   Arsen kann   einen   Menschen   umbringen?
                How much   arsenic can   a   man   kill
                "How much arsenic is enough to kill somebody?"
        d.   How big a difference (in light intensity)is perceivable?

In all these examples, an appropriate answer would name a minimum (the minimal amount of money on which a professor can live, the minimal distance it suffices to swim etc.), rather than a maximum. Why should that be the case?

The "minimum" interpretation crucially depends on what will be called the question predicate. I will somewhat informally use this term to refer to what is the argument of the max operator in formulas like (88).

In the degree questions that required maximal answers, we always had question predicates that allowed inferences from larger dergrees to smaller degrees. So for instance in (91) the question predicate (91b) allows inferences from a number

n to numbers m smaller than n; i.e. if John has read five books, then he has also read four books, three books etc.

(91) a.   How many books did John read?
      b.   λn'[John read n' books in w']

So in (91) the question predicate has the following property:

(92)   A predicate P is downward scalar iff
        For all n,m: P(n) & m≤n   ->   P(m)

In the minimality inducing examples (87) and (90), on the other hand, the question predicate had the reverse property:

(93)   A predicate P is upward scalar iff
        For all n,m: P(n) & n≤m   ->   P(m)

So for instance if three eggs are sufficient, then four eggs, five eggs etc. will also be sufficient.

The suggestion is that the difference between the maximality inducing examples and the minimality inducing ones boils down to informativity. In case the question predicate allows inferences from a large number to smaller ones, the most informative answer to the question will be to name the maximum, since this implies all other true answers. In the minimality case, it is most informative to give the minimum answer because here the minimum implies all other true answers.

Therefore, I believe that it is misguided to give the maximum (or, for that matter, the minimum) any special status. We should have neither a maximum nor a minimum operator in the semantics of degree questions. Note that we do not get an ambiguity; what type of answer is required seems fixed for a given predicate. The fact that we choose the "maximum" answer in the case of downward scalar predicates should follow from general principles. The same principles should account for the fact that upward scalar predicates require a minimum answer.

The upward scalar predicates seem to be considerably rarer. I do not at present know why this should be so; it explains, however, why they were first overlooked.

So far, these remarks on informativity have been completely informal. Before we turn to a proper formalization of this idea, I will discuss another type of question predicate that behaves in yet another way with degree questions.

4.5.2.1.2. Degree questions with nonscalar predicates

Consider (94):

(94)   a.   With how many people can you play this game?
        b.   How many courses are you allowed to take per semester?
        c.   How high can a helicopter fly?

A complete answer to (94a) could be, for instance, between 4 and 6. This is, in effect, a complete list of all true answers to the question, or to put it differently, their conjunction. Similarly for the other examples.

The question predicates in (94) are predicates that do not allow inferences either from large degrees to smaller ones or the other way around. If it is permissible to take five courses per semester, for example, then nothing follows about the possibility of taking six courses or four courses. You might be required to take at least five courses. On the other hand, six might be too many. In other words, in cases like (94) we know that there might be a lower bound as well as an upper bound for the degrees that the predicate applies to. More complicated scenarios are conceivable, for example that you are allowed to take either 4 courses or else between 6 and 8. Or a game may be played with any even number of players.

In other words, the question predicates are neither downward scalar nor upward scalar. I will refer to them as nonscalar predicates. Since in these cases naming one true answer does not allow any inferences, the only fully informative answer is the conjunction of all true answers. So this is a case where neither a maximum nor a minimum operator would get us anywhere. Resorting to informativeness, however, is still a natural thing to do.

4.5.2.2. Maximal informativeness of answers

4.5.2.2.1. Answer1

We are now in a position to formalize the idea that informativeness is the crucial notion in describing the types of answers you get in degree questions. The strategy pursued will be to incorporate informativeness not into the semantics of the question, but into the definition of answerhood to a question. I will take as my starting point the ordinary Hamblin/Karttunen semantics for questions. On the basis of that I will define the concept of a maximally informative answer. As it turns out, the notion of maximally informative answer that we need for degree questions has already been formalized as a concept of answerhood in the Karttunen system by Heim (1994), who calls it answer1.[68]

(95)   the answer1 to a question Q in w, answer1(Q)(w) = $\cap$\{p: Q(w)(p) \& p(w)\}

Answer1 is the intersection of all true propositions in the question extension. Later on, we will see a second concept of answerhood, answer2. Q is the Hamblin/Karttunen intension. To see how answer1 works, we will now consider an example for each of our three types of question predicate.

The easiest case is the nonscalar predicates. Intersection of all true propositions in the Hamblin/Karttunen denotation of the question is just conjunction of all those propositions in which the question predicate is truthfully applied to its argument. So for instance in (96a), given the Hamblin/Karttunen intension (96b),[69]

(96)   a. How many courses are you allowed to take?
        b.$\lambda w\lambda p\exists n[R(w)(n)$ \& $p=\lambda w'[$you are allowed in w' to take n courses$]]$

the intersection of the true propositions in (96b) will be the conjunction of all the true propositions of the form "you are allowed to take n courses". So for instance if

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[68]There is a trivial difference between this definition of answer1 and the one in Heim (1994) and Beck & Rullmann (1996) because in the latter two, the definition was based on a Karttunen semantics, while here, answer1 operates on a Hamblin/Karttunen denotation.

[69]In this semantics, forming the intension doesn´t actually do very much. The only world variable that gets bound is in the restriction of the variable introduced by the wh-phrase. That restriction isn´t even explicit in many cases we are going to look at.

you are actually allowed to take either four or between six and eight courses, answer1(⟧(96a)])(w) would be the following proposition:

(97)   λw[you are allowed to take 4 courses in w and you are allowed to take 6 courses in w and you are allowed to take 7 courses in w and you are allowed to take 8 courses in w]

In the case of a downward scalar question like (98a) answer1(⟧(98a)])(w) would be as in (98b):

(98)   a.   How many books did John read?
       b.   ∩{q: λw"λp∃n[R(w")(n) & p = λw'[John read n books in w']](w)(q)
                  & q(w)}
       c.   λw'[John read 5 books in w']

Now suppose that John actually read five books (and no more than five). The proposition that John read four books (which is also in the Hamblin/Karttunen denotation of (98a)) is actually a superset of the proposition that he read five books. Similarly for the other true propositions of the form "John read n books". So the intersection of all these propositions is the same set as the proposition that John read five books, (98c). answer1(⟧(98a)])(w) is thus identical to the maximum answer.

    Finally, consider a minimum case like (99a). Answer1 (⟧(99a)])(w) would be constructed as in (99b):

(99)   a.   How many eggs are sufficient?
       b.   ∩{q: λw"λp∃n[R(w")(n) & p= λw'[n eggs are sufficient in w']](w)(q)
                  & q(w)}
       c.   λw'[3 eggs are sufficient in w']

Let us assume once more that three eggs are sufficient (and fewer than three eggs are not sufficient). The true propositions in the Hamblin/Karttunen denotation are of the form "n eggs are sufficient" for n ≥ 3. The proposition that three eggs are sufficient is a subset of all these propositions. Therefore, the intersection of all the propositons is identical to the proposition that three eggs are sufficient, (99c). We thus end up with the minimum answer as answer1(⟧(99a)])(w).

Note that it can only make a difference whether we take the maximal, minimal and intersective answer if there is more than one true proposition in the original Hamblin/Karttunen denotation (i.e. if there is more than one true "simple" answer to the question). Frequently, there is only one true propostion in that set (as in cases involving modal necessity). Cases with modal possibility are frequently cases in which the Hamblin/Karttunen denotation contains more than one true proposition. That is why so many of the examples given involve modals like *can* or *be allowed to*. What type of answer we get then depends on the inferential properties of the predicate.

So for the three types of degree questions that we have looked at, the notion of answer1 seems to give good results. This notion will now be related to Rullmann's original proposal as well as to G&S's semantics for questions. In the course of doing that we will also get back to the issue of exhaustivity.

4.5.2.2.2. Answer2

Compare the denotation of answer1 for example (100a), (100b), to Rullmann´s (1995) semantics of (100c) (assuming the same facts about the actual world as before):

(100)   a.   How many books did John read?
        b. λw[John read five books in w]
        c. $\lambda w[\max(\lambda n$[John read n books in w])=5]

The two propositions are not identical. While (100c) contains the information that five is the maximal number of books John read, (100b) expresses just the proposition that John read five books. Rullmann´s semantics and answer1 also differ in (101):

(101)   a.   Who was at the party?
        b. λw[Mary+Sue+Jane were at the party in w]
        c. $\lambda w[\max(\lambda x$[x was at the party in w])=Mary+Sue+Jane]

(101c) expresses the proposition that the maximal group that was at the party consists of Mary, Sue and Jane. (101b) just says that Mary, Sue and Jane were at the party, without any information as to whether there were other people there or not. In

other words, (101b) gives the complete true answer, while (101c) gives the complete true answer plus the information that this is the complete true answer to the question.

Rullmann shows that (101c) in a sense captures the same information as the G&S denotation (102) of (101a) (for discussion of a G&S semantics for interrogatives the reader is referred to G&S (1982)):

(102)   λw'[λx[x was at the party in w']=λx[x was at the party in w]]

(102) captures strong exhaustivity: Suppose John knows (102). This means that he knows the proposition that the set of people who were at the party is what it actually is. That is, he knows the exact extension of the set of people at the party, and knows that that is the extension of that set. This implies that for any given individual, he knows whether that individual is in the set or not. This covers both weak and strong exhaustivity.

So essentially, while Rullmann´s proposal and Groenendijk & Stokhofs semantics incorporate strong exhaustivity, the notion of answer1 only yields weak exhaustivity, since any information concerning negative instances is lacking.

Discussion of this issue in the last decade has made clear at least that we need to have strong exhaustivity at some points, for example in questions embedded under the verb *know*. Fortunately, Heim´s (1994) paper already contains a proposal of how to get strong exhaustivity from answer1, her notion of answer2.

(103)   answer2(Q)(w) = λw'[answer1(Q)(w') = answer1(Q)(w)]

This second notion of answer corresponds to the proposition that the complete true answer (in the first sense) to the question is what it actually is. Heim (1994) shows that answer2 will in general produce the same truth conditions as the G&S-semantics. In certain cases this equivalence breaks down. See Heim (1994) for discussion.[70] These cases can be disregarded here.

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[70]These are cases that concern the interpretation of the common noun argument of *which*-phrases. G&S distinguish a *de re* and a *de dicto* interpretation of *which*-phrases, depending on whether the common noun is interpreted inside or outside the scope of the interrogative operator. In a Karttunen semantics, it is interpreted outside (*de re*), while G&S account for the *de dicto* interpretation. The *de re* interpretation is of course inherited by the answer2 of a question from the basic question denotation, hence in these cases, answer2 is not equivalent to the G&S denotation. These cases do not directly concern us here. Moreover, I hope to work out a solution to the *de dicto* problem in a Karttunen framework in future work with Hotze Rullmann. My conjecture is that it will then be possible to achieve a complete equivalence of the G&S denotation and answer2.

This means that one can obtain the information needed to capture strong exhaustivity from the original Hamblin/Karttunen denotation, by applying answer1 and answer2.

Answer2 in a sense remodels a G&S semantics. Moreover, it can be presumed that a G&S semantics gives fairly good results for degree questions (although this won´t be discussed here; G&S don´t treat degree questions explicitly). This raises the question of why we went through all this trouble of defining notions of answerhood on the basis of a Hamblin/Karttunen semantics, if we could have had a satisfactory result in a G&S semantics straightforwardly without such a fuss. This question will be addressed in the next section.

Maybe at this point a remark on the status of these notions of answerhood is in order. It might be supposed that they are convenient technical notions designed to give the right results formally, but without much conceptual foundation. I think that the opposite is the case. I consider Heim´s formalizations of answer1 and answer2 an important step in developing an understanding of the role and interpretation of interrogatives in natural language semantics. The idea is that interrogatives do not always enter semantic composition with their basic question denotation. To give an example, if "x knows Q" is true (where Q is an interrogative sentence), then the subject does not stand in the know-relation to a question (in contrast, possibly, to relations like *wonder*, which might be a relation a subject bears towards a question denotation), but to the answer, in some sense, to the question. Since for "x knows Q" to be true, x has to know a certain proposition, G&S concluded that Q denotes that proposition. Heim´s proposal is quite different: one does not know a question, one knows an answer to a question. Therefore, we need not conclude that Q itself denotes a proposition. Rather, it seems a natural mechanism of the interpretation of interrogatives to step from the question denotation to an answer to that question.
The notion of being an answer to a question leaves room for various concepts of what constitutes an answer to a question. This will also crop up in the discussion of the noun *answer*. Answer1 and answer2 are two possible formal notions that can be employed, both corresponding to intuitive concepts of complete answers. Later on we will see that there is at least one more concept of answerhood, "example" or "simple" answers.

4.5.2.3. Arguments for a flexible approach to exhaustivity

Summarizing the discussion so far, we have a theory of questions which makes available at least three distinct semantic objects that are associated with a question. Firstly, there is the Hamblin/Karttunen denotation, the set of all propositions that count as (not necessarily exhaustive) answers to the question. Let's call this set Q(w) (Q being the Hamblin/Karttunen intension). Secondly, we have answer1(Q)(w), the proposition that is the intersection of all true members of Q(w). This constitutes the weakly exhaustive true answer to the question. Thirdly, we have answer2(Q)(w), which is the strongly exhaustive answer to the question and which is (almost) the same as the denotation that G&S assign to questions. An important question that arises then is whether we really need all three of these notions, or whether we could as well have assumed a theory that associates with interrogatives only a strongly exhaustive question denotation. In this section this question will be addressed; it will be argued that having all three notions allows one to adopt a more flexible theory that takes into account cases in which insisting on strong exhaustivity gives rise to truth conditions that appear to be stronger than is intuitively justified. This position is greatly inspired by Heim (1994) who also provides many of the arguments discussed in this section.

The points that are going to be made are not necessarily problematic for a theory that incorporates strong exhaustivity when taken individually - G&S explicitly discuss and account for some of them, in particular the mention-some interpretations. Nonetheless, the global picture that emerges supports a rich and flexible system which provides a range of interpretations for questions with various degrees of exhaustivity, because of its greater overall simplicity and elegance. In addition, at certain points facts will be presented that are problematic for G&S, or Rullmann (1995), or in fact any theory that treats strong exhaustivity as a property of the basic question denotation. This will be mentioned explicitly in each case. So this section argues for a Hamblin/Karttunen semantics as the basic question denotation, and against incorporating strong exhaustivity at the level of the question in any form.

4.5.2.3.1. Weak exhaustivity

As Heim points out, although it is possible to define answer2 in terms of answer1, and answer1 in terms of the Hamblin/Karttunen denotation, this is crucially a one-way street. When we have only answer2, it's not possible to get back answer1 or the

Hamblin/Karttunen denotation.[71] So in a certain sense, answer2 contains less information than answer1 and the Hamblin/Karttunen denotation. For instance, because a question and its negation impose the same partition on the set of possible worlds, (104a) and (104b) will have the same answer2, but their Hamblin/Karttunen denotation and answer1 will generally differ:

(104)   a.   Who was at the party?
        b.   Who was not at the party?

To see this, suppose that Mary, Sue and Jane were at the party and Roger, Graham and Marc were not, and that that´s all the people in the context. Then answer1(](104a)])(w) will be (105), and answer1(](104b)])(w) will be (106).

(105)   λw[Mary+Sue+Jane were at the party in w]

(106)   λw[Roger+Graham+Marc were not at the party in w]

Answer2(](104a)])(w) will be (107), and answer2(](104b)])(w) will be (108):

(107)   λw[answer1(](104a)])(w) = λw'[Mary+Sue+Jane were at the party in w']]

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[71]I add an informal proof.
What we are interested in is whether we can recover from the G&S semantics Q[G&S]of a given question Q its Hamblin/Karttunen semantics Q[H/K] or answer1(Q[H/K]) (Q[G&S] being the same as answer2(Q[H/K]) in the cases we are looking at).
So, is there a function f such that for any question Q, f(Q[G&S])=Q[H/K], or a function g such that for any question Q, g(Q[G&S])=answer1(Q[H/K])?
Consider (ia,b):

(i)   a.   Who left?
        b   Who didn´t leave?

The G&S-semantics of (ia) is the same as the G&S semantics of (ib):

(ii)   (ia)[G&S]=(ib)[G&S]= λwλw'[λx[x left in w] = λx[x left in w']]

This is because the set of worlds in which the set of leavers is a certain set is identical to the set of worlds in which the set of non-leavers is the complement of that set. A question and the corresponding negated question impose the same partition on the set of possible worlds.
However, obviously the Hamblin/Karttunen semantics of (ia), (ia)[H/K], is not the same as the Hamblin/Karttunen semantics (ib)[H/K] of (ib). Accordingly, neither is answer1((ia)[H/K]) identical to answer1((ib)[H/K]). Therefore we cannot find functions f and g above, since f((ia)/(ib)[G&S]) cannot yield two different values for the same argument, or it would not be a function. Similarly for g.

(108) λw[answer1(](104b)])(w) =

$\qquad$ λw'[Roger+Graham+Marc were not at the party in w']]

However, these two sets of possible worlds will be identical, since whenever the answer1 to (104a) will be the proposition that Mary, Sue and Jane were at the party, the answer1 to the negated question will be that the complement of Mary, Sue and Jane in the universe of discourse were not at the party.

It is easy to see that the G&S denotations (109) and (110) of (104a) and (104b) will be identical:

(109) λw'[λx[x was at the party in w']=λx[x was at the party in w]]

(110) λw'[λx[x was not at the party in w']=λx[x was not at the party in w]]

The same holds for the Rullmann denotations of (104a) and (104b). Thus the strongly exhaustive question denotations cannot distinguish between an affirmative question and its negation. One potential problem for strong exhaustivity will therefore be question-embedding verbs which discriminate between an embedded question and its negation. A case in point are emotive factives such as *surprise* (Berman 1991, Heim 1994). As Berman argues, (111b) may very well be true although (111a) is false, for instance in a situation in which everyone who was at the party was expected to be there by the speaker, but some people who were also expected to be there did not show up:

(111) a.   It surprised me who was at the party.
        b.   It surprised me who was not at the party.

This can be captured easily if we have the notion of answer1 at our disposal, but not if the only thing we have is (information amounting to) answer2.

Another example illustrating the same problem are propositional attitude verbs which refer to ways of conveying information, like *tell, read, write down* and *list*. These verbs seem to have two distinct senses, a transparent and a non-transparent one (cf. Heim 1994). On the transparent sense of *read*, reading who was at the party implies reading who was not at the party. This is the sense that G&S seem to have in mind when they argue for strong exhaustivity. However, although I don´t doubt the existence of the transparent sense, there is certainly also a sense in

which (112a) and (112b) are not equivalent - and in fact this probably is the sense in which this class of verbs is ordinarily understood:

(112)   a.   John read/wrote down who was at the party.
        b.   John read/wrote down who was not at the party.

I agree with Heim (1994) that there is an interpretation for these verbs (which is still fairly transparent, but not completely) in which for instance *tell* means something like *cause one to know answer2 by uttering answer1*. The point is that in this sense the verbs would make use of answer1 as well as answer2.

A third case in which answer1 seems to play a role in embedded *wh*-constructions is based on the semantics of the noun *answer* (Heim (1994)). She notes that (113) may be true in a situation where John just happens to know a proposition which constitutes the strongly exhaustive answer to the embedded question, even if he is not aware that it is the weakly exhaustive answer.

(113)   John knows the answer to the question who was at the party.

So suppose that Mary and Sue were the only party guests then (113) is true if John knows the propositions that Mary and Sue were at the party, even if he believes (wrongly) that others attended the party as well. The noun *answer* must therefore mean answer1. But because answer1 cannot be retrieved from answer2, this implies that the embedded question itself cannot be strongly exhaustive.

Heim's argument can actually be extended to show that in certain cases the noun answer is not even weakly exhaustive. This is the case when it is combined with an indefinite determiner as in (114):[72]

(114)   John knew only one answer to the question who won a medal at the
        Barcelona Olympics.

This sentence will be true iff John was able to mention exactly one medalist. In this case the noun *answer* must be construed as referring to non-exhaustive true answers, that is, the true propositions in the Hamblin/Karttunen-set. This concept of answerhood will be formalized later. It corresponds to "simple" or example answers

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[72]I owe this observation and the example to Hotze Rullmann.

mentioned earlier, and is an instance of the so-called "mention-some reading of questions" (see below) - which will be reanalyzed not as a reading of the question, but as one particular underlying notion of answerhood. Thus we see that intuitions about the noun *answer* can be regarded as the intuitive foundation of the formal definitions of answerhood.

4.5.2.3.2. Mention-some readings

Another argument showing that sometimes questions are not even weakly exhaustive can be based on what G&S call the mention-some interpretation of questions (see especially G&S 1984, chapter 6). Some examples which favour the mention-some interpretation are the following:

(115)   a.   John knows where you can buy the New York Times.
        b.   Mary told me how to get to the train station.

(115a) for instance has a reading on which it is true even if John isn't able to provide a complete list of places where one can buy the NYT, but only one particular location, say, the newsstand at the train station. G&S account for the existence of the mention-some interpretation in terms of disjunctions of questions - an analysis which I won´t discuss here. What is relevant for the present purposes is that the mention-some interpretation can be straightforwardly captured if we can avail ourselves of the Hamblin/Karttunen-interpretation of the embedded question. On the mention-some interpretation (115a) will be true iff John knows at least one of the true propositions in the Hamblin/Karttunen denotation of the embedded question, as indicated in (116).

(116)   ∃p[know(John,p,w) & where_can_you_buy_the_NYT'(w)(p) & p(w)]

The underlying notion of answerhood can be formalized as in (117):

(117)   answer3(Q)(w) = λP[∃p[P(w)(p) & Q(w)(p) & p(w)]]

This is the set of all properties that a true element of the Hamblin/Karttunen set has. Applied to the example, we get (118):

(118) answer3(Q)(w)(λw'λp'[know(John,p',w')])   iff

λP[∃p[P(w)(p) & Q(w)(p) & p(w)]] (λw'λp'[know(John,p',w')])   iff

∃p[know(John,p,w) & Q(w)(p) & p(w)]

where Q = (119):

(119) λw'λp[∃x[place(w')(x) & p=λw[you can buy the NYT at x in w]]

Note that the mention-some interpretation represents a case in which not only strong, but also weak exhaustivity fails.

An important question is when the mention-some interpretation is actually available. For many speakers it only seems to be possible in principle if the question contains a modal element of some sort. Other factors that obviously play a role are of a pragmatic nature, including considerations of plausibility and world knowledge. I will not go into this here.

4.5.2.3.3. (Non-)exhaustivity markers

Yet another argument in favour of a flexible approach to exhaustivity derives from the use of various linguistic expressions to explicitly mark a question as being understood either exhaustively or non-exhaustively. One such marker is the expression *for example* in (120):

(120) Who for example was at the party last night?

By adding *for example* the speaker makes explicit that she will be satisfied with a non-exhaustive answer to the question. *For example* cannot easily occur in embedded questions. However, there are other non-exhaustivity markers in other languages that can. In Dutch we find *zoal* (see (121)), and in German its cognate *so* (see (122)).

(121) Jan wil weten wie er zoal op het feest waren.
       Jan wants know who there zoal at the party were
       "John wants to know who for example were at the party"

(122) Hans will wissen, wer so auf dem Fest war.

Hans	wants	know		who	so	at	the	party	was

"John wants to know who for example were at the party"

For (122) to be true, Hans wants to know a representative sample of people who were at the party. This clearly is a non-exhaustive interpretation. Although I will not provide a formal interpretation for non-exhaustivity-markers, I believe that intuitively their existence shows that questions in natural language in principle have the option of being interpreted non-exhaustively. The question can be marked to enforce this interpretation.

In addition to non-exhaustivity markers we find expressions in natural language which can be used to indicate exhaustivity. German has the word *alles* which has exactly that function (Reis (1992), Beck (1996)), and in Dutch we find the corresponding *allemaal*:

(123)
Hij	weet	wie	er	allemaal	op	het feest	waren.
He	knows	who	there	all	at	the party	were

"He knows who all were at the party"

(124)
Er	weiss,	wer	alles	auf	dem	Fest	war.
He	knows	who	all	at	the	party	was

"He knows who all were at the party"

What these expressions do is force a (weakly) exhaustive interpretation of the question in which they are contained. They are incompatible with a mention-some interpretation:

(125)
Hans	weiss	wo	man	alles/ueberall	die	NYT	kaufen	kann
Hans	knows	where	one	all/everywhere	the	NYT	buy	can

"Hans knows where all you can buy the NYT."

In contrast to (115a), (125) does not have the mention-some interpretation and can only be interpreted exhaustively. It should be pointed out though that *alles* and *allemaal* do not force strong exhaustivity, which explains why they are not incompatible with the class of verbs mentioned earlier like *surprise* which disprefer a strongly exhaustive interpretation:

(126) Es   hat   mich   überrascht,   wer   alles   auf   dem   Fest
      war.

      it   has   me   surprised   who   all   at   the   party   was

      "It surprised me who all was at the party."

I suggest the following semantics for *allemaal/alles/all* (repeated from chapter 2):

(127)   alles(Q)(w) = λp[p=∩(Q(w))]

Alles operates on a question denotation and gives us a weakly exhaustive interpretation, i.e. a set containing weakly exhaustive alternatives (among them a true one, the proposition corresponding to answer1).[73] Since the proposal is to deal with mention-some interpretations via the true elements in the question denotation, from (125) there will be no way back to a real mention-some interpretation. The only true element in the set denoted by the question is already weakly exhaustive.

    Just like non-exhaustivity markers such as *for example*, exhaustivity markers like German *alles* pose a challenge to a theory that uniformly gives every question an exhaustive interpretation. If the basic meaning of questions already were an exhaustive one, exhaustivity markers would be superfluous and the question with the exhaustivity marker should have exactly the same interpretation as the corresponding question without it. However, this does not seem to be the case: (125) differs in meaning from (115) in that the former does not allow a nonexhaustive interpretation whereas the latter does. A rigid approach to exhaustivity will have no way to deal with this difference (for instance the G&S approach to the mention-some interpretation could not, as far as I can see, predict that (125) does not have a mention-some interpretation, since *alles* could make no difference to the original question interpretation).

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[73]This might not capture all aspects of the interpretation of *alles*. *Alles* seems to presuppose plurality, in some sense, since it is incompatible with wh-phrases marked explicitly as singular:

      (i)   *   Welches Mädchen   hat   alles   geniest?
                which   girl   has   all   sneezed
            '   Which girl sneezed?'

I am not quite sure about the acceptability of (ii):

      (ii) ?   Welches Mädchen   hat   alles   welches Pferd   geritten?
                which   girl   has   all   which   horse   ridden
                'Which girl rode which horse?'

If (ii) is acceptable, the (un-)grammaticality of *alles* should not be linked to a particular wh-phrase.

4.5.2.3.4. Degree questions with *at least/at most*

The next argument gets us back to the issue of degree questions. Consider the paradigm in (128).

(128) a.   Wieviele   Leute   waren da?
                How many   people were   there
                "How many people were there?"
       b.   Wieviele   Leute   waren mindestens   da?
                How many   people were   at least   there
                "How many people were there at least?"
       c.   Wieviele   Leute   waren hoechstens   da?
                How many   people were   at most   there
                "How many people were there at most?"

The intuition is clear that (128a-c) mean something different. This holds also for the embedded case:

(129) a.   Hans weiss,   wieviele   Leute   da   waren.
                Hans knows   how many   people there   were
                "Hans knows how many people were there"
       b.   Hans weiss,   wieviele   Leute mindestens   da   waren.
                Hans knows   how many   people at least   there   were
                "Hans knows how many people were there at least"
       c.   Hans weiss,   wieviele   Leute hoechstens   da   waren.
                Hans knows   how many   people at most   there   were
                "Hans knows how many people were there at most"

(129b) and (129c) are actually a bit odd. We will come to a tentative explanation for that in a minute.

    Intuitively, for (129a) to be true, Hans has to know the exact number of people who where there. For (129b) to be true, he has to know a reasonable lower bound of the number of people who were there, for (129c) a reasonable upper bound. So for example if in fact 86 people were there, and Hans knows that definitely no more than 90 people were there, one could truthfully utter (129c).

    For the following formal discussion I will assume that *at least* and *at most* mean exactly what they normally do, namely (130)

(130) a.   at least n (N) (P) <=> card(λx[N(x) & P(x)]) $\geq$ n
       b.   at most n (N) (P) <=> card(λx[N(x) & P(x)]) $\leq$ n

(131) a-c are the Hamblin/Karttunen denotations of (128) a-c:

(131)   a. $\lambda p \exists n[R(w)(n)$ & $p=\lambda w'[\exists x[people(x)$ & $card(x)=n$ & $were\_there(x)(w')]]]$
      b. $\lambda p \exists n[R(w)(n)$ & $p=\lambda w'[card(\lambda x[people(x)$ & $were\_there(x)(w')]) \geq n]]$
      c. $\lambda p \exists n[R(w)(n)$ & $p=\lambda w'[card(\lambda x[people(x)$ & $were\_there(x)(w')]) \leq n]]$

Now suppose that actually 86 people were there. The propositions in (131b), for example, will be "at least n people were there", for some n. The true propositions among them will be "at least n people were there", for some $n \leq 86$. Those propositions are ordered, the proposition that at least 86 people were there being a subset of all the others. The answer1 of (128b) will thus be (132b). Applying answer1 to the other two sets will result in the propositions (132a) and (132c) (in the same context):

(132)   a. $\lambda w[86$ people were there in w]
      b. $\lambda w[$ at least 86 people were there in w]
      c. $\lambda w[$ at most 86 people were there in w]

This would mean that for Hans to know how many people were there at most, he would have to know that at most the actual number of people were there. This is not the result we intuitively want: It is sufficient for Hans to know that definitely no more than a reasonable upper bound of the actual number of people were there. The same holds for (128b). The ordinary G&S interpretation runs into the same problem. Note that here also, a maximality operator would give the wrong results: (128b) would come out as (128a), while (128c) is undefined.

What is going on here? I think that in (128b,c) the mention-some interpretation is the only one that makes sense. An exhaustive interpretation of any kind will always lead to unintuitive results in that the resulting interpretation predicts truth conditions that are too strong. So technically (128)a-c are just more instances of a mention-some interpretation. They were discussed separately because (i) the data are quite interesting by themselves, (ii), because they pose another fairly obvious problem for a maximality operator, and (iii), because they show that non-exhaustivity in the case of degree questions will be non-maximality and non-minimality, and that that is in fact possible in degree questions. Another example

demonstrating this might be (133) in an appropriate context (e.g. an artist wanting to make a realistic life-size sculpture of a polar bear).

(133)   How tall can a polar bear be?

The enforced mention-some interpretation might be what makes (129b,c) odd: A predicate like *know* seems to favour exhaustive interpretations. So in order to interpret (129b,c), one might have to use a slightly disfavoured way of combinig the question meaning with *know*.

4.5.2.4. Two approaches to flexible exhaustivity

I have reviewed a number of arguments, partly taken from the existing literature, which show that questions do not uniformly receive a (weakly or strongly) exhaustive interpretation. Jointly and separately, these arguments undercut an approach in which exhaustivity is built directly into the basic meaning of the question (like G&S´s semantics and Rullmann´s (1995)). However, G&S have shown that at least in some cases (strong) exhaustivity is called for, especially when we are dealing with an embedding verb like *know*. I therefore conclude with Beck & Rullmann (1996) that a flexible approach to exhaustivity is called for, one in which the basic denotation of questions is a non-exhaustive one, but where exhaustivity may arise as a result of several factors that are so to speak external to the question itself. The three formal notions discussed in this section (the Hamblin/Karttunen denotation, answer1, and answer2) might play a key role in articulating such an approach. This immediately raises the important question of when and how exhaustivity of either variety comes into play. I do not have a definitive answer to these questions, but I will discuss two possible ways one may go about answering them. Both approaches have in common that they assign to the question the non-exhaustive Hamblin/Karttunen denotation as its basic interpretation. They differ however in the way in which weak and strong exhaustivity comes into play.

4.5.2.4.1. Lexical semantics

On the first approach, exhaustivity is built into the meaning of certain question-embedding predicates. So for instance, the strongly exhaustive interpretation of the verb *know* could be derived as follows:

(134) a. $know_{exhaust}(Q)(x)(w)$ iff $know_{prop}(answer2(Q)(w))(x)(w)$

Here $know_{prop}$ is the denotation of the propositional attitude verb *know* that takes a that-complement. $know_{exhaust}$ is a relation between a person and a question intension (and a possible world) which is defined in terms of $know_{prop}$. Whether this is done with a meaning postulate or by means of lexical decomposition is immaterial for present purposes. A person x stands in the $know_{exhaust}$-relation to a question-intension Q in a world w iff x stands in the $know_{prop}$-relation to answer2(Q)(w) in w.

Similarly, we can account for the contrast between the "transparent" and the "non-transparent" sense of *write* as follows:

(135) a. $write_{transp}(Q)(x)(w)$ iff $write_{prop}(answer2(Q)(w))(x)(w)$
       b. $write_{nontransp}(Q)(x)(w)$ iff $write_{prop}(answer1(Q)(w))(x)(w)$

4.5.2.4.2. Type shifts

The second approach treats the operations that turn the Hamblin/Karttunen denotation into either answer1, answer2, or answer3 as type shifting operations that turn a set of propositions (the Hamblin/Karttunen denotation) into a proposition. Type shifting is triggered whenever there is a mismatch between the type of argument required by the embedding predicate and the basic type of the embedded question. Some predicates like *wonder* (G&S's intensional verbs) inherently take a complement of the type of a question-intension, $<s,<p,t>>$ (where p is the type of a proposition, $<s,t>$). For such verbs, no type-shifting is necessary. Other verbs - which are extensional in G&S's sense - take propositional complements, of type p. If their complement is an embedded question, it is necessary to apply a type shift. We can now view the answer-operations as type-shifting operations which lower an object of type $<s,<p,t>>$ to one of type p. This is straighforward in the case of answer1 and answer2. Answer3 is a somewhat more complex operation. Technically we turn the question-intension into a generalized quantifier over propositions, of type $<<s,<p,t>>,t>$.

(136) $answer3(Q)(w) = \lambda P[\exists p[P(w)(p) \& Q(w)(p) \& p(w)]]$

This generalized quantifier can now be combined with the question-embedding verb by the standard techniques that are used to combine a quantified object-NP with an extensional verb (QR, quantifying-in, storage, or type shifts), to give the mention-some interpretation (as illustrated in section 4.5.2.3.2). The important point is that the argument of the "question-embedding" verb is again a proposition rather than a question denotation.

On the view of the syntax-semantics interface advocated here, the answer-operations could be operations available in the syntax. The mention-some interpretation of (137), for example, could be derived via the (simplified) LF in (138).

(137)   John knows where you can buy the NYT.

(138)

$$\text{answer3(where\_you\_can\_buy\_the\_NYT')(w)}$$
$$(\lambda w' \; \lambda p'[\text{know(john,w',p')}])$$

```
                                    IP
                   _____/  _____
                  /                    λw' λp'[know(john,w',p')]
                 CP                                    IP
              __/  \__                          _____/  _____
      answer3        CP                    John                I'
                      |                    john               /  \
              where you can                                  I    VP
              buy the NYT                                     |   /  \
                                                            know V    t_i
                                                            know |     p'
                                                                 know
                                                                 know
```
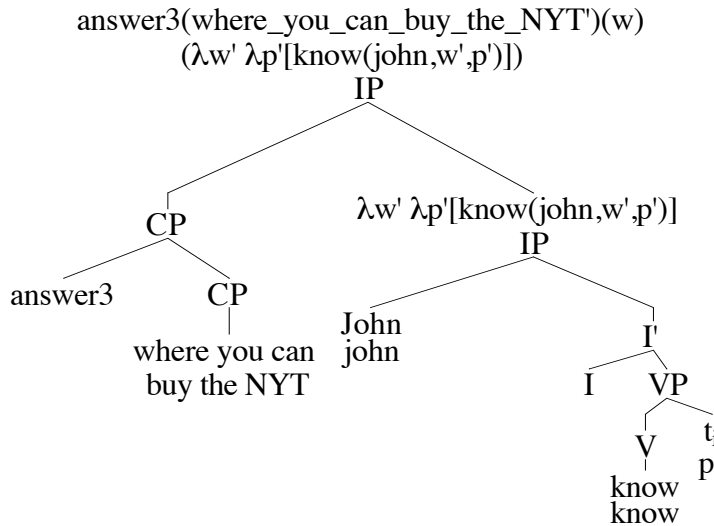
(139)

        answer3(where_you_can_buy_the_NYT')(w)(λw'λp'[know(John,p',w')])

iff   λP[∃p[P(w)(p) & where_you_can_buy_the_NYT'(w)(p) & p(w)]]
            (λw'λp'[know(John,p',w')])

iff   ∃p[know(John,p,w) & where_you_can_buy_the_NYT'(w)(p) & p(w)]

iff   ∃p[know(John,p,w) & λw'λq∃x[place(w')(x) &
                    q=λw''[you can buy the NYT at x in w'']](w)(p) & p(w)]

iff   ∃p[know(John,p,w) &
                ∃x[place(w)(x) & p=λw''[you can buy the NYT at x in w'']] & p(w)]

This will be true iff John knows at least one true proposition "you can buy the NYT at x", where x is a place - the desired mention-some interpretation.

In principle, each of the three typeshifting operations is always available; this accounts for the range of interpretations we have observed in section 4.5.2.3. However, all interpretations are not available, or equally salient, in all contexts. Ideally various external factors can be identified to explain why in fact we find only certain specific readings in many examples. At this point, I have no concrete proposals to make as to what these factors might be, however.

In the first approach (that holds lexical semantics responsible) we do not have this problem: it is possible to specify exactly for each (extensional) question-embedding predicate what sort of interpretation it gets. But since in a sense this is done by brute force, this approach gives up the hope of achieving a really explanatory account of when we get which reading. The second approach aims to provide just that, but it would be fair to say that at this point this is not much more than a promissory note.

It is possible that the truth is somewhere in the middle, i.e. that there is a lexical as well as a grammatical possibility to type shift. Certain shifts seem pretty much lexicalized (e.g. *know* plus answer2), others seem to apply in a more flexible way. (140) might be a case in point, since *believe* does not normally take an interrogative argument.

(140)   You won´t believe who I met last night.

Obviously, (140) is interpretable, and gets interpreted using the answer (in some sense) to the question "who I met last night". It seems undesirable, though, to allow a lexical type shift from propositions to questions in the case of *believe*: the relative grammaticality of (140) is rather unusual, since *believe* normally does not combine with a question complement. The occurance of the negation in (140) can be expected to play a role in the explanation of the example´s relative well-formedness. Note that this would mean that non-lexical properties of the question-embedding context would have to be taken into account.

Quite generally, if we assume lexical type shift in this case, we can no longer state that *believe* does not select interrogative complements as a rule. Having only grammatical type shift, on the other hand, if we allow it in cases like (140), would

predict no differences between verbs that always allow interrogative complements like *know*, and *believe*. Thus I think one might want to have both. More will have to be said about when a shift is lexicalized, whether all of them can be lexicalized etc.

4.5.2.4.3. Unembedded questions

We have not considered so far the case of unembedded questions and their relation to answers. They will not be formally related here. I believe rather uncontroversially that the relation is in essence pragmatic. So when a speaker S asks a question Q, a hearer under most circumstances (though not all) infers that S wants to know a satisfactory answer to Q. What is satisfactory for S depends on the specific context. It may be answer1, answer2, or just an example answer, an element of Q(w). The hearer will provide what information s/he can in accordance with Gricean maxims, so in particular the answer will be true and as informative as necessary, but no more than that. If the context suggests that S will be satisfied by an example answer, a hearer will not bore S with a complete list. On the other hand, it seems a natural strategy to provide a maximum of information, answer1. This in turn carries the implicature that the hearer really was as informative as possible, i.e. given an answer A it is often inferred that A is the complete answer. S thus concludes answer2 from answer1. If this inference is not desired, the answer provided must be marked as partial (by adding something like *for example, among others,...*).

What I have just sketched should extend to degree questions in particular: If for instance John in fact read five books, no well-informed person would answer the question "how many books did John read?" with "John read four books", since the answer is, while true, not the most informative one. Giving the most informative answer involves no extra trouble, so it should be very highly preferred. Since the answer actually given carries the implicature that it is the most informative answer, such an answer would even be very misleading. Here, an answer indicating explicitly that the speaker is not maximally informative would be marked with *at least*.

However, in the case of unembedded questions, there are various other formal relations possible between question and answer. See for example G&S for discussion. What is important for present purposes is that I believe that the Hamblin/Karttunen denotation will work ok for unembedded questions as well as embedded questions. That is, I believe that the various relations of pragmatically "good" answer to Q can be defined given the information that the Hamblin/Karttunen denotation Q provides. Although I do not formally show this, I feel justified in that

assumption since from the Hamblin/Karttunen denotation the G&S denotation (more or less) can be derived, and G&S have demonstrated in detail the usefulness of that in defining question-answer relations.

4.5.2.5. Summary and conclusion of 4.5.2

Rullmann´s interrogative semantics strengthens Karttunen´s interrogative semantics to incorporate strong exhaustivity and maximality, the formal instrument being the maximality operator. We have seen in this section that there are various problems with the assumption of a maximality operator in a Karttunen style semantics. Degree questions can not only have a maximum interpretation, but also a minimum or list interpretation. What interpretation a question has depends on the inferential properties of the question predicate. A maximality operator cannot deal with minimum and list interpretations, and does not capture the fact that all three types of readings are predicted correctly by considerations of informativity. This aspect can be captured once we acknowledge (with Heim (1994)) that the semantic contribution of embedded interrogatives can not only be their basic question denotation, but also their answers. Whenever the relevant notion of answerhood is that of a (in some sense) complete, true answer, we get maximality in degree questions, or minimality, or a list answer, without any further assumptions. This undermines the claim that we always have a maximality operator in degree questions. Concerning the more general motivation of a maximality operator in questions, strong exhaustivity, we have argued that a maximality operator is the wrong way to capture exhaustivity. I have listed a number of (sometimes well-known) cases in which we do not have strong exhaustivity. I have argued with Beck & Rullmann (1996) that it is undesirable to associate strong exhaustivity irrevocably with interrogative semantics. Again, the view that the notion of answer plays an important role in the interpretation of interrogatives provides a more attractive perspective, since it is more suited to capture the interpretive flexiblity we encounter. The arguments presented are not arguments against Rullmann´s proposal only: Karttunen´s semantics has been criticized for not accounting for strong exhaustivity. We have seen that it is possible to give interrogatives a Hamblin/Karttunen denotation and still capture exhaustivity effects. I have thus defended the interrogative semantics I have assumed throughout against the most important criticism raised against it. I hope to have shown that the resulting rich semantic system is more attractive than the previous suggestions, since

it captures the range of possible interpretations in a natural way, and makes available formal objects that we do not have in the more rigid approaches to exhaustivity.

Hence, I have justified what I have presupposed so far, that the basic Hamblin/Karttunen semantics for questions that I use is the best semantic analysis available. We can now get back to the issue of negative islands.

4.5.3. No maximality operator in negative islands

We have seen that there is counterevidence to the claim that there is a maximality operator in the semantics of *wh*-questions. What consequences does this have for Rullmann´s (1995) explanation of the negative island effect?

Remember that the explanation for the ungrammaticality of (141) was that the interpretation of the embedded interrogative (142) according to Rullmann is undefined:

(141)   *   Luise weiß,   wie   groß   niemand   ist.
                 Luise   knows how   tall   nobody   is
                 'Luise knows how tall nobody is.'

(142) $\lambda p \exists d[p(w) \& p = \lambda w'[d = \max(\lambda d[\text{nobody is d-tall in w'}])]]$

There is no maximal degree d such that nobody is d-tall. Hence, the maximum of that set of degrees and the entire expression in (142) are not defined. Obviously, if we no longer assume that there is a maximality operator in the semantics of *wh*-questions, this explanation is lost. The way suggested in 4.5.2 to capture maximality does not lead to a corresponding effect: maximality is captured by applying answer1 to the Hamblin/Karttunen interpretation of the interrogative. The result will depend on the facts in the actual world, and will be either a list of propositions of the form "nobody is d-tall", or the minimum answer of that form. In any case, the interrogative complement will have a perfectly good semantic interpretation. Thus we are again in need of an explanation for the ungrammaticality of (141).

One might object that while the technical explanation is lost, Rullmann´s intuitive idea might be saved that (141) somehow just doesn´t make sense semantically. Quite apart from the general result of 4.5.2, however, a few of the data

discussed in that section prove interesting in the context of negative islands. The following observations argue against the validity of Rullmann´s explanation on a more intuitive basis. So even if the intuitive appeal of Rullmann´s semantic explanation rather than its technical side is at stake, I believe that once the data from 4.5.2. are taken into account the explanation cannot be maintained.

Remember, that (143), for instance, admits (or rather, requires) the "minimum" strategy of interpretation:

(143)   John knows how many eggs are sufficient.

Now once it is established on an intuitive level that the "minimum" strategy is a way of interpreting degree questions, we can no longer even on an intuitive basis rely on negated degree questions being odd because their interpretation is in some way odd: We should be able to use the "minimum" strategy and interpret (144) as (145):

(144)   How tall is nobody?

(145)   Which is the smallest degree such that nobody is d-tall?

So, if the tallest person is 1,79m, the answer should be 1,80m. Importantly, this strategy should work if there is no contextually given set of degrees at all. So the answer "1,80m" is supposed to imply that for all degrees d greater than 1,80, nobody is d-tall. This is completely parallel to the interpretation that we do in fact get with upward scalar degree questions like (143). Nothing semantic or pragmatic should preclude such an interpretation in the negative case if it works for the standard upward scalar predicates.

Note that the downward scalar predicate (146a) is transformed by a negation into an upward scalar predicate:

(146)   a. $\lambda n[\text{John read n books}]$
        b. $\lambda n[\neg[\text{John read n books}]]$

So if John didn´t read (at least) five books, then he didn´t read six books, seven books etc. Similarly for (147):

(147) a.   How high can John jump?

b.   λd[John can jump d-high]

c.   λd[¬[John can jump d-high]]

If John can jump 1,20m, he can also jump 1,19m, 1,18m etc., but if he cannot jump as high as 1,21m, then he cannot jump 1,22m either, and so on. Negation thus reverses the scalar properties of the question predicate. Now if negation played no special role at all, we would expect the resulting upward scalar predicates to behave just like all the other upward scalar predicates, i.e. they should result in a well-formed minimum interpretation of the question. The fact that they don´t means that negation does play a special role of some sort.

Moreover, since negation acts as a scale reverser, we would expect (148) to have a well-formed maximum interpretation with narrow scope of the indefinite "d-much money", since the non-negated question predicate (149a) was upward scalar, and the negated question predicate is hence downward scalar:

(148) ??   Mit   wievielGeld kann   ein   Professor   nicht
               with   how much   money can   a   professor   not
               auskommen?
               make do
               'On how much money can´t a professor live?'

(149) a.   λd[a professor can live on d-much money]

b.   λd[¬[a professor can live on d-much money]]

So if a professor cannot live on 1000 $, s/he can´t live on 900$ either. Answering (148) with "1000$" should thus mean that the maximal amount of money on which it is impossible for a professor to live is 1000$. Anything more should be sufficient. However, (148) does not have such a reading. This shows that even when by semantic considerations we ought to have the "standard" maximum interpretation for a negated degree question, the negation contained in it wreaks havoc in some other way.

Note also that the unacceptablity of this reading of (148) could not be explained in Rullmann´s system: The maximum of the set (149b) is defined, thus the Rullmann interpretation (150) of (148),

(150) ?d: d=max(λd'[¬[a professor can live on d'-much money]])

is also defined and amounts to the maximum interpretation sketched above.

Thus I conclude that not just the technical solution of an undefined maximum interpretation, but also the intuitive foundation of this idea cannot be maintained. This can be seen once "basic" upward scalar question predicates as in (143) are taken into account.

Hence I believe that the semantic explanation offered does not work. This does not imply, of course, that it is in principle impossible to find a semantic expalantion for the negative island effect. If such an explanation could be found, this might still be more attractive than the syntactic explanation suggested in 4.2, considering that the negative island effect does seem fairly universal. However, I am unable to see at present just what could be semantically wrong with the interpretation of negative island data. Thus I propose a syntactic explanation in terms of the MNSC.

Let me just briefly note two points in which Rullmann´s explanation makes different predictions than the MNSC, cases in which the MNSC explanation seems favourable to me.

Firstly, *why*-questions are not analyzed on a par with the other negative island data. Here, the maximality explanation does not predict the narrow scope reading to be undefined. However, I think that whatever explains the other negative island data should capture the effect in why-questions as well. But see also Rullmann (1995), chapter 5 for discussion.

Secondly, we have discussed in 4.2.4 that negation might not be the only operator that prohibits narrow scope of reconstructed material. The maximum is defined with some of the other operators, though. Again, I think that this symmetrical behaviour should be captured by the same mechanism. However, I admit that the data in that section are too unclear to really make a point here.

4.6. Conclusion of chapter 4

I believe that the above considerations show that (i) there is still a need for an explanation for the negative island effect, and (ii), that MNSC/MQSC can be expected to play a role in such an explanation, and makes a reasonable start at it. However, I am also certain that we haven´t said all there is to say about this type of scope interaction by far. Remember for instance the Korean data (151) from chapter 3:

(151) a. #? Mira-ka   sakwa myôch'   kae-lûl chachu
                Mira-Nom   apple how many   CL-Acc   often
                môk-ôss-ni?
                eat-Past-Q

      a'.   'For which number n: there are n apples which Mira often ate.'

      b.   Mira-ka   chachu sakwa myôch'   kae-lûl
                Mira-Nom   often   apple   how many   CL-Acc
                môk-ôss-ni?
                eat-Past-Q

      b'.   'For which number n: it is often the case that Mira ate n apples.'

The adverb only admits scope corresponding to linear order. However, we have seen that it does not block LF wh movement.

Actually, this open-endedness does not come as a surprise: I think that in principle we have to distinguish different types of movement at LF (just like we do at S-Structure). It seems that LF *wh* movement and "declarative" LF movement (QR) are subject to slightly different restrictions. We have also seen evidence for that in chapter 2, but haven´t been able to formally capture this yet. The reconstruction scope interaction may turn out to require a more differentiated picture, since both LF *wh* movement and LF "declarative" scope interaction participate. So it is not surprising that we do not entirely capture its behaviour at present. If it should be confirmed that the MNSC/MQSC is a good way to think about this type of problem, a more refined formulation should be found which gets the entire picture right.

5. Summary and conclusion

5.1. Summary

We have looked at a number of *wh*-constructions, mainly from German and Korean. We have seen that there are linearization restrictions for *wh-in-situ* and quantificational expressions in both languages. It was argued that these restrictions reflect a transparency condition on relative scope: Both Korean and German are scrambling languages, and have the option of making relative scope clear at S-Structure via linearization. I have suggested a restriction, the MQSC, that ensures that this potential transparency is in fact obligatory. The MQSC prohibits LF movement across a quantifier at LF. So, for an expression to be interpreted outside the scope of a quantifier, it has to be moved across that quantifier already at S-Structure. The MQSC thus captures a restriction on the relation of where an expression can occur in the syntax, and where it can enter into compositional interpretation.

It has been shown that the MQSC makes good predictions in cases that do not involve upward LF movement across a quantifier, but that are structurally identical to such cases: semantically motivated reconstruction in negative island constellations. I have argued that (i) the MQSC is successful in providing an analysis of negative islands, and (ii), that a successful analysis has been lacking so far. Part (ii) concerned in particular an analysis of negative islands in terms of a maximality operator. A maximality operator has been shown to be semantically problematic in questions for reasons independent of negative island facts. I have concluded that there is no semantic explanation for negative island effects, so that a syntactic explanation seems to be called for.

The criticism of a maximality operator involved a general discussion of what a basic interrogative semantics should be like, in particular, what should account for the property of strong exhaustivity in questions. I have argued that the Hamblin/Karttunen semantics of interrogatives plus the availablity of certain notions of answerhood due to Heim (1994) leads to the most attractive explanation of exhaustivity.

5.2. The restriction on semantic types - STyR & MQSC

In the light of all we have seen concerning the workings of the MQSC, let us reconsider the role of the restriction on semantic types introduced in chapter 1, the STyR (simplest types restriction). I will presuppose here the lexical part of it and only talk about the restriction on the types of traces, repeated below.

(1)   Restriction on the types of traces

Traces may only be translated as variables of the simplest type that makes them combinable with their sister category, and that is compatible with their binder.

What does the STyR do that is relevant for the MQSC? Consider (2a) and its LF (2b):

(2)   a.   Wen   hat   jeder   wo   gesehen?
                whom has   everybody   where seen
                'Where did everybody see whom?'
        b.

```
                              CP
                          /         \
                    jeder_i          CP
                              /            \
                        wen_j              C'
                              /                \
                          wo_k                 C'
                                          /          \
                                        C^0           IP
                                                       |
                                          t_i hat t_j t_k^{LF} gesehen
```
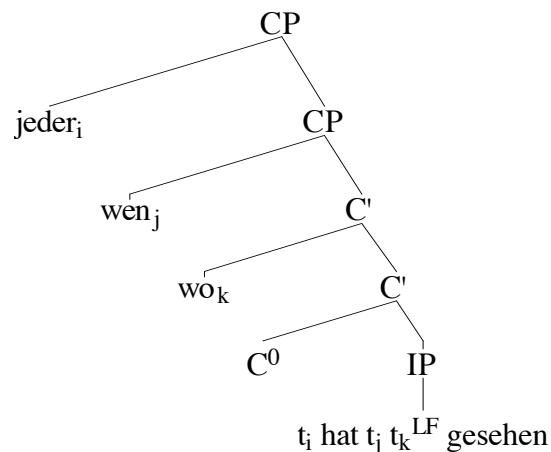
(2b) is the LF I have suggested for the distributive reading of (2a). Now suppose the STyR didn´t hold, and we interpreted a trace of the universal NP with the NP type, as indicated in (3).

(3)

$$\lambda p[\lambda\wp\exists y[person_w(y) \;\&\; \exists z[place_w(z) \;\&\; p=\lambda w'[\;\wp(w')(\;\lambda w\lambda x[saw_{w,z}(x,y)])]]$$
$$(\lambda w\lambda Q\forall x[person_w(x) \to Q(w)(x)])\;]$$

CP

jeder$_i$
$\lambda Q\forall x[person_w(x)$
$\to Q(w)(x)]$

$\lambda\wp\exists y[person_w(y) \;\&\; \exists z[place_w(z) \;\&\;$
$p=\lambda w'[\;\wp(w')(\;\lambda w\lambda x[saw_{w,z}(x,y)])]]$

CP

wen$_j$
$\lambda P\exists y[person_w(y)$
$\&\; P(y)]$

$\lambda y\exists z[place_w(z) \;\&\;$
$p=\lambda w'[\;\wp(w')(\;\lambda w\lambda x[saw_{w,z}(x,y)])]]$

C'

wo$_k$
$\lambda P\exists z[place_w(z)$
$\&\; P(z)]$

$\lambda z[p=\lambda w'[\;\wp(w')$
$(\lambda w\lambda x[saw_{w,z}(x,y)])]]$

C'

C^0
$\lambda q[p=q]$

$\lambda w'[\;\wp(w')$
$(\lambda w\lambda x[saw_{w,z}(x,y)])]$

IP

t$_i$
$\wp$

$\lambda w\lambda x[saw_{w,z}(x,y)]$

I'

hat t$_j$ t$_k$^{LF} gesehen
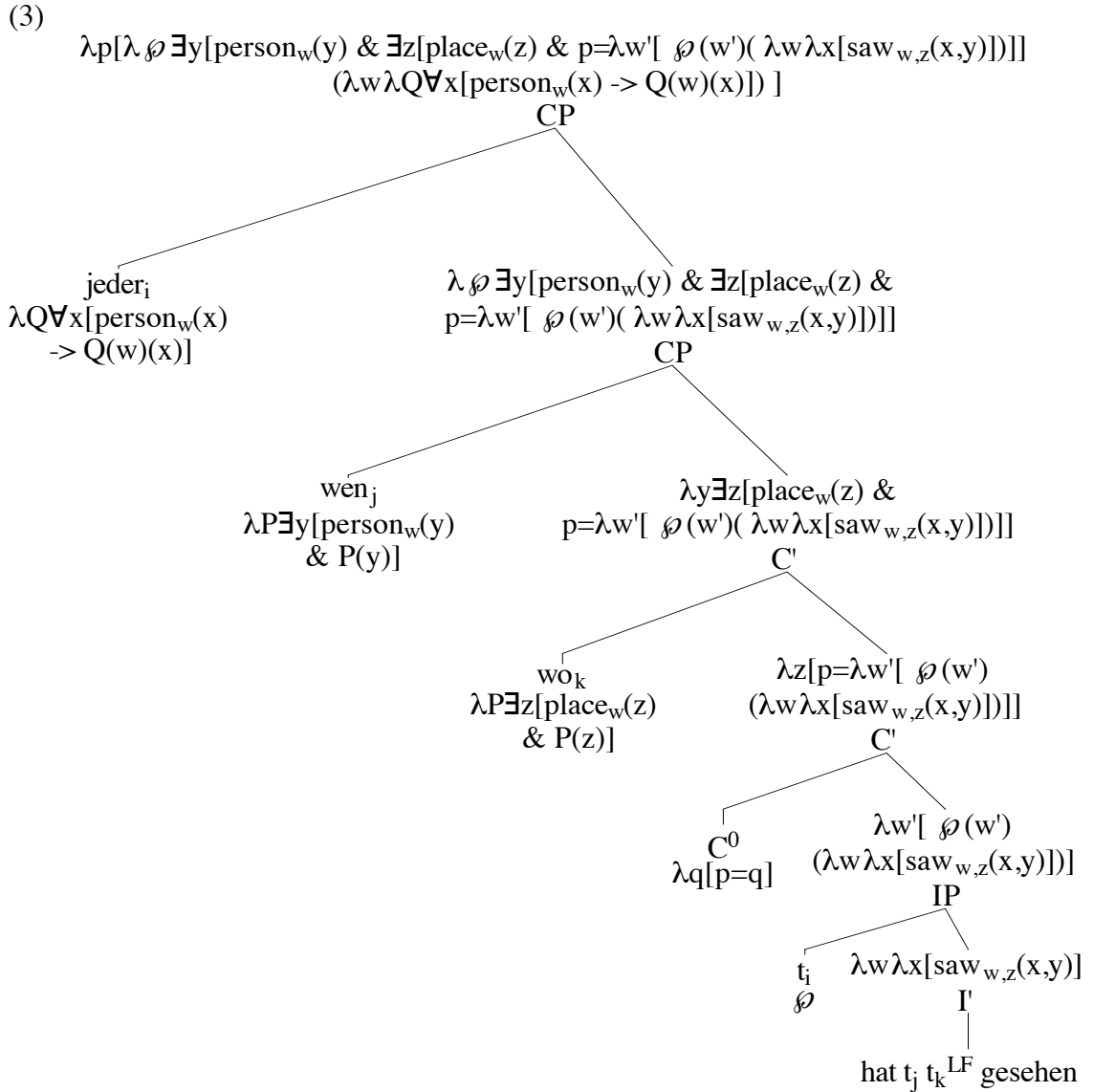
The interpretation we get from this is the non-distributive reading:

(4) $\lambda p[\lambda\wp\exists y[person_w(y) \;\&\; \exists z[place_w(z) \;\&\; p= \lambda w'[\;\wp(w')(\lambda w\lambda x[saw_w(x,y)])]]$
            $(\lambda w\lambda Q\forall x[person_w(x) \to Q(w)(x)])\;]$

iff

$\lambda p[\exists y[person_w(y) \;\&\; \exists z[place_w(z) \;\&\; p=$
        $\lambda w'[\lambda w\lambda Q\forall x[person_w(x) \to Q(w)(x)]\;(w')(\lambda w\lambda x[saw_w(x,y)]]]]]$

122

iff

$$\lambda p[\exists y[person_w(y) \ \& \ \exists z[place_w(z) \ \& \ p=$$
$$\lambda w'[\lambda Q\forall x[person_{w'}(x) \rightarrow Q(w')(x)] \ (\lambda w\lambda x[saw_w(x,y)])]]]]$$

iff

$$\lambda p[\exists y[person_w(y) \ \& \ \exists z[place_w(z) \ \& \ p=$$
$$\lambda w'[\forall x[person_{w'}(x) \rightarrow \lambda w\lambda x[saw_w(x,y)](w')(x)]]]]$$

iff

$$\lambda p[\exists y[person_w(y) \ \& \ \exists z[place_w(z) \ \& \ p= \lambda w'[\forall x[person_{w'}(x) \rightarrow saw_{w'}(x,y)]]]]]$$
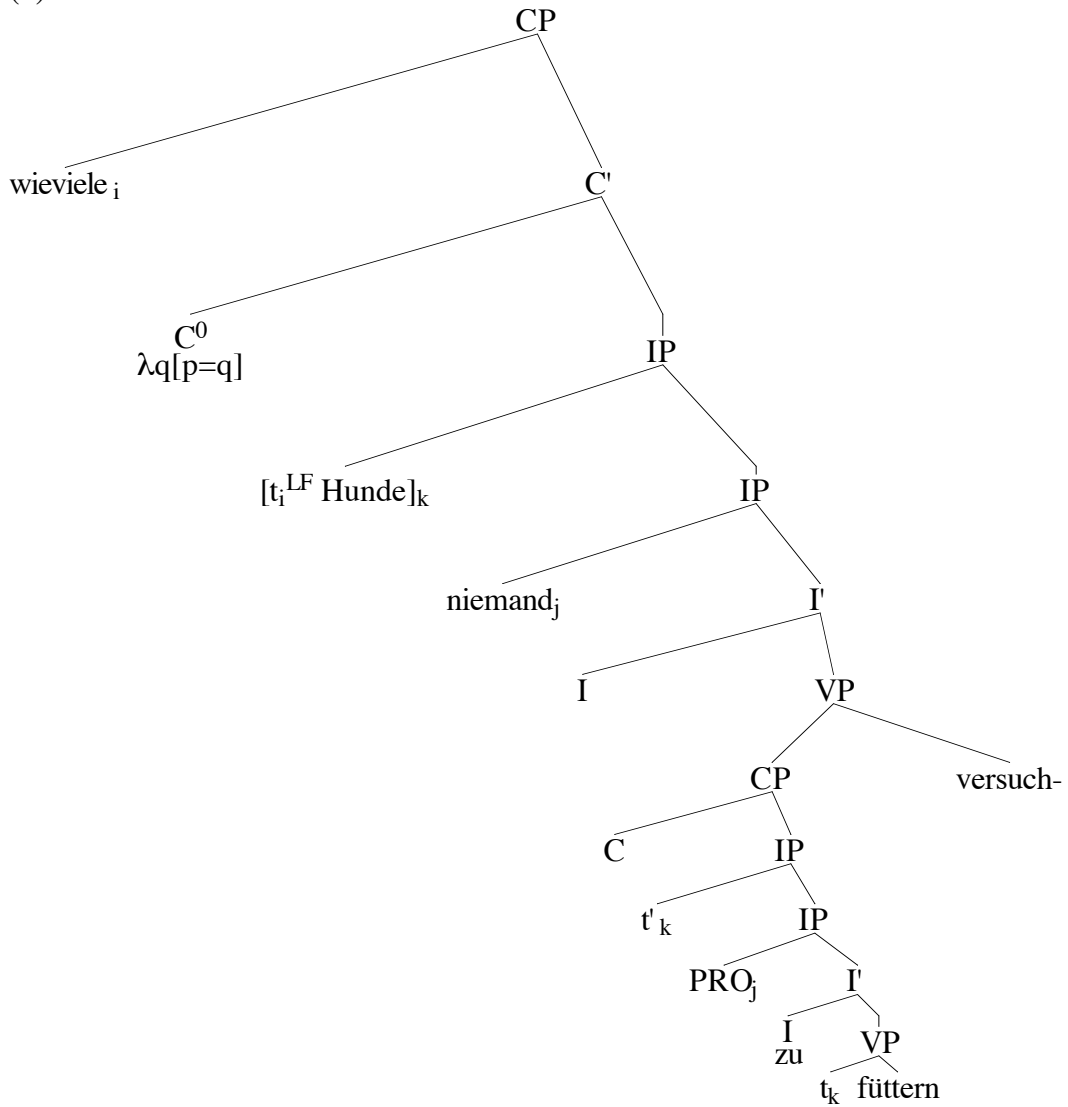
Moreover, (3) presumably does not violate the MQSC (unless we want to say that the NP type trace acts as a quantifier and induces a QUIB; this strategy does not always work though, so that I will ignore it). We would thus have a well-formed LF to yield the non-distributive interpretation.

In a similar fashion, non-universal quantifiers might be raised to a CP-adjoined position (i.e. moved out of the way for the purposes of the MQSC), to be reconstructed by type raising, yielding a well-formed interpretation from a well-formed LF. In other words, if we didn´t have the STyR, the empirical predictions of the MQSC would be virtually zero: we could always move the offending quantifier out of the way and later on reconstruct it to its desired scope position via type raising and lambda conversion.

Consider also a negative island case like (5) with an LF like (6) in which we have syntactically reconstructed the indefinite part to a position above the negation:
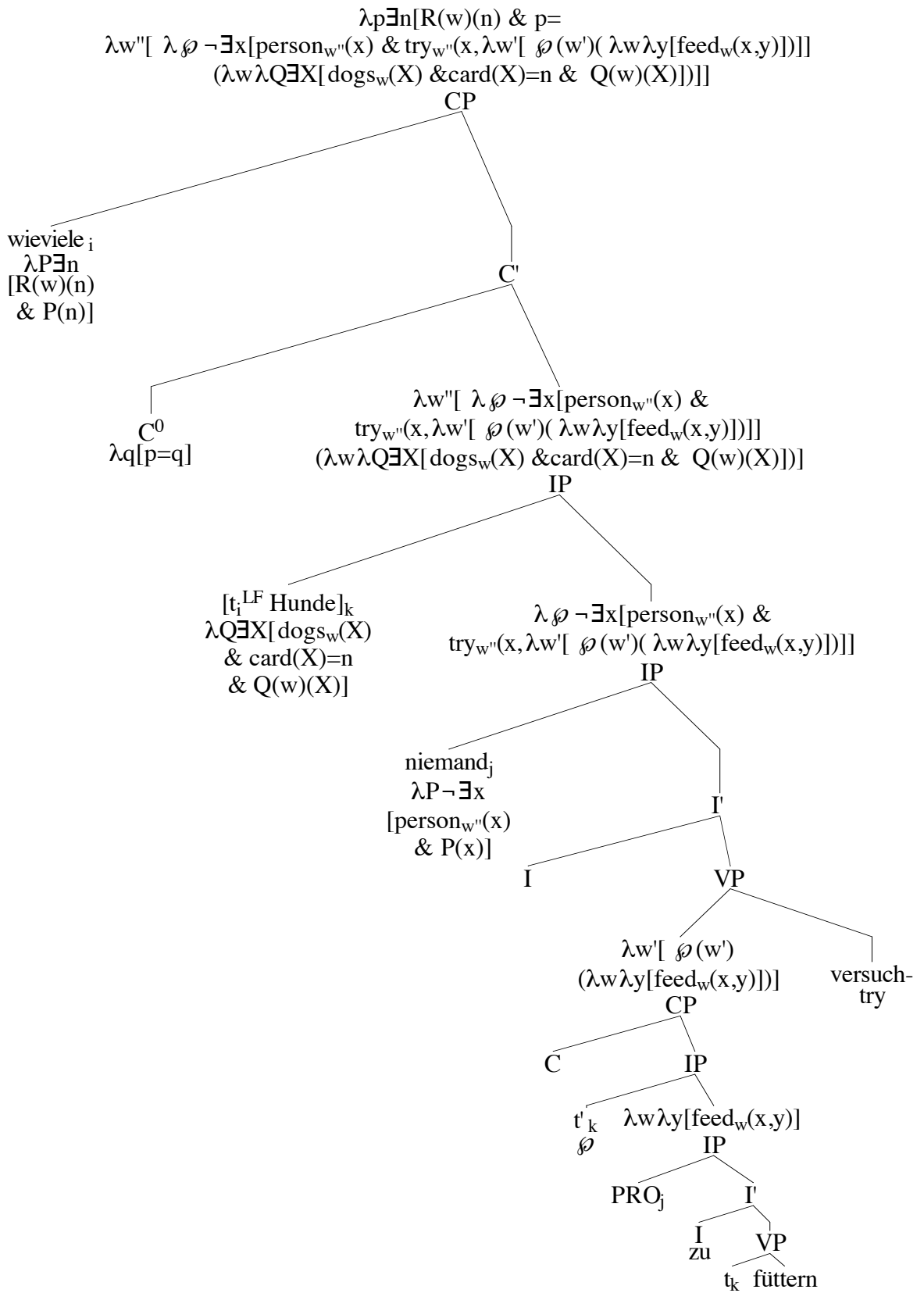
(5) Wieviele   Hunde hat niemand versucht   zu   füttern?
     how many   dogs   has nobody tried   to   feed
     'How many dogs did nobody try to feed?'

(6)

```
                                    CP
                   _____/  \
         wieviele ᵢ                     C'
                              _____/ \
                         C⁰                  IP
                         λq[p=q]        _____/ \
                              [tᵢ^LF Hunde]ₖ      IP
                                           _____/ \
                                     niemandⱼ         I'
                                              _____/ \
                                           I              VP
                                                    _____/ \
                                                CP            versuch-
                                          _____/ \
                                       C          IP
                                           _____/ \
                                        t'ₖ           IP
                                                _____/ \
                                             PROⱼ        I'
                                                    ___/ \
                                                  I       VP
                                                  zu    _/ \
                                                     tₖ    füttern
```

Obviously, this is a legitimate LF that does not violate the MNSC. Again, we could interpret a trace that is c-commanded by the negation with the higher type, as in (7):

(7)

$\lambda p \exists n[R(w)(n) \,\&\, p=$
$\lambda w"[\ \lambda \wp \neg \exists x[\text{person}_{w"}(x) \,\&\, \text{try}_{w"}(x, \lambda w'[\ \wp(w')(\ \lambda w \lambda y[\text{feed}_w(x,y)])])]]$
$(\lambda w \lambda Q \exists X[\text{dogs}_w(X) \,\&\, \text{card}(X)=n \,\&\, Q(w)(X)])]]$

CP

wieviele $_i$
$\lambda P \exists n$
$[R(w)(n)$
$\&\, P(n)]$

C'

C^0
$\lambda q[p=q]$

$\lambda w"[\ \lambda \wp \neg \exists x[\text{person}_{w"}(x) \,\&\,$
$\text{try}_{w"}(x, \lambda w'[\ \wp(w')(\ \lambda w \lambda y[\text{feed}_w(x,y)])])]]$
$(\lambda w \lambda Q \exists X[\text{dogs}_w(X) \,\&\, \text{card}(X)=n \,\&\, Q(w)(X)])]$

IP

$[t_i^{\text{LF}} \text{ Hunde}]_k$
$\lambda Q \exists X[\text{dogs}_w(X)$
$\&\, \text{card}(X)=n$
$\&\, Q(w)(X)]$

$\lambda \wp \neg \exists x[\text{person}_{w"}(x) \,\&\,$
$\text{try}_{w"}(x, \lambda w'[\ \wp(w')(\ \lambda w \lambda y[\text{feed}_w(x,y)])])]]$

IP

niemand $_j$
$\lambda P \neg \exists x$
$[\text{person}_{w"}(x)$
$\&\, P(x)]$

I'

I

VP

$\lambda w'[\ \wp(w')$
$(\lambda w \lambda y[\text{feed}_w(x,y)])]$

CP

versuch-
try

C

IP

t'_k
$\wp$

$\lambda w \lambda y[\text{feed}_w(x,y)]$

IP

PRO $_j$

I'

I
zu

VP

t_k füttern

125

Obviously, the result will be the reading (8) in which the indefinite has narrow scope with respect to the negation, i.e. an unavailable reading. (Note that here, the way out via claiming that the high-type trace induces a barrier would not help, since we didn´t need to raise the negation or anything else across the high-type trace).

(8) $\lambda p \exists n[R(w)(n) \ \& \ p= \lambda w''[\neg \exists x[person_{w''}(x) \ \&$
        $try_{w''}(x, \lambda w'[\exists X[dogs_{w'}(X) \ \& \ card(X)=n \ \& \ feed_{w'}(x,X)]]]]]]$

So the type raising approach to reconstruction is incompatible with my analysis.

Thus it turns out that the restriction on the interpretation of traces is fundamental to the formulation of the MQSC.

It should be stressed that the MQSC is not the only restriction on the form of LFs that necessitates a restriction on types. As an example, consider the Korean sentence (9):

(9)   Suna-ka   muôs-ûl   ilk-ôss-ni?
       Suna-Nom   what-Acc   read-Past-Q
       'What did Suna read?'

It is usually assumed that we want to force the *wh*-phrase in situ to move at LF to the position where it takes scope, i.e. we want to disallow a reading and an LF in which the *wh*-phrase ends up as a non-wh narrow scope indefinite. One way of enforcing this movement is to have a version of the *wh*-Criterion hold at LF, which would force a *wh*-phrase to be in a position within the domain of a *wh*-head (C^0). With this syntactic requirement, we get (10) as a well-formed LF for (9), as opposed to (11), where we left the *wh*-phrase in situ.
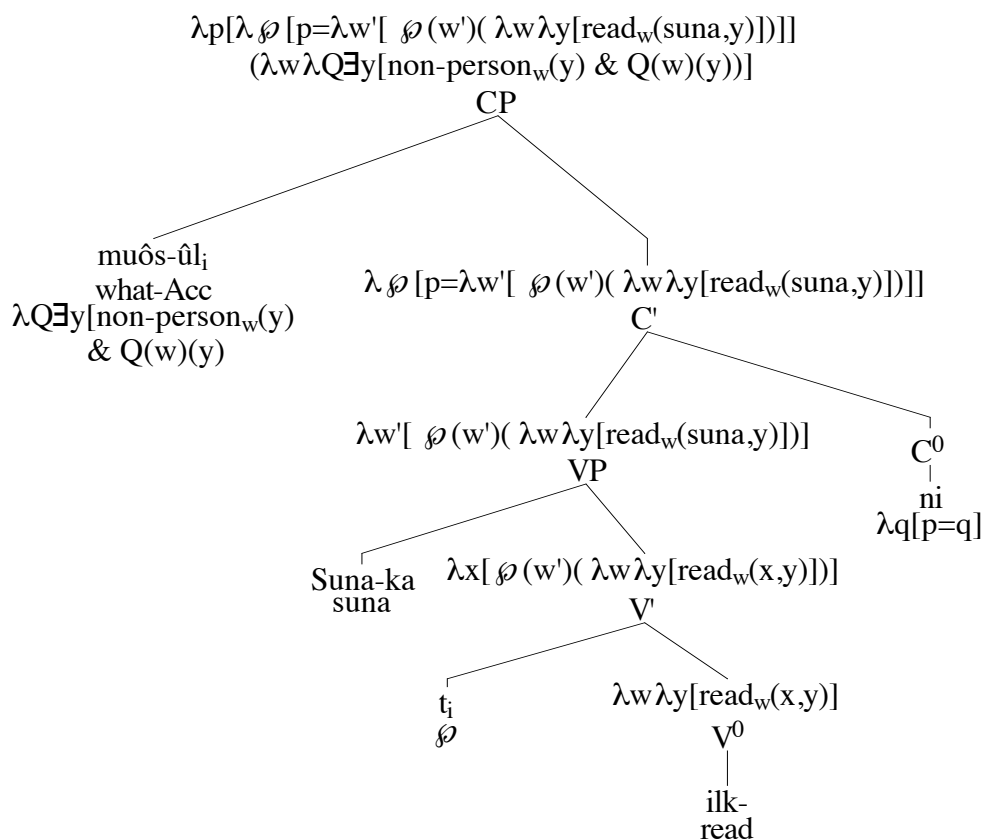
(10)

```
                        CP
              _____/   \
         muôs-ûl_i          C'
         what-Acc        __/  \___
                       VP          C^0
                    __/  \          |
               Suna-ka    V'        ni
                        _/  \
                      t_i    V^0
                              |
                             ilk-
                             read
```

(11)

```
                    CP
                     |
                     C'
                  __/  \___
                VP          C^0
             __/  \          |
        Suna-ka    V'        ni
                 _/  \
           muôs-ûl    V^0
           what-Acc    |
                      ilk-
                      read
```
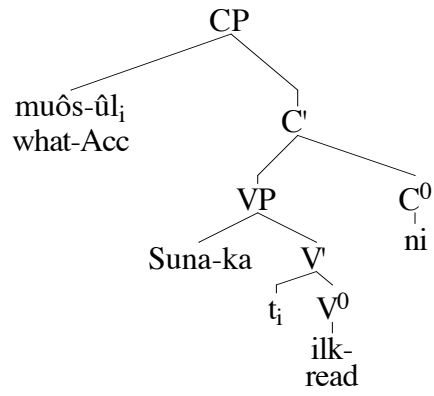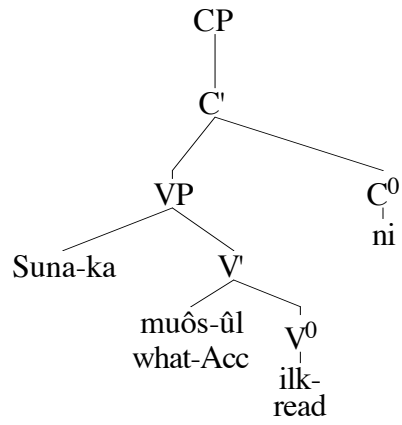
Now suppose we interpret (10) in the following way, using NP-type traces:

(12)

$$\lambda p[\lambda \wp [p=\lambda w'[\wp(w')(\lambda w \lambda y[read_w(suna,y)])]]$$
$$(\lambda w \lambda Q \exists y[non\text{-}person_w(y)\ \&\ Q(w)(y))]$$

CP

muôs-ûl$_i$
what-Acc
$\lambda Q \exists y[non\text{-}person_w(y)$
$\&\ Q(w)(y)$

$\lambda \wp [p=\lambda w'[\wp(w')(\lambda w \lambda y[read_w(suna,y)])]]$
C'

$\lambda w'[\wp(w')(\lambda w \lambda y[read_w(suna,y)])]$
VP

Suna-ka
suna

$\lambda x[\wp(w')(\lambda w \lambda y[read_w(x,y)])]$
V'

C^0
ni
$\lambda q[p=q]$

t_i
$\wp$

$\lambda w \lambda y[read_w(x,y)]$
V^0

ilk-
read

The interpretation of (12) is not an intuitively available meaning of (9).

(13) $\lambda p[p=\lambda w'[\exists y[non\text{-}person_{w'}(y)\ \&\ read_{w'}(suna,y)]]]$

(13) is a set containing one proposition, namely the proposition that Suna read something. It is hard to say what that interpretation would amount to, but it is not the question expressed by (9). If we allow (12), we wrongly predict the sentence to have that interpretation. Things went wrong because we could via type raising reconstruct the semantically motivated movement of the *wh*-phrase, so basically incorrectly undo this movement. In this way it is possible to derive the interpretation that (11) would have - an interpretation we wanted to exclude by ruling out (11) as an LF for (9). So type raising of traces does not agree very well with the *wh*-Criterion either.
This problem could be overcome by forcing *wh*-phrases to move to their scope positions by some other mechanism. The point is not that this is an unsolvable

problem, but rather, that type raising is far from a harmless mechanism and could wreak havoc with all sorts of conditions on LF representations that people have in mind. Other examples illustrating this can be found. Whenever we propose enforced LF movement to capture a scope effect, the STyR is necessary to make the enforcement semantically meaningful.

So it cannot be used as an argument against the MQSC that it makes things like STyR necessary. They would be needed in any case when talking about syntactic restrictions on LFs.

What do we learn from this? We cannot simply talk about restrictions on LF without having a very, very restricted view of what we can do at LF. Even rather harmless looking things like type raising of traces make it impossible to formulate a restriction like the MQSC. This means that an unrestricted picture of LF makes it impossible to talk about certain types of restrictions for that level in a meaningful way. Basically if we assume a level of LF and dangerous technical possibilities like unrestricted type raising, we end up with an interpretational mechanism that is much to powerful. I think one could have one or the other, but not both.

The conception of LF adopted here is that of a semantically transparent level of representation. As I have assumed, one can do all kinds of movements on the way from S-Structure to LF to achieve that interpretational transparency. If we could do things like type raising there, too, on top of that, virtually anything goes. The resulting interface would be too unrestricted. If, on the other hand, one adopted a strategy à la Rullmann to have an LF as close to S-Structure as possible (or a formalization thereof), one would have to have, and could have type raising without ending up with a virtually unrestricted syntax-semantics interface. The problem is to find a consistent system of some sort.

5.3. Concluding remarks

I have abandoned the most obvious strategy of interpreting natural language expressions, namely, interpreting the surface structure of these expressions directly, in favour of interpreting a level of Logical Form. Once one departs from interpreting

S-Structure, a range of possibilities opens up. This necessitated a restriction on the mechanism used to interpret LFs, the STyR, which from the point of view of the interpretational mechanisms used is completely arbitrary.

The first strategy is, in a sense, still by far the most attractive view, as it is very economical and does not run into problems of motivation. For the purposes of my dissertation, I have departed from this strategy, for the following reason:

The constructions I have looked at all involve what I call non-local interpretation. That is, an expression occurs at S-Structure in a position where it could not reasonably be interpreted. It should be interpreted higher up in the compositional (functional) structure. Thus it has to be saved for a later point. The restriction I suggest is supposed to constrain where an expression can occur at S-Structure, and how it can enter compositional interpretation. It can be fairly easily formulated as a syntactic restriction, if the relation it is supposed to restrict is modelled in a level of syntax - that is, if we have another level of representation at our disposal where we can talk about that relation. Moreover, the restriction is really syntactic in nature. Nothing is wrong with the interpretation that would result, there is something wrong with getting it from a particular S-Structure. If we didn´t have a mediating level of syntax, the restriction would have to be formulated as a restriction on whatever mechanism is used to cover non-local interpretation. Now, whatever that might be (type raising, storage,...), the restriction would be a very unnatural restriction on such a type of mechanism. So while I think that the intuitive content of MNSC/MQSC is independent of the issue of LF, I do think that the possibilty to formulate MNSC/MQSC like I did is a point in favour of LF as it is conceived of in Heim/Kratzer and von Stechow.

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