# Partial *Wh*-Movement and Logical Form An Introduction*

Arnim von Stechow

## 1 The aim of this volume

On Friday the 1st and Saturday the 2nd of December 1995, the Sonderforschungsbereich 340 held a workshop entitled *Syntax and Semantics of Partial Wh-Movement*. This volume contains most of the papers presented there.[1] One of the leading ideas underlying the workshop was that detailed investigation of the partial *wh*-movement construction provides an excellent test ground for checking assumptions about the syntax/semantics interface.

One of the most challenging properties of partial *wh*-constructions is that they alternate with "total" *wh*-movement constructions. Thus, a theory of syntactic variation seems to be called for, a much debated issue in recent syntax, notably in the Minimalist Program.

On the semantic side, the interpretation of questions has been well established since the seminal work by Hamblin (1973) and Karttunen (1977). The semantics fits the classical LFs given in generative grammar, notably GB-theory, and most semanticists assume that we have a reasonably good understanding of the syntax and semantics of English interrogatives.

The standard assumption is that the LF of German interrogatives is exactly like English both for total and for partial *wh*-constructions. Recently, this view has been challenged by Dayal (1994). Dayal claims that partial *wh*-constructions are analyzed like Hindi *wh*-sentences, which arguably have a syntax and LF rather different from German *wh*-sentences. One of the purposes of the workshop

*For helpful comments and discussion, I would like to thank Gereon Müller. Many thanks to Graham Katz for helping me with English.

[1] There were two papers on V/2 relatives read by Hans-Thilo Tappe and Hans-Martin Jäger; these are not included for thematic reasons.

was to settle this issue. Consequently, Hindi and German were the languages in focus.

It is the purpose of these pages to give a first introduction into the problems to be studied in this volume and to sketch some of the results. The discussion is by no means complete and certainly not entirely free from personal preferences of one topic over another.

## 2 The syntax/semantics interface

Most of the participants of the workshop assumed that sentences have LFs which have the same ontological status as surface structures. In other words, LFs are conceived as syntactic structures made of the same material as s-structures, i.e., words, morphemes and so on. I stress this point because it is not self-evident: other theories assume structures of a different ontological kind for semantic interpretation, for instance DRSs, argument structure, functional structure, conceptual structure, and so on. The idea underlying such frameworks seems to be that the mind has different systems of representations, which are somehow translated into each other and serve as inputs of different "modules" of the mind/brain. I think that virtually nobody denies the ontological difference between phonetic and syntactic representations, but whether there is a similar abyss between syntactic and semantic representations, this is at least at issue, and the null hypothesis is that there is no such difference in ontological status.

In the Minimalist Program, we have syntactic structures, and the distinction between s-structure and LF doesn't make sense, strictly speaking. But there is the branching point to Phonetic Form (PF), and for convenience we may call the structures derived at that point *s-structures*. As we will see, *s-structure constraints* will play an important role in the discussion. The particular form of the LFs is under debate. Whereas the Minimalist Program tries to get rid of indices, semanticists make abundant use of them. The reason is that some indices, namly traces, play the role of bound variables, and few semanticist want to "explain variables away", and I am not sure that any of the participant wanted to do that. Thus, we assume that LFs are syntactic trees with variables and variable binders.

The next question is then what the function of LFs in grammar is. Some theorists, myself included, assume that an LF unambiguously determines the interpretation of an expression — modulo context dependency. Let us, follow-

ing Heim (1993b) and Stechow (1993a), call these LFs **transparent LFs**. At least five of the participants (d'Avis, Beck, Berman, Dayal, and Müller) had in mind this concept of LF. "Pure" syntacticians usually do not want to commit themselves to such a view: for May (1985) an LF may be ambiguous, or perhaps underspecified, with respect to scope. The two views are presumably not incompatible, but the formulation of grammatical constraints certainly will look quite different in the two frameworks. The reader should keep in mind that the notion of LF used in this introduction is the notion of transparent LF.

The minimal requirements on the syntax/semantics interface are then these:

1. The grammar determines which LFs an s-structure has, if it has any at all.
2. Each LF is semantically interpretable in an unambiguous way.

The second requirement is most safely met by actually assigning an interpretation to each LF. Semanticists know that this task must not be underestimated, or the theorist runs the risk that his LFs are meaningless.

The first requirement is the syntactic task proper and different theories differ in their assumptions. At least four participants thought of the relation between s-structure and LF in purely derivational terms (Fanselow, Mahajan, Müller, Sabel). And most participants assumed that the notion of *LF-movement* played an important role for the definition of the relation.

# 3 The direct dependency approach

The next step is to establish the "direct dependency" approach to partial *wh*-movement constructions. The essential idea is that the construction involves a scope marker *was* and a coindexed *wh*-phrase. This relation is called **direct dependency** by Dayal (1994), and it is the task of this section to make it precise in semantic terms.

Recall Riemsdijk's (1982) examples [25], which established the theoretical discussion of the phenomenon:

(1) a. Was glaubst du was Peter meint, was Hans sagt was Klaus
What believes you what Peter thinks what Hans says what Klaus
behauptet *mit wem* Maria gesprochen hat?
claims with whom Maria talked has

b. Was glaubst du was Peter meint was Hans sagt *mit wem* Klaus behauptet daß Maria gesprochen hat?

c. Was glaubst du was Peter meint *mit wem* Hans sagt daß Klaus behauptet daß Maria gesprochen hat?

d. Was glaubst du *mit wem* Peter meint daß Hans sagt daß Klaus behauptet daß Maria gesprochen hat?

e. *Mit wem* glaubst du daß Peter meint daß Hans sagt daß Klaus behauptet daß Maria gesprochen hat?

Riemsdijk comments on these: "Semantically, all are equivalent to what in English would have to be expressed as (25e) [= (1-e)]." Riemsdijk considers German *was* a **scope marker** which indicates the scope of a partially moved *wh*-phrase. Following Riemsdijk and Williams (1981), Riemsdijk assumes that the LF for sentence (1-c) is something like this[2]:

(2) Was$^i$ glaubst du was$^i$ Peter meint *mit wem*$_i$ Hans sagt $t_i$ daß Klaus behauptet $t_i$ daß Maria $t_i$ gesprochen hat?

The problem with this representation is that no interpretation is given. The very notion of scope marker suggests that the *wh*-phrase moves to its (highest) scope marker at LF. In fact, this is the only sense I can make of Riemsdijk and Williams's (1981) rule of Quantifier Interpretation QI which yields the configuration considered here as a special case (cf. Riemsdijk (1982, 3)):

(3) i[... quantifier-phrase$_i$ ...], i a scope marker

In section 10 I will discuss a method which allows for the interpretion of existential quantifiers in situ. If we follow Karttunen (1977) and consider *wh*-phrases to be existential quantifiers as well, the method extends to questions. But this method cannot be intended by Riemsdijk and Williams (1981) because their rule is supposed to interpret any quantifier whatsoever, and universal quantifiers cannot be interpreted in situ. Therefore, I assume that (2) cannot be the transparent LF. The *wh*-phrase must move to COMP.

Let me briefly repeat the essential of the Hamblin/Karttunen semantics which will be assumed here. Consider the question (4-a). It has the LF (4-b),

[2]According to Höhle, the idea of interpreting *was* as a scope indicator is actually due to Hans-Thilo Tappe, who gave an explicit formulation at an RDGG-talk in January 1980. Vide Höhle (this volume).

whose interpretation is (4-c).

(4) a. Mit wem spricht Maria?
With whom talks Mary?

b. [mit wem]$_1$ Q Maria $t_1$ spricht?

c. $\lambda$p$\exists$x[person(x) $\wedge$ p = $\lambda$w[talk-to$_w$(Mary,x)]]

It should be obvious that (4-b) can be translated in a 1-1-fashion into the formula (4-c), which has a standard semantics. The "interrogativizer" Q, i.e., the semantic [+wh]-feature is translated as "p =". Q may be thought situated in C. The *wh*-phrase "mit wem" is translated as an existential quantifier (or as an open proposition) binding a trace in the question nucleus, and the propositional variable p introduced by Q is $\lambda$-bound at CP. I have to add that I take it that the preposition *mit* "with" is semantically empty; it is selected by the verb *sprechen* "to talk to".

To be sure, the LF (4-b) should have further indices corresponding to the variables in (4-c). We have to assume a general theory which interprets indices. This is not a trivial matter, but it is plausible that the interpretation can be done for this particular LF, because it is very close to the surface.

The essential point for a Hamblin/Karttunen approach is that *wh*-phrases have wide scope with respect to the interrogativizer Q at LF. In other words, this semantics for interrogatives requires LF-movement. As to the position of *wh*-phrases, let us assume this: If we have one *wh*-phrase, it is in SpecC, the standard assumption. If we have more than one, the additional ones are adjoined to C'.[3]

Returning to van Riemsdijk's examples, it follows that the transparent LF must have the form of (1-e) for all of them. Thus, the transparent LF is (5-a) and it has the interpretation (5-b). The representation ignores intensionality, i.e., the world parameter.

(5) a. wem$_i$ glaubst du $t_i$ daß Peter meint $t_i$ daß Hans sagt $t_i$ daß
Who$_i$ believe you $t_i$ that Peter believes $t_i$ that Hans says $t_i$ that
Klaus behauptet $t_i$ daß Maria $t_i$ mit-gesprochen hat?
Klaus claims $t_i$ that Mary $t_i$ with-talked has?

b. $\lambda$p$\exists$x[person(x) $\wedge$ p = you believe that Peter thinks that Hans says that Maria talked to x]

[3] In the GB-literature, *wh*-phrases are adjoined to SpecC. This creates problems with c-command which do not arise under the assumption made here.

This kind of LF is assumed in Stechow and Sternefeld (1988, 354).[4]

It follows that the highest scope marker is a *wh*-expletive, which has to be replaced by a *wh*-phrase at LF. A scope marker may bind more than one *wh*-phrase. They all move to COMP at LF. The direct dependency relation is therefore implemented as LF-movement. One or more *wh*-phrases move to COMP creating the following LF-configuration:

(6) *Direct dependency*

a. s-structure:
was$^i$ Q ... *wh*-phrase$_i$...

b. LF:
*wh*-phrase$_i$ Q ... t$_i$...

c. Interpretation:
$\lambda p \exists x_i$ *wh*-phrase($x_i$) $\wedge$ p = ...$x_i$...

# 4 Some properties of German

In this section, I list some of the properties of partial *wh*-movement which have been discussed in the literature. I will make some comments on the question of how they are derived in the account outlined.

A striking property of partial *wh*-movement is that the CP with the partially moved *wh*-phrase in its Spec has to occur in a [–wh]-position (cf. Stechow and Sternefeld (1988, 356)):

(7) a. Was glaubst du wer gekommen ist?
What believe you who come is?

b. *Was fragst du wer gekommen ist?
What ask you who come is?

It is precisely this fact that suggests that the embedded *wh*-phrase cannot be at a visible position at LF, because that would violate the *wh*-criterion. Stechow

[4]The LF ignores the interpretation of intermediate traces. Each of them can be regarded as a variable x + $\lambda x[\ldots x \ldots]$, where x may be regarded as the "referential index" of the trace and $\lambda x$ as the "movement index" of the trace. The terminology is due to Heim (1993a). By $\lambda$-conversion, this reduces to ...x..., i.e., the intermediate trace "disappears". This interpretation of intermediate traces has been proposed in Stechow (1991).

and Sternefeld (1988) derive the property by postulating that Lasnik and Saito's (1984) *Wh*-filter holds at LF: After LF-movement, the criterion is satisfied.[5]

The analysis relies on a tacit assumption, however: the CP in question has to be an argument of the matrix predicate. In other words, *wer gekommen ist* is regarded as a complement of *glaubst*. The assumption is plausible for several reasons: There is no intonation break, verb in final position, among other things (cf. Reis (this volume)).

Another property of the partial *wh*-construction is its **anti-locality**: The scope marker cannot occur in the same clause as the *wh*-phrase which it binds. Stechow and Sternefeld (1988), who have observed the phenomenon, give the following example:

(8) *Was$^n$ ist wer$_n$ gekommen?
What$^n$ is who$_n$ come?

Von Stechow and Sternefeld derive this property, together with other ones, in the following way. First they establish a terminological distinction between ***wh*-elements** and ***wh*-operators**. The latter are the "true" *wh*-phrases whereas the former include in addition the scope marker *was*. They further assume the following definition: A *wh*-element $\alpha$ *scope-binds* a *wh*-element $\beta$ iff $\alpha$ is in an A-bar position, i.e., in SpecC, and binds $\beta$ in the usual sense. The principles mentioned are then these:

(9) Stechow and Sternefeld (1988, 355)
a. Every *wh*-element in situ is scope-bound by a *wh*-operator.
b. A *wh*-element in COMP is not scope-bound by a *wh*-operator.

The ungrammaticality of (8) follows from principle (9-a) because the scope marker *was* is not a *wh*-operator and cannot scope bind the *wh*-phrase in situ

[5]Nowadays, the filter is mostly referred to as Rizzi's (1990) *wh*-criterion. Brandner (this volume) criticises this solution by arguing that there would be no need for overt movement if the *wh*-criterion did not hold at s-structure. In order to satisfy the criterion at s-structure, she invokes *wh*-chains and stipulates that the *wh*-criterion is satisfied by chains, cf. McDaniel's (1989) account. It seems to me that this is a purely terminological divergence amounting to the same thing: Stechow and Sternefeld (1988) assume a local formulation of the *wh*-criterion, whereas a formulation in terms of chains is global in an obvious sense. The difference between Stechow and Sternefeld (1988) and McDaniel (1989) is that the different principles assumed by the former author are all packed into the definition of *wh*-chains, as the reader may check by consulting Brandner's paper, where the definition is cited.

*wer*.

Stechow and Sternefeld (1988) observe that scope marking requires partial *wh*-movement. Their example (ibidem) is:

(10) *Was$^n$ glaubst du daß Fritz wen$_n$ besucht hat?
What$^n$ believe you that Frith who$_n$ visited has?

The ungrammaticality follows from (9-a).

Partial *wh*-movement comes in tandem with scope marking, i.e., partial *wh*-movement without scope marking leads to ungrammaticality.

(11) *Glaubst du wann$_i$ (daß) sie t$_i$ gekommen ist?
Believe you when$_i$ (that) she t$_i$ come is?

This does not follow from Stechow and Sternefeld's (1988) account as far as I can see. They need an additional stipulation such as the following one:

(12) Every *wh*-operator in a [–wh]-position is scope bound.

Together with the following principle, which the two authors assume[6], the ungrammaticality of (11) follows.

(13) An empty COMP is not a scope marker in German.

The same point is made in Höhle (1990) for embedded clauses:

(14) *Ich weiß nicht daß sie gemeint hat wann$_i$ sie t$_i$ kommen würde
I know not that she thought has when$_i$ she t$_i$ come would

Again, this would require an empty COMP as a scope marker for *wann*.

As the term *scope marker* suggests, a scope marker can never occur *in situ*. This trivial sounding generalization has been stated explicitly in Höhle (1990) and it is illustrated by the following example:

(15) *Wer [$_{\text{VP}}$ meint was] [$_{\text{CP}}$ wann sie gekommen ist]?
Who thinks what wann she come is

Under Stechow and Sternefeld's (1988) account, this sentence is out for several

[6]Cf. loc. cit., p. 355

reasons. First of all *was* cannot scope-bind *wann*, because *was* is in an A-position. *Wann* cannot be scope-bound by *wer*, because that would be a violation of principle (9-b). Furthermore, we have a violation of the theta criterion because the verb "thinks" selects a proposition for its object. But scope-marking *was* is semantically empty. If *wann* could move to *was* and replace it, that wouldn't help because *wann* is not of the proposition type.

The distribution of scope markers exhibits a number of further intricacies: the highest scope marker must occur in a "semantic" *wh*-position (cf. (16-a)), a scope marker cannot follow a *wh*-phrase in the same chain (McDaniel (1989), Brandner (this volume), cf. (16-b)).

(16) a. *Glaubst du was$^i$ Fritz meint wann$_i$ sie t$_i$ gekommen ist?
Believe you what$^i$ Fritz thinks when$_i$ she t$_i$ come is?

b. *Was$^i$ glaubst du wann$_i$ Fritz meint was$^i$ sie t$_i$ gekommen ist?
What believe you when$_i$ Fritz thinks what$^i$ she t$_i$ come is?

In Stechow and Sternefeld's (1988) analysis, the ungrammaticality of (16-a) follows from the stipulation that an empty COMP cannot be a scope marker in German. (16-b) is exluded by scope (9-b), since the lower *was*, a *wh*-element in A-bar position, is illicitely scope-bound by a *wh*-operator.

One may question the explanatory power of the principles invoked by Stechow and Sternefeld (1988) in order to describe the partial *wh*-movement construction. On the descriptive level, their analysis is quite successful, provided we add the missing link (12). This volume will contain new data, of course, and we hope, a more principled account of these data.

Let me briefly remark on the class of verbs which license partial *wh*-movement. Stechow and Sternefeld (1988, 357) note that the class of verbs which license partial *wh*-movement is not fully identical with the class of bridge verbs. Among the examples they give are these:

(17) Partial *wh*-verbs

a. Was hat Hans entschieden wer kommen soll?
What has Hans decided who come should?

b. *Wer hat Hans entschieden daß kommen soll?
Who has Hans decided that come should?

c. *Was hast du dich erinnert wer kommen soll?
What have you yourself remembered who come should?

d. Wen kannst du dich erinnern daß wir eingeladen haben?
Who can you yourself remember that we invited have?

*Entscheiden* "to decide" licenses partial *wh*-movement but not long *wh*-movement, whereas *erinnern* "to remember" licenses long *wh*-movement but not partial *wh*-movement. Disregarding possible difference, the relevant property of these verbs seem to be that they somehow make possible long *wh*-movement of a *wh*-phrase in the SpecC of the complement clause. It is interesting to note that *ob*-clauses, "whether"-clauses, may not appear as complements of these verbs. Höhle (this volume) gives the following example:

(18) a. Was glaubt sie auf wessen Hilfe man sich verlassen kann?
What thinks she on whose help one self rely can?

b. *Was glaubt sie ob man sich auf seine Hilfe verlassen kann?
What thinks she whether one self on his help rely can?

Perhaps, "whether" clauses have an invisible *wh*-phrase in their COMP. Even if this is so, this *wh*-clause certainly doesn't undergo long *wh*-movement. Thus, the direct dependency account predicts the ungrammaticality of (18-b). We will see that this datum is a serious problem for an indirect dependency analysis.

A semantic property to which considerable attention is paid in this volume is the phenomenon of **weak islands**.

(19) a. *Was$^i$ glaubt niemand wen$_i$ Karl t$_i$ gesehen hat?
What$^i$ believes nobody who$_i$ Karl t$_i$ seen has?

b. Wen$_i$ glaubt niemand t$_i$ daß Karl t$_i$ gesehen hat?
Who$_i$ believes nobody t$_i$ that Karl t$_i$ seen has?

Höhle (1990) and Rizzi (1990) note the ungrammaticality of (19-a) and assume that the reason for the deviance is that the binding relation between the scope marker and the partially moved *wh*-phrase crosses an intervening negation – here the negative quantifier *niemand* "nobody". Beck (1996) formulates a rather general LF-filter which will allow to predict this datum together with many others. The filter will be given below.

The partial *wh*-movement construction has more properties that have to be explained. Some of them will be mentioned in this introduction, others will be discussed in the articles contained in this volume.

# 5 The indirect dependency approach

Starting from Hindi, Dayal (1994) has developed a different analysis of the data discussed. In her theory, the term partial *wh*-movement is a misnomer, because she claims that German *was* is not a scope marker at all but a true *wh*-word which is restricted by an extraposed interrogative clause. One of Dayal's standard examples is this:

(20) jaun kyaa soctaa hai meri kis-se baat karegi
John what thinking is Mary who-with will-talk

Dayal argues that *kyaa* "what" is a genuine *wh*-word meaning something like "which proposition", and the embedded *wh*-sentence restricts this *wh*-word. Dayal considers the *wh*-sentence as extraposed and *kyaa* as a correlate of this sentence. The meaning of the Hindi example can be roughly paraphrased as (21-a); an analysis in terms of the Hamblin/Karttunen semantics for questions is something like (21-b). By the laws of identity, the formula is equivalent to the formula which corresponds to the direct dependency account (cf. the last line in (21-b).

(21) a. "Which proposition of property 'Who will Mary talk to' does John believe?"

b. $\lambda p \exists q[Q(q) \wedge p = \text{John believes } q]$,
where $Q = \lambda p \exists x[\text{person}(x) \wedge p = \text{Mary will talk to } x]$
$= \lambda p \exists q \exists x[\text{person}(x) \wedge q = \text{Mary will talk to } x \wedge p = \text{John believes } q]$
$= \lambda p \exists x[\text{person}(x) \wedge p = \text{John thinks Mary will talk to } x]$

The paraphrase (21-a) makes it clear what is going on here: a question is a set of propositions and sets can be regarded as properties, here a property of propositions. Therefore, a question can serve as the restriction of an existential quantifier over propositions. Dayal uses the term **indirect *wh*-dependency** to characterize her approach. One of the claims defended in Dayal (1994) is that German is like Hindi, i.e., the so-called partial *wh*-movement isn't partial at all but should be analyzed as an indirect *wh*-dependency.

Regardless of whether Dayal's analysis carries over to German, let me remark that the approach strikes me as basically correct for Hindi, even if some of the details may still be under dispute. Let us have a closer look at Hindi, before we

return to German.

# 6 Remarks on Hindi interrogatives

Instead of beginning with the competing analyses of the Hindi construction proposed by Dayal and Mahajan in this volume, I present a unified analysis that has been proposed by participants of the workshop, and which combines the insights of Dayal and Mahajan. I will indicate the points at which Dayal's and Mahajan's individual proposals differ from this one. Thus, I hope that my representation is fair to everyone.

Looking at the paraphrase (21) for Dayal's standard example, one would think that the Hindi material which corresponds to the information "Which proposition of property 'Who will Mary talk to'", viz. "kyaa + meri kis-se baat karegi" were analyzed as one semantic unit at d-structure, and the finite interrogative sentence which forms the restriction is extraposed at s-structure. At LF, the extraposed sentence would then be reconstructed and the entire term would undergo *wh*-movement at LF. In other words, the most straightforward derivation would seem to be this:

(22) A "transparent" derivation

a. d-structure:
jaun $[_{\mathrm{NP}}$ kyaa $[_{\mathrm{CP}}$ meri kis-se baat karegi$]]$ soctaa hai?
John $[_{\mathrm{NP}}$ what $[_{\mathrm{CP}}$ Mary who-with will talk$]]$ thinking is

b. LF:
$[_{\mathrm{NP}}$ kyaa $[_{\mathrm{CP}}$ kis-se$_j$ meri $\mathrm{t}_j$ baat karegi$]]_i$ jaun $\mathrm{t}_i$ soctaa hai?

c. s-structure:
jaun $[_{\mathrm{NP}}$ kyaa $\mathrm{t}_i]$ soctaa hai $[_{\mathrm{CP}}$ meri kis-se baat karegi$]_i$?

Indeed, there is a one-to-one translation from the LF (22-b) into a Hamblin-Karttunen formula. The only thing we have to do is to translate *kyaa* as $\lambda \mathrm{P} \lambda \mathrm{Q} \exists \mathrm{p}[\mathrm{P}(\mathrm{p}) \wedge \mathrm{Q}(\mathrm{p})]$, where P and Q are variables of type $\langle st, t \rangle$. The translation of the LF would then roughly be the following:

(23) $\lambda \mathrm{q}[\lambda \mathrm{P} \lambda \mathrm{Q} \exists \mathrm{p}[\mathrm{P}(\mathrm{p}) \wedge \mathrm{Q}(\mathrm{p})]\ \lambda \mathrm{p} \exists \mathrm{x}[\mathrm{person}(\mathrm{x}) \wedge \mathrm{p} = \text{Mary will talk to x}]$
$(\lambda \mathrm{p}.\mathrm{q} = \text{John is thinking p})$
$= \lambda \mathrm{q}[\lambda \mathrm{Q} \exists \mathrm{p}[\exists \mathrm{x}[\mathrm{person}(\mathrm{x}) \wedge \mathrm{p} = \text{Mary will talk to x}] \wedge \mathrm{Q}(\mathrm{p})]$
$(\lambda \mathrm{p}.\mathrm{q} = \text{John is thinking p})]$

$= \lambda q \exists p[\exists x[\text{person}(x) \wedge p = \text{Mary will talk to x}]$
$\wedge q = \text{John is thinking p}]$
$= \lambda q \exists x[\text{person}(x) \wedge q = \text{John is thinking Mary will talk to x}]$

Dayal (1994), however, does not quite take this line. For her, *kyaa* is the correlate of an extraposed *wh*-clause. What we have called an s-structure in (22) is her d-structure. At LF, *kyaa* is moved to SpecC. The meaning of *kyaa* is as before except for the fact that that the restrictive *wh*-sentence is linked to the pronoun *via* coindexing.

(24) Dayal's (1994) derivation

a. d-structure:
jaun [kyaa $t_i$] soctaa hai [meri kis-se baat karegi]$_i$?

b. LF: [kyaa $t_i$]$_j$ jaun $t_j$ soctaa hai [meri kis-se baat karegi]$_i$?

A superficial inspection of the syntax suggests that this approach is even simpler than the one indicated first. A closer inspection reveals, however, that the rule which links *kyaa* with the extraposed interrogative clause is rather complicated (cf. Dayal (this volume)). Beck and Berman (this volume) question the account for the reason that this correlate must have rather unusual properties. Normally, a correlate is of the same logical type as its "explicans" (a term used by Bech (1955/57)). On semantic grounds, *kyaa* must, however, express a relation between questions, i.e., it must be of type $\langle\langle st, t\rangle\langle\langle st, t\rangle, t\rangle\rangle$. The type is reduced to $\langle\langle st, t\rangle, t\rangle$ by interpreting the index of *kyaa* as a variable of the question type, where the variable gets the interpretation of the extraposed interrogative as its value. Perhaps, the term "correlate" is a misnomer in this context. It seems to me, however, that there is good evidence that Dayal's analysis is nevertheless correct. Vide the remarks on reanalysis in section 8.

The syntax which Mahajan (this volume) proposes for the Hindi construction is almost compatible with the transparent analysis outlined. The only thing that has to be done is to revise his LF and to combine it with a semantics in Dayal's style. Mahajan gives the the following derivation for sentence (25-a):

(25) a. Sitaa-ne kyaa socaa ki Raam-ne kis-ko dekhaa
Sitaa-erg KYAA thought that Raam-erg who saw
"Who did Sita think that Ram saw?"

b. d-structure:
Sitaa-ne socaa [$_{\text{NP}}$ kyaa [$_{\text{CP}}$ ki Raam-ne kis-ko dekhaa]]

c. s-structure:
Sitaa-ne [$_{V}$ kyaa$_i$ socaa] [$_{NP}$ t$_i$ [$_{CP}$ ki Raam-ne kis-ko dekhaa]]

d. *Wh*-structure:
[$_{CP}$ kyaa$_i$ Q Sitaa-ne t$_i$' socaa [$_{NP}$ t$_i$ [$_{CP}$ kis-ko$_j$ ki Raam-ne t$_j$ dekhaa]]

e. LF:
[$_{CP}$ [$_{CP}$ kis-ko$_j$ ki Raam-ne t$_j$ dekhaa]]$_i$ Q Sitaa-ne t$_i$' socaa [$_{NP}$ t$_i$]]

Just as we wanted, *kyaa+ki Raam-ne kis-ko dekhaa* form a syntactic unit at d-structure and could be interpreted by means of Dayal's method. Mahajan, however, goes a different way. At s-structure, *kyaa* incorporates into the verb *socaa* "thinks". Then comes an intermediate step, which I have called *Wh*-structure for convenience[7]. Here, both *kyaa* and *kis-ko* "who" move to their local COMP. In the last step, the interrogative complement "Who did Ram see" is moved to the higher COMP and written over *kyaa*. As in German, *kyaa* therefore is an expletive. Note that the trace of the interrogative is deleted for some reason, such that at LF only the *kyaa*-trace survives.

Mahajan gives the following comment on the interpretation of his LF:"Q can now coindex with the SPEC of its SPEC yielding the required scope of the *wh*-phrase." In other words, Mahajan's final LF is this:

(26) [$_{CP}$ [$_{CP}$ kis-ko$_j$ ki Raam-ne t$_j$ dekhaa]]$_i$ Q$_j$ Sitaa-ne t$_i$' socaa [$_{NP}$ t$_i$]]

The only way I can see to interpret this LF is to assume that *kis-ko*$_j$ has scope over the interrogativizer Q, whereas the remnant of the interrogative has to be reconstructed. In other words, (26) has to be interpreted as if it were (27-a), whose interpretation is (27-b).

(27) a. kis-ko$_j$ Q$_j$ Sitaa-ne socaa [$_{CP}$ ki Raam-ne t$_j$ dekhaa]
b. $\lambda$p$\exists$x[person(x) $\wedge$ p = Sita thinks that Ram saw x]

Thus, a closer inspection of Mahajan's analysis shows that it is a direct dependency approach. This assessment is shared by Dayal (this volume). I am not sure, however, whether this consequence is really intended by Mahajan.

As noted already, Mahajan's account can be simplified by assuming an LF in the style of Dayal, a suggestion made by Gereon Müller at the workshop. The

[7] The term is used in analogy to Riemsdijk and Williams's (1981) "NP-structure".

derivation would then be this:

(28) a. d-structure:
Sitaa-ne socaa [$_{NP}$ kyaa [$_{CP}$ ki Raam-ne kis-ko dekhaa]]

b. s-structure:
Sitaa-ne kyaa$_i$ socaa [$_{NP}$ t$_i$ [$_{CP}$ ki Raam-ne kis-ko dekhaa]]

c. LF: [$_{NP}$ kyaa [$_{CP}$ kis-ko$_j$ ki Raam-ne t$_j$ dekhaa]]$_i$ Sitaa-ne socaa t$_i$]
For which proposition p of the set "Who did Ram see", Sita thinks p?

The LF is obtained from the d-structure by internal *wh*-movement of *kis-ko* to its local COMP and by movement of the entire *kyaa*-NP to its local COMP. The result is interpreted in a straightforward way by Dayal's method, as indicated by the paraphrase. This derivation is almost the same as the "transparent" derivation given initially. The differences are that the *wh*-clause is not extraposed in the syntax, that the *kyaa*-NP is base generated in a postverbal position and that *kyaa* is incorporated. One might object that the LF should be built up from the s-structure and not from the d-structure. I think one can argue that incorporation is always reconstructed at the level of transparent LF, but I cannot go into this here.

It would be nice if it turned out that Dayal's semantic account and that Mahajan's syntax were correct and that the two could be brought together in the way sketched. Presumably, this is not so, however. Considerations of reanalysis suggest that the more complicated syntax assumed by Dayal is basically correct. For the time being, let us presuppose the transparent analysis for the comparison of Hindi with German. Nothing hinges on that. It could be translated into Dayal's actual approach, but not into Mahajan's analysis, as it stands.

# 7 Is German like Hindi?

This section contains some of the arguments relevant for deciding on the issue of whether German is shaped as Dayal claims. I have to add that the arguments presuppose Dayal's (1994) analysis. Dayal (this volume) contains revisions which can meet some of the objections but not all of them, as far as I can see.

We start with the generalization that a scope maker cannot occur in situ. The ungrammaticality of sentence (29-a) is a problem for Dayal, because it

should have the LF (29-b), which is semantically perfect. The reading is indicated informally as (29-c).

(29) a. *Wer meint was wann sie gekommen ist?
Who thinks what wann she come is

b. [$_{CP}$ Wer$_1$ [$_{C'}$ [$_{CP}$ was wann sie gekommen ist]$_2$ [$_{C'}$ meint$_3$ [$_{IP}$ $t_1$ [$_{CP}$ who$_1$ [$_{C'}$ [$_{CP}$ what when she come is]$_2$ [$_{C'}$ believes$_3$ [$_{IP}$ $t_1$ $t_2$ $t_3$]]]]
$t_2$ $t_3$]]]]

c. For which person x and for which proposition p of the form "When did she come", x believes p?

(Recall that I am assuming adjunction to C′ at LF in the case of multiple questions.) The direct dependency approach has no problem here, because the sentence is illformed on syntactic grounds as we know from the discussion in section 4.

A related objection is put forward in Beck and Berman (this volume), who point at the following contrast between German and Hindi:

(30) a. *Was glaubst du ob Maria mit Hans gesprochen hat?
What believe you whether Mary with Hans talked has?

b. tum kyaa socte ho ki meri-ne haans-se baat kiyaa yaa nahiiN?
you what think that Mary Hans-with talked or not

If the German construction were analyzed as an indirect dependency, we would expect (30-a) to mean something like:

(31) For which proposition p of the form "Did Mary talk to Hans?", you believe p?

The Hindi sentence means that, the German sentence doesn't. The direct dependency analysis can explain the contrast by stipulating that *was* is a scope marker of a *wh*-phrase which undergoes movement at LF. In section 4, we mentioned that *whether*-clauses do not contain such a *wh*-phrase.

Let us turn to weak islands such as negation. Recall the relevant contrast:

(32) a. *Was$^i$ glaubt niemand wen$_i$ Karl $t_i$ gesehen hat?
What$^i$ believes nobody who$_i$ Karl $t_i$ seen has?

b. Wen$_i$ glaubt niemand t$_i$ daß Karl t$_i$ gesehen hat?
Who$_i$ believes nobody t$_i$ that Karl t$_i$ seen has?

As mentioned in section 4, Beck (1996) proposes an LF-filter which bans movement over the negation and over quantifiers at LF, but not at s-structure. A somewhat simplified form of the filter is this:

(33) *Beck's filter*
A constellation of the form
$\alpha_i \ldots$ negation/quantifier$\ldots$ t$_i{}^{LF} \ldots$
is not wellformed.

It is important to keep in mind that the trace referred to by the filter is generated through LF-movement; at s-structure, the constellation is allowed as (32-b) shows.

Beck's filter blocks (32-a), because the partially moved *wh*-phrase *who* would have to cross the LF-barrier *nobody*, since it has to move to its scope marker. Beck's filter is not expressible in an indirect dependency account, because there, no LF-movement is necessary: *was* is a *wh*-pronoun which is moved at s-structure. The relation between the *wh*-pronoun and its restricting *wh*-clause doesn't cross an LF-barrier either, since the *wh*-clause is extraposed.

To this problem, Dayal (1994) has a pragmatic/syntactic answer of the following sort. Consider the following question:

(34) Was glaubt niemand?
What believes nobody?

There are countless things not believed by anybody. In order to be able to answer the question, the context has to provide a restriction of the question word "what". Now, Dayal assumes that a contextually given restriction excludes an overt restriction. This assumption is not very plausible as such, because overt restrictions always interact with contextually given ones (cf. Beck and Berman (this volume) for discussion).

Even if Dayal's principle could explain weak islands induced by negation, we still have another problem, which may be dubbed the **problem of missing readings**. The problem addressed in Pafel's contribution to this volume. He considers the following examples:

(35) a. Wo$_i$ glaubst du t$_i$ daß jeder gerne t$_i$ sitzen würde?
Where$_i$ believe you t$_i$ that everyone readily t$_i$ sit would

b. Was$_i$ glaubst du wo$_i$ jeder gerne t$_i$ sitzen würde?
What$_i$ believe you where$_i$ everyone readily t$_i$ sit would

These two have exactly the same readings. *Everyone* can have narrow scope with respect to the *wh*-phrase or it may extend its scope over the matrix-CP giving raise to a distributive question. The two readings are conveniently paraphrased as follows:

(36) a. For which place x, you believe that everyone would like to sit at x?

b. For everyone y: for which place x, you believe that y would like to sit at x?

Now, Pafel makes the following observation. In the examples just given, the universal quantifier *everyone* is c-commanded by the moved and partially moved *wh*-phrase, respectively. Consider now constellations in which *everyone* c-commands the trace of a *wh*-phrase and a partially moved *wh*-phrase, respectively. We still find an ambiguity in a sentence with long *wh*-movement whereas, quite unexpectedly, the corresponding construction with partial *wh*-movement only has the distribuitive question reading.

(37) a. Wo$_i$ glaubt jeder daß sie gerne t$_i$ leben würde
Where believes everyone that she readily t$_i$ live would

b. Was$_i$ glaubt jeder wo$_i$ sie gerne t$_i$ leben würde
What believes everyone where she readily t$_i$ live would

In other words, (37-a) has both reading (38-a) and (38-b), whereas (37-b) only has reading (38-b).

(38) a. For which place x, does everyone believe that she would like to live at x?

b. For everyone y: for which place x, does y believe that she would like to live at x?

The missing reading for (37-b) is a mistery under Dayal's approach because (37-b) should have LFs which corresponds to the following two paraphrases:

(39) a. For which proposition p, p of the form "Where would she like to live?", everyone believes p?

b. For every person x: for which proposition p, p of the form "Where would she like to live?", x believes p?

I see no way for Dayal (1994) to block (39-a). On the other hand, a direct dependency account bars reading (38-a) by Beck's filter: the LF-movement of *for which place* has to cross the LF-barrier *everyone*, whereas (38-b) contains no such barrier, because the trace of the scoped "everyone" is no barrier for LF-movement. For convenience, I state the illicit and the licit LF for (37-b) that correspond to the readings (38-a) and (38-b), respectively:

(40) a. $[_{\text{CP}}$ $\text{wo}_i$ glaubt **jeder** $[_{\text{CP}}$ $\text{t}_i^{LF}$ sie gerne $\text{t}_i$ leben würde]]
$[_{\text{CP}}$ $\text{where}_i$ believes **everyone** $[_{\text{CP}}$ $\text{t}_i^{LF}$ she readily $\text{t}_i$ live would]]

b. $\text{jeder}_j[_{\text{CP}}$ $\text{wo}_i$ glaubt $\text{t}_j$ $[_{\text{CP}}$ $\text{t}_i^{LF}$ sie gerne $\text{t}_i$ leben würde]]
$\text{everyone}_j[_{\text{CP}}$ $\text{where}_i$ believe $\text{t}_j$ $[_{\text{CP}}$ $\text{t}_i^{LF}$ she readily $\text{t}_i$ live would]]

The intervening LF-barrier is indicated by boldface letters in (40-a).

The only thing that is missing from Beck's account is the interpretation of (40-b), i.e., we have to make precise the semantics of "quantifying-in" for questions. This can be done by a type-lifting operation. The interpretation of (40-b) is roughly this:

(41) $\lambda$Q$\forall$x[person(x) $\rightarrow$ Q($\lambda$p$\exists$y[place(y) $\wedge$ p = x believes that she would like to live at y])], Q of type $\langle\langle$st,t$\rangle$,t$\rangle$

It should be clear that the lifted question of type $\langle\langle\langle st,t\rangle t\rangle,t\rangle$ contains exactly the same information as the unlifted question of type $\langle st,t\rangle$. So, the operation is simply a sort of type accomodation.[8]

In his talk, Pafel made another very interesting observation about German, which is not of direct relevance to the comparison between Hindi and German but which helps to complete the picture of partial *wh*-movement in German. In contrast to *was-w*-constructions, "copying constructions" like (42) are ambigu-

[8]This method of type lifting has been proposed in Stechow (1993b). This handout shows explicitely how different answer relations (partial answers, exhaustive answers) can be defined on the basis of the lifted type. The method goes back to a conversation with Irene Heim, who told me that basically the same idea is found in Groenendijk and Stokhof (1984).

ous.[9]

(42) Wo glaubt jeder wo sie gerne leben würde?
Where believes everyone where she readily live would

The obvious explanation is that copying constructions are not partial *wh*-movement constructions but rather exhibit long *wh*-movement.[10]

None of the data discussed so far speaks in favour of the indirect dependency analysis. But the following minimal pair discussed in Reis' contribution (cf. Reis (this volume)) could be taken as prima facie evidence for Dayal's approach:

(43) a. Wo glaubt/sagt/suggeriert sie daß Fox populärer ist als er
where believes/says/insinuates she that Fox popular-er is than he
ist?
is?

b. Was glaubt/sagt/suggeriert sie wo Fox populärer ist als
what believes/says/insinuates she where Fox popular-er is than
er ist?
he is

Reis observes that (43-a) is ambiguous: the object of attitude may be consistent or inconsistent. On the other hand, the object of attitude in (43-b) is inconsistent only. We can paraphrase the two readings as follows:

(44) a. *Consistent object of attitude:*
For which place x, in her belief worlds is Fox is more popular at x than Fox is popular at x in the real world?

b. *Inconsistent object of attitude:*
For which place x, in her belief worlds is Fox is more popular at x than Fox is popular at x?

If we make this precise by one of the usual methods of comparative semantics,

[9] I explicitly refer to Pafel's talk, because recently doubts about the empirical correctness of the data have worried him. For some people, the *wo-wo*-construction is ambiguous. For them, it is a partial *wh*-movement construction. For my dialect, Pafel's original observation is correct.

[10] In recent work, Chomsky defends the copy theory of "trace". German copying constructions suggest that this theory is true for *wh*-words, at least. "Long" *wh*-phrases never leave a visible copy.

we obtain the following formulae:[11]

(45) a. $\lambda p \exists x$ [place(x) $\wedge$
p = $\lambda w[\iota d[\text{believe}_w(\text{she}, \lambda w'[\text{d-popular}_{w'}(\text{Fox})])]$
$> \iota d[\text{d-popular}_w(\text{Fox})$ at x]]

b. $\lambda p \exists x$ [place(x) $\wedge$
p = $\lambda w[\text{believe}_w(\text{she},$
$\lambda w'[\iota d[\text{d-popular}_{w'}(\text{Fox})$ at x] $> \iota d[\text{d-popular}_{w'}(\text{Fox})$ at x]])]]

The indirect dependency analysis faces no problem here because it can have only the reading with the inconsistent object of attitude, which is represented by the following paraphrase and formula:

(46) a. For which proposition q of the form "At x Fox is more popular than Fox is", she believes q?

b. $\lambda p \exists q$[proposition(q) $\wedge \exists x$[place(x) $\wedge$
q = $\lambda w'[\iota d[\text{d-popular}_{w'}(\text{Fox})$ at x] $> \iota d[\text{d-popular}_{w'}(\text{Fox})$ at x]
$\wedge$ believe$_w$(she,p)]]]

There is no way to represent the consistent object of attitude in an analysis in which the interrogative restricts the *wh*-word, for the consistent reading requires that the comparative morpheme plus its complement, i.e., the information "MORE than Fox is popular", has wide scope with respect to the predicate of attitude. This is not possible if the interrogative clause has wide scope with respect to that predicate, and Dayal's account predicts this. Here are the three LFs which corresponds to the formulae discussed.

(47) a. [$_{\text{CP}}$ Wo$_1$ Q [$_{\text{DegP}}$ -er [$_{\text{CP}}$ als$_d$ Fox e$_1$ d-populär ist]]$_d$ [$_{\text{IP}}$ sie
[$_{\text{CP}}$ Where$_1$ Q [$_{\text{DegP}}$ MORE [$_{\text{CP}}$ than$_d$ Fox e$_1$ d-popular is]]$_d$ [$_{\text{IP}}$ she
glaubt daß Fox t$_1$ d-populär ist]]?
believes that Fox t$_1$ d-popular is]]?

b. [$_{\text{CP}}$ Wo$_1$ Q [$_{\text{IP}}$ sie glaubt daß [$_{\text{DegP}}$ -er [$_{\text{CP}}$ als$_d$ Fox e$_1$
[$_{\text{CP}}$ Where$_1$ Q [$_{\text{IP}}$ she believes that [$_{\text{DegP}}$ MORE [$_{\text{CP}}$ than$_d$ Fox e$_1$
d-populär ist] [$_{\text{IP}}$ Fox t$_1$ d-populär ist]]]]?
d-popular is] [$_{\text{IP}}$ Fox t$_1$ d-popular is]]]]?

[11] A survey of different accounts is given in Stechow (1984). The formulae assume a semantics in the style of Russell (1905).

c. [$_{CP}$ Was [$_{CP}$ wo$_1$ Q [$_{DegP}$ -er [$_{CP}$ als$_d$ Fox e$_1$ d-populär
[$_{CP}$ What [$_{CP}$ where$_1$ Q [$_{DegP}$ MORE [$_{CP}$ than$_d$ Fox e$_1$ d-popular
ist]] [$_{IP}$ Fox t$_1$ d-populär ist]]$_2$ Q [$_{IP}$ sie glaubt t$_2$]
is]] [$_{IP}$ Fox t$_1$ d-popular is]][$_2$ Q [$_{IP}$ she believes t$_2$]

(47-a) is the LF for the consistent object of belief, (47-b) the one for the inconsistent object, and (47-c) is the LF for an indirect dependency account. It is a notorious problem what the precise structure of the comparative complement is. I am assuming a structure which is parallel to the structure of the main clause and which contains a parasitic gap for the place variable. Nothing hinges on this particular assumptions.

The LFs presuppose that the comparative morpheme is the head of a degree phrase (cf. Bresnan (1973)), whose first argument – the *than*-phrase – is extraposed at s-structure. At LF, it is reconstructed and scoped together with the head. For more details, see Stechow (1993a).

The direct dependency approach seems to have a problem here, which can be stated in this way: why should (44-b) have only reading (47-b) whereas (44-a) has both reading (47-a) and (47-b)? The direct dependency approach assumes the same LFs for the two constructions, and they therefore should have the same readings. But is this really so? Consider the LFs for the *was-wo*-construction discussed in a direct dependency approach:

(48) a. [$_{CP}$ Wo$_1$ Q [$_{DegP}$ **-er** [$_{CP}$ als$_d$ Fox e$_1$ d-populär ist]]$_d$ [$_{IP}$
[$_{CP}$ Where$_1$ Q [$_{DegP}$ **MORE** [$_{CP}$ than$_d$ Fox e$_1$ d-popular is]]$_d$ [$_{IP}$
sie glaubt [$_{CP}$ t$_1{}^{LF}$ Fox t$_1$ d-populär ist]]]?
she believes [$_{CP}$ t$_1{}^{LF}$ Fox t$_1$ d-popular is]]]?

b. [$_{CP}$ Wo$_1$ Q [$_{IP}$ sie glaubt [$_{CP}$ t$_1{}^{LF}$ [$_{DegP}$ -er [$_{CP}$ als$_d$ Fox
[$_{CP}$ Where$_1$ Q [$_{IP}$ she believes [$_{CP}$ t$_1{}^{LF}$ [$_{DegP}$ MORE [$_{CP}$ than$_d$ Fox
e$_1$ d-populär ist] [$_{IP}$ Fox t$_1$ d-populär ist]]]]]?
e$_1$ d-popular is] [$_{IP}$ Fox t$_1$ d-popular is]]]]]?

(48-a) is the LF expressing the consistent belief. It is barred by Beck's filter, because *wo* has been moved over the intervener *-er* "MORE" at LF, and the comparative morpheme clearly is a quantifier. To be sure, there are more LF-traces in (48-a). I have indicated only the offending one. On the other hand, the LF expressing the inconsistent belief, viz. (48-b), exhibits no illicit LF-movement, because the comparative morpheme is lower than the SpecC position containing

*wo* at s-structure. Thus, Reis' data are no problem for the direct dependency analysis either.

Dayal (this volume) cites an example due to Fanselow and Mahajan (this volume) in favour of her approach:

(49) Was$_i$ hat [ohne e$_i$ offen auszusprechen] Hans t$_i$ gemeint [$_{\mathrm{CP}_i}$
What$_i$ has without e$_i$ open out-to-pronounce] Hans t$_i$ thought [$_{\mathrm{CP}_i}$
wen$_j$ Maria t$_j$ liebt]
whom$_j$ Maria t$_j$ loves]

The idea is that the *was*$_i$ in COMP licenses the parasitic gap e$_i$ and its trace t$_i$. The licensing presupposes that e$_i$ and t$_i$ are of the propositional type, an assumption not compatible with the direct dependency analysis.

The analysis is not forced upon us, however. The parasitic gap may by licensed as well by the extraposed *wh*-clause, given that the extraposed clause is in an A-bar position. In other words, the structure of the example could be the following one:

(50) Was$_i$ hat [ohne e$_i$ offen auszusprechen] Hans t$_j$ gemeint [$_{\mathrm{CP}_j}$
What$_i$ has without e$_i$ open out-to-pronounce] Hans t$_i$ thought [$_{\mathrm{CP}_j}$
wen$_i$ Maria t$_i$ liebt]
whom$_i$ Maria t$_i$ loves]

Thus, the example doesn't decide the issue.[12]

It would be a harder problem for a direct dipendency approach if Fanselow and Mahajan's (this volume) claim were correct that long *wh*-movement is compatible with a correlate *es* in the middle field whereas "scope marking" *was* isn't because the latter is a correlate of an extraposed interrogative. Among other things, the authors give the following examples (Fanselow and Mahajan's (this volume)[10]):

(51) a. Wen glaubst du es mir nicht daß sie liebt?
Who believe you it me not that she loves?

b. *Was glaubst du es mir nicht daß sie liebt?
What believe you it me not that she loves

[12]Sabel (this volume) claims that German has no genuine parasitic gaps but only "pseudo" parasitic gaps. For him, the construction is irrelevant for the issue anyway.

Nobody I have asked accepts (51-a). On the contrary, the literature known to me takes it for granted that we cannot extract from sentences which have an *es*-correlate in the middlefield (cf. Müller (1989)).[13]. Thus, I take it that Fanselow and Mahajan's claim is not yet established.

To summarize the discussion: it seems to me that the direct dependency analysis is the correct one for German, given the present state of research.

# 8 Partial *wh*-movement as reanalysis

In view of the arguments for LF-movement and influenced by Reis's (this volume) remarks on reanalysis, Dayal (this volume) has changed her original proposal in a way which I will sketch in the following lines. Reis considers the following examples:

(52) a. Was glaubst du, wohin ist er gegangen?
What believe you, where-to is he gone?

b. Was glaubst du wohin er gegangen ist?
What believe you where-to he gone is?

The first construction may be considered as a sequence of two questions. Reis calls this type of construction *parenthetical*[14]. The second question is of the *was-w*-type. The "second question" exhibits verb final word order, an indication that the clause has been reanalyzed as a subordinate clause. The process of reanalysis involved here is described in detail in section 4 of Reis' paper.

On Reis' view, the *was-w*-construction still has properties of the former parenthetical construction. Among other things, the matrix predicates which license the construction are exactly those that license the parenthetical construction, as Reis convincingly argues in section 3.2 of her paper. This still doesn't answer the question which mechanism is behind this licensing, but empirically, this is a

[13]The same holds for prepositional correlates, i.e., for Fanselow and Mahajan's (this volume) example [17]

[14]The term is a bit puzzling for the example discussed, which would better be called "paratactic". Clearly parenthetical in an intuitive sense is the related question:

(i) Wohin, was glaubst du, ist er gegangen?
Where-to, what believe you, is he gone?

important correlation.

Dayal (this volume) assumes two stages of reanalysis, which she schematizes in the following way (cf. her [28]):

(53) a. Sequential structure
[$_{CP}$ [$_{CP}$ what do you think [$_{CP}$ where he should go]]]
b. "Indirect" subordination (Hindi)
[$_{CP}$ what$_i$ do [$_{IP}$ [$_{IP}$ you think t$_i$][$_{CP}$ where he should go]]]]
c. "Direct" subordination (German)
[$_{CP}$ what$_i$ do [$_{IP}$ you [$_{VP}$ think [$_{CP}$ where he should go]]]]

Dayal (1994) assumes (53-a) for Hindi. Dayal (this volume) revises this hypothesis in favour of (53-b). The reason is that a pronoun in the "second question" can be bound by an antecedent in the "first question", which is never possible in a sequential construction. The possibility is witnessed by her example [33]:

(54) har aadmii$_i$ kyaa soctaa hai ki us-ko$_i$ kahaaN janaa hai
every man what think PR that he-A where go has

Dayal (this volume) assumes that German has reached the stage of direct subordination. At the same time she gives up her earlier claim that the German LF is exactly alike to that of Hindi. While Hindi links the interrogative pronoun *kyaa* to the embedded interrogative via coindexation[15], German moves the embedded interrogative clause to the interrogative pronoun *was* at LF. As I said, this is an interesting revision which can face a number of the objections made in section 7.

For concreteness, consider Dayal's (this volume) example [32]:

(55) Was glaubt jeder$_i$ wohin er$_i$ gehen wird?
What thinks everyone where he go will?

[15]Viewed from the historical perspective, Dayal's LF for Hindi gains additional plausibility. If the construction is a reanalysis of a sequence of questions, then little speaks in favour of Mahajan's and our earlier assumption that "what" + the interrogative CP form a constituent at d-structure if Hindi is verb final: the two were never adjacent. If Hindi were a verb second language, we could have such an NP by reanalysis. But then we should have further evidence for the reality of the NP such as scrambling of the entire NP. If no such evidence exists, Dayal's coindexation analysis is the most convincing one.

If we assume Beck's filter, the only possible LF is (56), which gives us the distributive question interpretation:

(56) everyone$_i$ [$_{\mathrm{CP}}$ [what where he$_i$ will go]$_j$ Q t$_i$ thinks t$_j$
For everyone x: which proposition p of the form "Where will x go?", x thinks p?

From earlier discussion we know that this prediction is welcome. In general, the approach allows to derive all the data which were deduced by means of Beck's filter.

Still, there are residua. For instance, the approach does not predict that scope marking *was* cannot occur in situ. Thus, we have to stipulate this property. Another problem not covered by the revision is that the constituent question may not be a yes/no-question. Here we seem to need a further stipulation. Finally, it is not clear how the matrix predicates could license or block this movement to the local COMP of the complement CP moves in toto. Recall that the situation is different for movement from SpecC to SpecC. Here we can imagine mechanisms which open a barrier for movement (cf. Müller (1989)).

Despite the remaining scepticism concerning Dayal's claims about German, I want to finish this discussion by admitting that I find her analysis extremely appealing. Clearly, we need her semantics for the analysis of sequential questions. Therefore it is prima facie very plausible that the semantics survives for the *was-w*-constructions as well. If the residua just mentioned here can be explained in a satisfactory way, the theory might turn out to be correct after all. If the residua remain, this may be an indication that the reanalysis has reached a further, third stage: the *wh*-phrase "was" has lost its meaning. It has turned into a scope marker.

# 9 Syntactic variation and LF

In an intuitive sense, Riemsdijk's examples (1) are alternations of each other. The notion of alternation is difficult to make precise under standard assumptions of the Minimalist Program. One would think that two sentences stand in the alternation relation if they are built up from the same lexical material ("same numeration") and lead to a well-formed LF. In other words, sentences would be alternations if they are in the same "reference set". If we take this line, Riemsdijk's sentences are not alternations, because they are made up from slightly

different lexical material. Consider, e.g., the following pair from Riemsdijk's list:

(57) a. Was glaubst du was Peter meint was Hans sagt was Klaus behauptet *mit wem* Maria gesprochen hat?

b. Was glaubst du was Peter meint was Hans sagt *mit wem* Klaus behauptet daß Maria gesprochen hat?

The first sentence contains four scope markers, the second only three, the second contains the complementizer *daß* "that", the first one doesn't. If one considers these words as lexical material, the numerations must be different, and there is no alternation. If one takes these forms as LFs, as Riemsdijk and Williams (1981) do, even the LFs of the sentences are different, and the notion of alternation has vanished completely. This is, in fact, what Mahajan (this volume) says. Here is a relevant quote from his talk:

"*was/kyaa* questions are actually a different strategy (for forming *wh*-questions) than the wh-movement constructions. They are different strategies in the sense that they involve different numerations and different syntactic derivations. Therefore, from the point of view of the minimalist framework, they cannot be considered as competing derivations (or even competing LFs) and their co-existence is not problematic."

To be sure, Mahajan does not assume Riemsdijk's LFs for the German partial *wh*-constructions (cf. the discussion in section 6), but his LFs are different in each case. Thus, for Mahajan, there is no problem of alternation to be accounted for: different sentences, different derivations, different LFs, but presumably sameness of meaning. This is all what there is to say. Certainly, this is a coherent position.

A different approach is taken in Müller's contribution (cf. Müller (this volume)). Müller assumes that LFs are transparent in the sense made precise in section 2. For the reasons discussed in section 4, the sentences actually have the same LF, i.e., scope markes are expletives which are replaced by a *wh*-phrase (or its trace) at LF. Together with some additional assumptions (head movement is reconstructed, there is no complementizer at LF, and perhaps some others) we obtain the result that Riemsdijk's sentences have the same (transparent) LF. The next move is to define competing derivations in terms of sameness of LF.

This time, Riemsdijk's sentences are genuine alternations and the theory has to provide a grammatical ("converging") derivation for each of them. In the minimalist framework, there could be different derivations of the same LF, in principle. In practice, however, this will very rarely be the case. There are

always some economy contraints at work which rule out one derivation in favour of another. Thus, this kind of approach requires a modification of standard assumptions of the minimalist framework.

Müller proposes an optimality-theoretical solution: he ranks the constraints which determine the distribution of *wh*-phrases in the syntax (cf. Prince and Smolensky (1993)). Different rankings generate different *wh*-patterns. To illustrate the method, let me mention the constraints that are needed to account for the differences between German and English:

1. PROJ-PRIN (s-structure): No adjunction to C, C′, SpecC or CP!
2. DER-ECON (derivational): No s-structure movement!
3. WH-CRIT (s-structure):
   a. *Wh*-operators are in SpecC.
   b. $C_{+wh}$ requires lexicalization of C or SpecC.
4. FULL-INT (s-structure) A lexical item has an interpretation.[16]

The principles are explained in greater detail in Müller (this volume). I mentioned earlier that some of the constraints explicitly refer to s-structure. This seems to be a crucial feature of the theory. Thus, in some sense, the notion of s-structure is real and not eliminable.

The ranking that brings out the difference between English and German is this:

(58) a. English:
PROJ-PRIN $\succ$ WH-CRIT $\succ$ FULL-INT $\succ$ DER-ECON

b. German:
PROJ-PRIN $\succ$ WH-CRIT $\succ$ FULL-INT $\prec \succ$ DER-ECON

The essential difference between English and German is that German doesn't rank FULL-INT and DER-ECON with respect to each other, whereas English ranks FULL-INT higher. It is clear that the "tie" between the two constraints

[16]The principle presupposes that open interrogative markers like Korean *--ka/-ni* are regarded as expletives. One would think that they express the "interrogativizer", i.e., the information p = question nucleus. This information is the semantic interpretation of the *wh*-feature, as Müller has informed me.

is the essential licenser of partial *wh*-movement: If we find a scope marker in SpecC, we automatically have a word which has no interpretation, because the scope marker is an expletive. English doesn't allow that: we have to move in the syntax, violating DER-ECON. For concreteness, consider one English/German contrast, where we assume for the sake of the argument that the English and the German examples are the only constructions contained in the same reference set (a different one for each language, of course).

(59) a. *What[1] do you think why$_1$ she has $t_1$ come?
b. Why$_1$ do you think $t_1$ that she has $t_1$ come?
c. Was[1] glaubst du warum$_1$ sie $t_1$ gekommen ist?
d. Warum$_1$ glaubst du $t_1$ daß sie $t_1$ gekommen ist?

(59-a) violates FULL-INT and DER-ECON, whereas (59-b) only violates DER-ECON. This suffices to rule out (59-a). In German, the same constraints are violated, but this doesn't rule out any of the constructions, since the constraints are equally ranked.

An essential assumption of Müller's account is that partial *wh*-movement is analyzed as a direct dependency, i.e., that the standard approach is correct. If an indirect dependency analysis were the correct one for German, partial *wh*-movement would not be an explanandum anymore. It would be ordinary *wh*-movement. Still, Müller's theory would derive the contrasts found in languages such as Polish, English and Korean.

I should add that Müller's treatment of weak islands is different in some respects from Beck's. Consider the following contrast:

(60) a. *Was[1] glaubst du **nicht** wen$_1$ (daß) Hans $t_1$ getroffen hat?
What[1] believes you **not** whom$_1$ (that) Hans $t_1$ met has?
b. ?Wen$_1$ glaubst du **nicht** $t_1$ daß Hans $t_1$ getroffen hat?
Whom$_1$ believes you **not** that Hans $t_1$ met has?

Müller introduces the further constraint BAR-CON, which implies that chain formation may not cross a weak island. This contstraint is ranked higher than DER-ECON and lower than WH-CRIT. The somewhat marginal status of (60-b) is a problem for OT (and the minimalist program), because the construction should be perfect since it wins over its competitor (60-a). According to Beck's (1996) analysis, (60-b) should be perfect as well. Müller discusses possible re-

finements of his theory which are needed to capture the marginal status of his theory.[17]

## 10 *Wh* in situ

In the preceding sections I assumed that an adequate analysis of partial *wh*-movement requires "total" *wh*-movement at LF. Now, Brandner (this volume) and Sabel (this volume) reject the idea of LF-movement of *wh*-phrases. The analyses they offer and the motivations behind their papers are rather different, but concerning partial *wh*-movement, the proposals offered by the two authors have in common that the "contentful" *wh*-phrase doesn't move to the scope marker at LF. In this section I want to make some remarks on the possibility of an in situ interpretation of *wh*-phrases, which the two authors (and many others) presuppose.

Brander assumes that the scope marker merely serves the job of achieving "autonomous clausal typing": an interrogative sentence has to be distinguished from a declarative one. English has to move a *wh*-phrase for that purpose wheras German can use a scope marker for the same purpose. The scope marker in intermediate positions are necessary to define a *Wh*-chain in the sense of McDaniel (1989). Brandner assumes that the scope marker *was* is semantically empty. Each *wh*-phrase splits into a *wh*-part and an indefinite part. Scope marking *was* is the *wh*-bit. Overt movement in the syntax is, in reality, movement of the *wh*-part. The indefinite part is pied-piped but in situ at LF (either by reconstruction or by assuming a copy theory of traces). The indefinite part is a quantifier which makes a sentence a question, and all quantifiers are interpreted in situ.

For Sabel, *wh*-movement serves the purpose of feature checking. He assumes that each COMP contains an operator feature ("op") which is strong and must therefore be checked. The highest COMP of an interrogative contains in addition the feature *+wh*, which must be checked as well. The checking can be done by true *wh*-phrases in German or by the scope marker *was*. Semantically, no *wh*-movement is required, and LF-movement of *wh*-phrases is even excluded in

[17] Gereon Müller informs me that he disagrees with Sigrid Beck on certain data. He considers the following *wh* in situ variant as perfect, which follows from his theory:

(i) Wer glaubt nicht daß Hans wen getroffen hat
Who believes not that Hans whom met has

Beck considers the sentence as ungrammatical, which is predicted by her account.

Sabel's approach.

In order to get the distribution of scope markers and *wh*-phrases right, both authors presuppose McDaniel's *wh*-criterion for chains which encodes a lot of the distribution by stipulation.

I want to make use of this last section to remark on the interpretation of *wh* in situ, a possibility assumed by both authors. The semantical methods known to me shed doubts on the position of both authors, as I will show. This does not necessarily mean that their analyses are not tenable, but the authors are invited to take the following remarks as a challenge to make their semantic assumptions more precise.

The only method I know of for interpreting *wh* in situ is due to Engdahl (1980) and has been taken up recently by Reinhart (1992). The idea is to quantify over choice functions. A **choice function** selects a representant for each set in its domain. For the sake of concreteness, consider the example (61-a), which can roughly be represented as (61-b):

(61) a. $\text{Was}_1$ glaubt Fritz welches $\text{Buch}_1$ Maria $t_1$ liest?
$\text{What}_1$ believes Fritz which $\text{book}_1$ Mary $t_1$ reads

b. $\lambda p \exists f$, f a choice function $\wedge$ p = Fritz believes that Mary reads f(book)

Taking up the old idea (originally due to Katz and Postal) that a *wh*-phrase splits into a *wh*-part and an indefinite part, it is tempting to establish the following interpretational equations:

(62) a. which book = wh+a book

b. *wh* = *was* = $\exists$f, f a choice function

c. a book = book

d. $\text{wh}_i \ldots t_i$ a book = $\exists$f, f a choice function ... f(book)

It is true that we need not move the indefinite part at LF if we take this line. It is however not true that *wh* is semantically empty. It is an existential quantifier, though one over higher order entities, viz. choice functions. It is crucial that this quantifier has wide scope with respect to the interrogativizer Q, i.e., "p =". We think of the relation between *wh* and *a book* as movement or a coindexation between a scope marker and indefinite part. In each case the semantics is indicated in (62-d). Thus, an in situ interpetation of *wh*-phrases is *almost* possible, but not entirely: we can have the indefinite part in situ, but we have to move

the *wh*-part. The conclusion is that Brandner's proposal has to be revised along these lines, or she has to develop a rather different semantics, which I cannot imagine.

The matter is more complicated, however, because we have to take into account intensionality, which the rough representation given so far doesn't. The choice function has to operate on a property and a world index. It has to evaluate a representative of the extension of the property with respect to that index. In the case just considered, the world index must be the actual world. Thus, a more accurate formalization of the example is given by the following formula, where we use the abbreviation "ch(f)" for "f is a choice function", is given in (63):

(63) $\lambda p \exists f[ch(f) \wedge p = \lambda w[\ believes_w(Fritz, \lambda w'[read_{w'}(Mary, f(book_{w_0}))])]]$

Note that we have applied the property "book" to the actual world $w_0$ before we apply the choice function. This gives us the intended reading, but the formalism is rather strong, because we could have chosen the world indices w and w′ as well with doubtfull results (cf. Heim (1993b) for discussion).

Leaving the matter at this stage[18], let us ask whether this kind of analysis gives us an idea what Sabel's operator feature "op" in the intermediate positions could be. In all these constructions, we find an abstraction over the world parameter, Richard Montague's "intensor."But this operator is hardly a candidate to be checked by a *wh*-element for it has nothing to do with questions. We have this operator invariably for objects of intensional predicates. It is selected by the matrix predicate and occurs in *that*-clauses or infinitivals. Given this kind of semantics, it is therefore not obvious what the interpretation of "op" could be. It seems to me that the question deserves attention and I leave it as a topic for further research.

At this point, a comment on d'Avis's contribuition to this volume is in order (cf. d'Avis (this volume)). D'Avis considers exclamative and causative *was*-questions of the following sort:

(64) a. Was schlägst du schon wieder den Hund?
What hit you already again the dog?

b. Was (der) Otto seine Frau liebt!
What (the) Otto his wife loves!

[18]The most thorough discussion of the different issues involved in the interpretation of *wh* in situ by means of choice functions which is known to me is Heim (1994).

One of the possible analyses discussed by d'Avis is to consider the *was*'s in these constructions as semantically empty. At first sight, this looks very similar to Brandner's approach. But there is a difference: d'Avis still assumes a standard semantics for the Q-morpheme. For instance, his transparent LF for (64-b) is something like (65):

(65) $\lambda$p WAS p = Otto loves his wife

I have written the exclamative *was* in capital letters. To be sure, this word is semantically inert and should not figure in this LF at all. So, *was* looks like a clausal typer, indeed. It is not clear to me whether d'Avis' approach yields the correct results, for we need principles that tell us why the *was* in (64-a) is interpreted as "why" whereas it means "how much" in (64-b). Anyway, the meaning of d'Avis' question is a singleton yielding the original proposition. This is the reason why he speaks of "empty questions." Obviously, the method doesn't extend to the cases discussed by Brandner, which involve true *wh*-phrases. In such cases we are not questioning an existential proposition. We are rather opening a set of alternatives, i.e., a great number of propositions.

# 11 Transparent LF in grammar

I conclude the introduction with some comments on my view of the role of transparent LF in grammar. In the minimalist framework, an LF is a syntactic representation, in fact, the result of a successful derivation. I was referring a number of times to that framework, because a number of the papers assume it. I have to pronounce a warning, however. In current syntactic theory, any sort of covert movement takes place at LF, for instance, head movement of different kinds. Since this movement is semantically without effect and even disturbing, it must be reconstructed.

Thus, the transparent LFs need not be identical in every respect with the LFs in the Minimalist Program, but they should not be too far away from them either. The theorist of transparent LF takes the requirements of the syntax seriously. The results of his research are structures which the "pure" semanticist won't like, because they are complicated. On the other hand, the theorist of transparent LF takes semantics, notably, compositionality seriously. (S)he always asks whether a certain LF makes sense, semantically. A structure that could account for observable facts but which is semantically nonsensical, is re-

jected as a transparent LF. At the interface level "logical form" one has to argue from both sides, from syntax and semantics. The issue is notoriously difficult and meets scepticism both from the side of pure syntacticians and from the side of pure semanticist. It think, however, that we are making progress in this area and that the papers contained in this volume show this.

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