

Wh-Expletives and Partial *Wh*-Movement: Two Non-Existing Concepts?*

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1 Introduction

This paper deals with properties pertinent to *Was-w* (or so-called *partial movement*) constructions in German. This construction is exemplified in section 2. I then briefly introduce two relevant analyses, one based on Tappe (1981), the other one on Srivastav (1991) and Dayal (1996). The first analysis is generally called the direct dependency approach (DDA), the second one the indirect dependency approach (IDA). The aim of this paper is to discuss criteria that might decide between these two alternatives.

Section 3 explains the DDA and section 4 the IDA. In section 5 I try to choose between them, ultimately arguing that the IDA is more appropriate than the DDA. In order to show this I develop various modifications of the traditional analyses. Section 6 extends the discussion to an analogous construction in Hungarian, showing that the semantic method developed and independently motivated in the previous section is able to deal with a problem that remains unsolved in previous theories.

2 The *Was-W*-Construction in German

The *Was-w*-construction is exemplified in (1-a) and (2-a):

- (1) a. **Was** glaubst du, **wen**_i wir t_i einladen sollen?
What believe you who we invite should
Lit.: What do you believe who we should invite?

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- b. %**Wen**_i glaubst du, dass wir t_i einladen sollen?
 Who believe you that we invite should
 Who do you believe that we should invite?
- (2) a. **Was** glaubst du, **warum**_i wir ihn t_i einladen sollen?
 What believe you why we him invite should
 Lit.: What do you believe why we should invite him?
- b. **Warum**_i glaubst du, dass wir ihn t_i einladen sollen?
 Why believe you that we him invite should
 Why do you believe that we should invite him?

(1-a) is synonymous with the long movement construction (1-b), which is grammatical only for speakers who accept long argument movement across a finite sentence boundary. Likewise, (1-a) is synonymous with long adjunct movement in (1-b), the latter being acceptable for all speakers of German. For some speakers, mostly from southern dialects, who accept (1-a), the *Was-W*-Construction, which is standard High German, is somewhat marked (or even ungrammatical), presumably because it is blocked by the availability of the constructions in (b). In what follows the dialect that rejects the *Was-w*-construction in favor of the long movement construction will completely be ignored.

As all speakers share the intuition that the (a/b)-sentences are logically equivalent, it is traditionally assumed that their LFs are (almost) identical to the S-structures of the (b)-sentences. This explains why the (a)-constructions are called partial movement construction: the question operator *wen* has moved in a first step at S-structure, but then would have to move in a second step at LF into the matrix clause, so that movement at S-structure is only partial. Moreover, partial movement is obligatory as can be seen from the ungrammaticality of (3):

- (3) ***Was** glaubst du, dass wir **wen** einladen sollen?

3 The Direct Dependency Approach

Our above description of the *Was-W*-construction forms the core of the so-called DDA, developed by Tappe (1981), Riemsdijk (1983), and Stechow and Sternefeld (1988), among others. Basically, these authors assume that *was* serves as a kind of **scope marker** in German, i.e., an element that anticipates LF movement of a *wh*-operator at S-structure. As has become well known, this kind of construction seems to exist in a number of unrelated languages, like Hungarian, Hindi or Arabic (but not in Standard English). The core of the DDA is schematized in (4):

(4) **Direct Dependency**

a. D-structure:

[CP [C' C_{+wh} [IP ... [CP [C' C_{-wh} [IP ... *wh*-phrase_j ...]]] ...]]]

b. S-structure:

[CP **was** [C' C_{+wh} [IP ... [CP *wh*-phrase_j [C' C_{-wh} [IP ... t_j ...]]] ...]]]

c. LF:

[CP *wh*-phrase_j [C' C_{+wh} [IP ... [CP [C' C_{-wh} [IP ... t_j ...]]] ...]]]

d. Semantic Interpretation:

$\lambda p \exists x_j (x_j\text{-phrase} \wedge p = \dots [IP \dots [CP_{-wh} [IP \dots x_j \dots]]])$

The main characteristics of this approach is that *was* has no lexical meaning of its own, rather, it is kind of expletive that, as a consequence of Full Interpretation, has to be deleted at the level of LF by expletive replacement. Another property of the construction in German is that the matrix verbs that embed the CP with the *wh*-term at S-structure cannot semantically take an indirect question as a complement. We therefore have the somewhat paradoxical situation that the embedded clause is marked as C_{-wh}, although its SpecC contains a +*wh*-phrase. (As observed by Stechow and Sternefeld (1988) this implies that the so-called *wh*-criterion only holds at LF).

4 The Indirect Dependency Approach

This analysis sharply contrasts with the Indirect Dependency Approach (IDA). Here, *was* is a logical *wh*-operator on a par with *who* and *which*. But whereas e.g. *who* quantifies over animate individuals, and *which* in *which man* quantifies over men, *was* quantifies over propositions. But which propositions? Whereas the domain of *which* is restricted by sets of individuals, namely those that form the denotation of the complement noun, the domain of *was* is restricted by sets of propositions that form the denotation of a question, namely the indirect question that appears in the S-structure of the *Was-w*-construction. This parallelism is of course based on a kind of Hamblin/Karttunen semantics which presupposes that the denotation of a question is the set of possible answers. In short, then, *which* selects an individual, whereas *was* selects an answer.

Thus, the embedded question of the *Was-w*-construction functions as a kind of restriction of the *Wh*-operator *was*. This works exactly as in other kinds of restricted quantification. The parallel to ordinary *wh*-constructions can be brought to light by the paraphrases in (5) and (6):

- (5) a. Which man came?
 b. For which individual x in the denotation of *man* does it hold that x came
- (6) a. **Was** glaubst du, **wer** kam?
 What believe you who came
 Lit. 'What do you believe who came?'
 b. For which proposition p in the denotation of *Who came?* does it hold that you believe that p

Given this semantics, it can be shown that the logical interpretation of the IDA is equivalent to that of the DDA. This follows, since (6-b) can be roughly paraphrased as (7):

- (7) IDA:
 Since a possible answer to *Who came?* has the form “ x came”, it holds that: q is a possible answer to lit. 'What do you believe who came' iff q has the form “you believe that p ”, where p has the form x came, for some animate x .

The meaning of the DDA analysis can be paraphrased as

- (8) DDA:
 q is a possible answer iff q has the form “you believe that x came” for some animate x .

Upon further reflection it should become clear that these paraphrases are logically equivalent, and that the IDA paraphrases the intended meaning in a more round-about “indirect” way.

The syntactic derivation of this meaning is exemplified in (9). This is actually not exactly what Dayal proposes, but an adaptation to German that will be presupposed in what follows, for reasons to be discussed below:

- (9) **Indirect Dependency**
- a. *D-Structure* (following Herburger (1994)):
 [IP du [NP **was** [CP **wer** kommt?]] glaubst]
- b. *S-Structure*:
- (i) Extraposition:
 [IP [IP du [NP **was** t_i] glaubst] [CP+*wh* **wer** kommt?] _{i}]
- (ii) (Remnant) *wh*-movement:
 [CP+*wh* [NP **was** t_i] _{j} [IP [IP du t_j glaubst] [CP+*wh* **wer** kommt?] _{i}]

(iii) Verb-Second Movement (V/2):

$$[{}_{CP+Wh} [{}_{NP} \text{ was } t_i]_j \text{ glaubst}_k [{}_{IP} [{}_{IP} \text{ du } t_j \ t_k] [{}_{CP+Wh} \text{ wer kommt? }]_i]]$$

c. *LF* (following Dayal 1996):

$$\lambda T [{}_{CP+Wh} \text{ for which } p \text{ in } T: \text{ du glaubst } p] ([{}_{CP+Wh} \text{ wer kommt })$$

By lambda conversion this is equivalent to (10), which is parallel to the surface form of *which*-questions:

(10) $[{}_{CP} [{}_{NP} \text{ was } [{}_{CP} \text{ wer kommt? }]]_j [{}_{IP} \text{ du } t_j \text{ glaubst }]]$

Characteristic for the IDA is that its semantics assumes two +*Wh*-CPs instead of only one and that the *was*-element is not a scope marker or an expletive, but a kind of ordinary *wh*-operator similar to *which*.

5 Comparison

Given these two alternatives we we now seek for data that behave differently with respect to the two theories sketched above, so that we eventually might decide which theory is the correct one. However, arguments are as always highly theory dependent, and it might seem necessary to point out in advance that the two theories make largely the same predictions, given appropriate auxiliary hypotheses. In effect, looking at standard German alone, it is difficult if not impossible to find knock down arguments that would settle the issue. The plausibility of our conclusion will therefore rest on (a) the plausibility of certain auxiliary assumptions, and (b) on certain crucial data from Hungarian that will be presented in section 6.

5.1 Multiple Embeddings

Riemsdijk (1983) observed that the construction can be iterated in the way exemplified in (11):

(11) **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
 Lit. ‘What do you believe what Peter thinks what Hans says what Klaus
 claims with whom Maria has talked?’¹

Multiple embeddings are no problem at all for the IDA; in fact, these are correctly predicted to be grammatical. The DDA, however, faces a minor terminological problem because the expletive *was* cannot literally be interpreted as a “scope” marker: obviously, the intermediate *was*-elements cannot indicate scope. But this seems to be a matter of terminology only. If we think of *was* as an **expletive**, the idea of expletive replacement suggests cyclic replacement of *was* (i.e. cyclic LF movement of the embedded *wh*-phrase (which is consistent with most post GB-theories of LF movement)). This too yields the correct result. Accordingly, iteration is no real problem for either of the two theories.

5.2 Locality

Another observation of Riemsdijk’s (1983) concerns the status of (12-b) which he considers as ungrammatical:

- (12) a. **Was** glaubst du **was** Fritz meint **wer** kommt?
 b. %**Was** glaubst du dass Fritz meint **wer** kommt?

To explain this judgment (within the DDA), Riemsdijk assumes that the relation between *was* and the *wh*-phrase is constrained by subjacency. However, intuitive judgments concerning (12-b) vary; the least one can say is that speakers who allow long movement of ordinary *wh*-terms also seem to accept (12-b). The data in (13) suggest that there is indeed some kind of locality involved here, but at the same time this locality can be hidden by SpecC to SpecC movement of the expletive *was* (which also seems to be an option in Hungarian, cf. Horvath (1997)). Accordingly, the *Was* of (12-b) originates in the second CP and is moved to the matrix by ordinary Comp-to-Comp-movement (for speakers who allow extraction from

¹For speakers who accept both *Was-w*- and long movement constructions, these can also be mixed, as in (i):

- (i) a. %**Was** glaubst du, was Peter meint, was Hans sagt, *mit wem* Klaus behauptet daß Maria gesprochen hat?
 b. %**Was** glaubst du **was** Peter meint *mit wem* Hans sagt daß Klaus behauptet daß Maria gesprochen hat?
 c. %**Was** glaubst du **mit wem** Peter meint daß Hans sagt daß Klaus behauptet daß Maria gesprochen hat?
 d. %**Mit wem** glaubst du daß Peter meint daß Hans sagt daß Klaus behauptet daß Maria gesprochen hat?

Riemsdijk comments: “Semantically, all are equivalent to what in English would have to be expressed as [(i-d)].”

finite clauses in German). This solution not only respects locality constraints but it is also consistent with both the IDA and the DDA. Whereas in DDA we assume Comp-to-Comp movement of a *wh*-expletive, the IDA presupposes Comp-to-Comp Movement of a *wh*-operator. Both possibilities are equally plausible.

Riemsdijk's subjacency condition is primarily motivated by (13):

- (13) ***Was** glaubst du der Behauptung, **wer** gekommen ist?
What believe you the claim who come has
Lit. 'What do you believe the claim who has come?'

Regarding (13) it should be obvious that the IDA can rule out (13) simply by subcategorization. This follows since *was* and the correlated finite CP are generated as one constituent in D-structure. Verbs that allow for the *Was-w*-construction subcategorize for such an NP, but nouns never will. It follows that (13) can be blocked without recourse to subjacency.

It should be noted that the syntactic mechanism embodied in Herburger's version of the IDA is also available for the DDA. One only would have to give up the idea that the scope marker is inserted in SpecC; rather, it has to be moved there via A-bar movement. There is nothing peculiar with this, because above we already dismissed with the idea that *was* is a scope assigner. Being an expletive, as argued above, the idea of generating an expletive together with its correlate in D-structure is common and in fact the usual analysis for the correlate '*es*' in German. If so, the distribution of *was* can be restricted in an analogous way to that of *es*; in particular, *was* (+ correlate) can, like *es* (+ correlate), only occur as a complement of a verb. What is special with *was* is that its complement must be a +*wh*-marked finite CP. Note, however, that this complement is not its correlate in the semantic sense of the DDA; the real correlate is the embedded *wh*-phrase in SpecC and not the entire embedded CP.

Given these modifications of the DDA, both theories are equally successful because they rely on the same syntactic analysis, at least as concerns the derivation until S-structure.

5.3 Lexical Selection

Adopting such a derivation within the DDA also allows us to give a simple account of the limited distribution of the *Was-w*-construction, which is possible for only a very small class of verbs. These verbs may now be said to simply select, i.e. subcategorize for *was*. No such explanation is possible within the classical DDA, in fact this theory has not yet offered any account of the distribution of the *Was-w*-construction.

It has already been observed by Stechow and Sternefeld (1988) that the grammaticality of the construction is governed by lexical factors, cf.

- (14) ***Was** weißt du **wen** sie wirklich liebt?
 what know you who she really loves
 Lit. ‘What do you know who she really loves?’

This is somewhat unexpected in Dayal’s original theory, because her account is almost purely semantic. On the other hand the original DDA does not have a simple explanation of these facts either. This is because the class of verbs that accept the construction does not coincide with any of the well established and independently motivated classes as the class of bridge verbs or that of non-factive verbs; cf. (15):

- (15) a. **Was** hat Hans entschieden, **wen** wir eingeladen haben
 What has H. decide who we invited have
 b. *%**Wen** hat Hans entschieden, dass wir eingeladen haben
 Who has H. decide that we invited have
- (16) a. ***Was** kannst du dich erinnern, **wen** wir eingeladen haben
 What can you REFL remember who we invited have
 b. %**Wen** kannst du dich erinnern, dass wir eingeladen haben
 Who can you REFL remember that we invited have

The fact that these restrictions seem to be specific to German and do not hold in Hindi or Hungarian suggest that these restrictions are additional parameters but do not as such count against Dayal’s theory; they simply show that something special must be said with respect to German that does not follow from these theories automatically. As suggested above, one simple way of doing so is to suppose special selectional restrictions with respect to *was* (and its correlate). Due to Herburger’s modified syntactic approach and our adaptation for the DDA, these restrictions can be formulated in both approaches simply as a head complement relation, but the exact nature of this kind of selection must be left open here.²

²Observe that the relevant restrictions seem largely semantic in nature; e.g. there seems to be a semantic requirement of non-factivity, also illustrated by the ungrammaticality of examples like (i):

- (i) ?**Was** wolltest du wissen, **wen** sie wirklich liebt?
 What wanted you know who she really loves
 Lit. ‘What did you want to know who she really loves?’

This requirement cannot be implemented by pure subcategorization, otherwise *wissen* would rule out not only (16), but (i) as well. This is similar to the selection properties in other domains, cf.

5.4 Multiple Questions

The IDA was originally developed for Hindi, which differs from German in that all *wh*-operators remain *in situ*. Above, we assumed that *was* moves into SpecC, but since German also exhibits *wh*-in-situ, namely in multiple questions and in echo questions, one would also expect (17) and (18) to be perfectly grammatical:

- (17) ***Wer** meinte **was** [_{CP} **mit wem** sie gesprochen hat]
Who thought what with whom she spoken has
Lit. ‘Who did what think with whom she has spoken?’
- (18) *Johann hat **WAS** gesagt [_{CP} **mit wem** sie gesprochen hat]
John has what said with whom she spoken has
Lit. ‘John has said what with whom she has spoken?’

Data like the above might tell in favor of the DDA if it is assumed, as traditionally is, that *was* must be inserted in SpecC. Given this, the data in (17)/Last would be explained. Above, however, we abandoned this assumption so that we now have to rule out (17) and (18) by a different mechanism. One way of doing so is to assume that *was* has a strong syntactic feature that makes movement into SpecC unavoidable.

Assuming that **was** obligatorily moves into SpecC still leaves a problem: one would now expect multiple constructions like (19) to be fully grammatical:

- (19) %**Was**_i meinte **wer** _{t_i} [_{CP} **mit wem** sie gesprochen hat]
What thought who with whom she spoken has
Lit. ‘What did who think with whom she has spoken?’

Constructions like (19) are indeed judged grammatical by Höhle (1990) and McDaniel (1986), but are considered ungrammatical in Reis (1996) and Sternefeld (1998). In the latter case we need some kind of additional explanation. For example, the assumed ungrammaticality might arise from relating (19) to the ungrammaticality of the construction in (20-b,c):

-
- (ii) a. Ich kann nicht sagen, ein Unbekannter zu sein
I can not say an unknown to be
Lit. ‘I can not say to be an unknown.’
- b. *Ich sage (nicht), ein Unbekannter zu sein
I say (not) an unknown to be
Lit. ‘I do not say to be an unknown.’

- (20) a. **Was** glaubst du: **Wer** ist gekommen?
 What believe you: Who is come?
 ‘What do you believe: Who has come?’
- b. ***Was** glaubt **wer**: **Wer** ist gekommen?
 What believes who: Who is come?
 Lit. ‘What does who believe: Who has come?’
- c. ***Wer** glaubt **was**: **Wer** ist gekommen?
 What believes who: Who is come?
 Lit. ‘What does who believe: Who has come?’

These sentences do not exhibit any syntactic interaction between the two clauses. It seems, therefore, that their unacceptability must somehow be derived from a property of the *was*-clause alone. Perhaps, then, *was* is unable to participate in the process of “absorption” that is assumed to take place when more than one *wh*-item is related to only one SpecC position. As (20) shows this property also holds in contexts where a kind of IDA is syntactically more plausible than the DDA; therefore neither theory can be argued to account automatically for the observed judgments.

Returning to echo-context already alluded to by (18), observe that a stressed expletive in A-bar position is perfectly grammatical within an echo context:

- (21) **WAS** hat Johann gesagt [_{CP} **mit wem** sie gesprochen hat]
 what has John said with whom she spoken has
 ‘What has John said with whom she has spoken?’

This observation seems to tell against the view that *was* is a pure expletive, since normally expletives cannot be stressed or focussed.

5.5 Two Related Constructions

5.5.1 The Copy Construction

As pointed out by Höhle (1990), the syntactic distribution of partial *wh*-constructions is more or less identical to that of the copy construction, which seems marginally acceptable in colloquial German:

- (22) a. ?**Wen** meinst du [_{CP} **wen** sie wirklich liebt] ?
 Who_{ACC} think you who_{ACC} she really loves
 Lit. ‘Who do you think who she really loves?’
- b. **Wer** glauben sie [_{CP} **wer** sie sind] ?
 Who_{NOM} believe you who_{NOM} you are
 Lit. ‘Who do you believe who you are?’

This construction also seems to exist in Afrikaans (cf. Plessis (1977)) and in Romanian (cf. McDaniel (1989)). Under the IDA, the agreement between the *wh*-terms is left unexplained; within the DDA one might appeal to some version of the copy theory of movement here. However, it seems to me that the coexistence between the unmarked and the copy construction is somewhat troublesome also for the DDA: In one case, we would like to explain the agreement phenomenon by alluding to movement, on the other we still have to explain why there is no agreement in the standard *Was-w*-construction.

The fact that the copy construction is somewhat marked in standard German, whereas the *Was-w*-construction is not, suggests that these are in fact different constructions that might require different analyses: whereas the copy theory might still account for the copy construction, the IDA or the expletive replacement theory (i.e. the DDA) might still work for the normal *Was-w* cases.

5.5.2 Free Relatives

On the other hand, there is clear evidence in favor of the IDA in a kind of construction closely related to *Was-w*-constructions. This is the free relative construction exemplified in (23-b):

- (23) a. **Was** Fritz glaubt, ist irrelevant
 What John thinks is irrelevant
 Meaning: Every (relevant) proposition *p* such that John believes *p* is irrelevant
- b. ?**Was** Fritz glaubt, **wer** gekommen ist, ist irrelevant
 What John thinks who come has is irrelevant
 Lit. ‘What John thinks who has come is irrelevant.’ Meaning: Every proposition *p* such that *p* is an answer to *who came?* and John believes *p* is irrelevant

The paraphrase shows that the semantics of this construction undoubtedly requires an analysis in the spirit of the IDA. This shows that the IDA is independently motivated on semantic grounds.

However, such an argument does not decide the issue either, because the standard *Was-w*-constructions might simply be so different from (23-b) that it requires a different analysis: As the kind of construction illustrated in (23-b) is relatively marginal and since the distribution of free relative clauses is different from that of ordinary *Was-w*-constructions, it seems to have another status than the standard *Was-w*-construction. The question then remains whether for the standard construction the IDA is superior to the DDA or not.

5.6 Scope and Command

Note that in Dayal's original proposal, the matrix sentence and the embedded question are syntactically almost unrelated at LF. In particular, her semantic theory implies that at LF no binding relations between the elements of the two clauses can exist. In German, this prediction can easily be falsified, as shown in (24):

- (24) a. ***Was** hat er_i gesagt, **wen** Fritz_i heiraten will
 What has he said who Fritz marry wants
 Lit. 'What did he say who Fritz wants to marry?'
- b. **Was** hat jeder_i gesagt, **wen** er_i heiraten will
 What has everyone said who he marry wants
 Lit. 'What did everyone say who he wants to marry?'

In (24-a) we should be able to derive a principle C-violation, in (24-b) we should be able to establish variable binding. In Dayal's proposal, however, the embedded question is an argument of *was* at LF (see (10)), implying that the c-command relations required for correct LFs cannot be established.³

Although these facts clearly speak against construing the indirect question as an argument of *was*, it is easy to see how to rescue the theory. According to the standard view of extraposition in German (cf. Büring (1995), Büring and Hartmann (1995)), we assume that the indirect question is reconstructed at LF into the position of its D-structural trace. At this position we can establish the required c-command relations. In addition, we now switch from Dayal's semantics to Reinhart's semantics for *wh*-in-situ as developed in Reinhart (1994). We now proceed parallel to what has been proposed for *which*-questions, e.g., in Chomsky (1993). This means that instead of (9) we now assume a derivation as shown in (25):

- (25) **Indirect Dependency (revised)**
- a. *D-Structure* as in (9).
- b. *S-Structure*:
- (i) Extraposition: (as above)
 [IP [IP du [NP **was** t_i] glaubst] [CP_{+wh} **wer** kommt?]_i]
- (ii) *Wh*-movement:
 [CP_{+wh} **was**_j [IP [IP du [NP t_j t_i] glaubst] [CP_{+wh} **wer**

³This observation also refutes the theories of Mahajan (1990), Fanselow and Mahajan (1996) and Horvath (1997) who assume that the entire embedded CP moves to the expletive, in order to perform expletive deletion. This step leaves us with an LF that is strictly speaking uninterpretable semantically, precisely because the scope relations are misrepresented; obviously, the above mentioned authors do not attempt to provide their LFs with any precise semantics.

- kommt?]_i]
- (iii) V/2:
 [CP_{+wh} **was**_j [C' glaubst_k [IP [IP du [t_j t_i] t_k]][CP_{+wh} **wer**
 kommt?]_i]]
- c. *LF*:
- (i) Reconstruction:
 [CP_{+wh} **was**_j [IP [IP du [NP t_j [CP_{+wh} **wer** kommt?]_i] glaubst]]
- (ii) Semantic Interpretation:
 For which choice function f : du glaubst f ([CP_{+wh} **wer**
 kommt])

At LF we interpret the trace of *was* as a choice function that select an element in the domain of its argument, the question CP. An element in this domain is a possible answer to this question. The *was*-operator in SpecC is then interpreted as usual, namely by existentially binding the choice function. We can thus represent (25-c-ii) as shown in (26):

$$(26) \quad \lambda p \exists f p = \text{you believe that } f(\lambda q \exists x q = \text{come}(x))$$

(26) is semantically equivalent to the original proposals, except that binding into the question now represents no problem any more.⁴

5.7 Yes/No-questions

It has sometimes been observed that in German (as well as in Hungarian) the *was*-matrix-clause cannot combine with an embedded Yes/No-questions:

- (27) ***Was** glaubst du, ob er kommt
 What believe you whether he comes
 Lit. ‘What do you believe whether he comes?’

Several explanations are possible. If we treat *ob/whether* on a par with other *wh*-terms, the meaning predicted by the DDA must be derived by moving *ob/whether* into the matrix, as shown in (28):

⁴Horvath (1997) claims that movement of the CP is some kind of LF-pied piping, which already suggests that this is not the end of a derivation; normally, overtly pied piped material has to be reconstructed at LF, and this is exactly what we did above. What is problematic, however, is the concept of pied piping *at LF*, because in general LF is just the level where pied piping has to be undone. For a discussion of LF-pied piping in another context, see Stechow (1996).

- (28) a. LF: *Ob* du glaubst, dass er kommt
 whether you believe that he comes
 Lit. ‘Whether you believe that he comes?’
 b. *Glaubst* du, dass er kommt?
 ‘Do you believe that he comes?’

The LF (28-a) can be expressed in natural language as (28-b). Obviously, (28-b) is a much more economical way of expression, hence it would seem that (28-b) blocks (27) by considerations of economy. Alternatively, it would be in line with the DDA to say that *ob* is a head in C which resists long movement at LF. Consequently, if this head cannot move so as to replace *was*, the DDA seems to be able to cope with (28) in a straightforward way, whereas the IDA seems to be in trouble.

However, such an explanation seems to be on the wrong track. The reason is that the DDA does not correctly represent the meaning of (27). Although constructions like (29) are sometimes judged ungrammatical in German, they do not seem to be entirely unintelligible, that is, they may not be judged so ungrammatical as to exclude any sensible interpretation. In fact, the construction in (29) seems to be marginally acceptable, and fully acceptable when uttered in an echo context:

- (29) ?**WAS** sagtest du, *ob* Hans kommt?
 What said you, whether John comes
 Lit. ‘What did you say whether John comes?’

If we are forced to interpret this sentence, the meaning would not come out as predicted by the DDA, i.e. it would not be equivalent to (30), as suggested by the analysis in (28):

- (30) *Sagtest* du, dass Hans kommt?
 ‘Did you say that John came?’

Rather, the correct paraphrase is (31):

- (31) *Sagtest* du, dass Hans kommt, oder sagtest du, dass Hans nicht kommt?
 Which is correct: you said John came or you said John didn’t come?

And this is not equivalent to (30) or to (32):

- (32) *Sagtest* du, *ob* Hans kommt?
 ‘Did you say whether John came?’

The difference is that (31) implicates that one of the alternatives is true, whereas no such implicature holds for (30) or (32). In other words, an answer like *I didn’t say anything about whether or not John came* is appropriate for (32), but would be

inappropriate for (31).

Because of this implicature it seems to be problematic to conclude that (30) is only acceptable in an echo context. Such a context requires a previously stated utterance which is identical to the scalar implicature of (31) itself. Therefore, we cannot distinguish between an echo context and a normal context, so that the restriction to echo context seems spurious and (30) is fully grammatical (although it can be uttered only in context which seems to coincide with echo-contexts).

This strongly supports the IDA which directly yields the correct semantics. Of course, the semantics alone cannot in and by itself explain why the construction might still be judged somewhat marginal. In fact it is fully grammatical in Hindi, demonstrating that the IDA is independently required, but leaving open, why this option is not fully natural in German.

From this perspective, compare also the following:

- (33) a. ***Was** sagtest / meintest du, ob wir **wen** einladen sollen?
What thought / said you whether we who invite should
Lit. 'What did you think/say whether who we should invite?'
b. ?**WAS** sagtest / ?meintest du, ob wir **WEN** einladen sollen?

Here, the distinction between a standard context and an echo context is much clearer. Although in a standard context, (33-a) is ungrammatical, it becomes much more acceptable in an echo context, which goes together with heavy stress on the capitalized items in (33-b). For this question, natural possible answers would be: I thought/said that we shouldn't invite Helen but that we should invite George. Given that *meinen* does not accept a *wh*-complement, it once again turns out that only our semantics of the IDA can provide for a correct interpretation of the *whether*-item in embedded clauses:

- (34) for which choice functions f and g does it hold that you said that $f(\text{whether we should invite } g(\text{person}))$?

The only additional thing we have to do is to interpret the *wh*-in-situ *who* as a choice function ranging over persons.

5.8 Quantifier Interaction

Another observation relates to scope ambiguities that can be observed with long distance movement as in (35):

- (35) **Wohin** glaubt jeder, dass sie gehen wird?
Where-to believes everyone that she go will
Lit. 'Where does everyone believe that she will go to?'

Many authors claim that this sentence permits for a pair list reading such that *jeder* has wide scope over *wohin*. However, these authors, notably Pafel (1996) and Reis (1996), also claim that this reading is unavailable in the parallel construction:

- (36) **Was** glaubt jeder, **wohin** sie gehen wird?
 What believes everyone where-to she go will
 Lit. ‘What does everyone believe where she will go to?’

This would come as a surprise for the DDA, because the LF of (36) is identical to (35), for which the pair list reading is available. On the other hand it would seem natural for the IDA that *jeder* and *wohin* cannot interact with each other because they are interpreted in different clauses.

Unfortunately, however, things are not that straightforward. For one thing, it would not be technically impossible to derive the pair list reading within Dayal’s theory, because an interaction between *jeder* and *was* (now interpreted as a quantifier ranging over choice functions), if permitted, would yield the very same effect as the interaction between *every* and *wohin* in the DDA. For another thing, at least one linguist, namely Josef Bayer (p.c.), accepts the pair list reading also for (36).

Accordingly, all we have shown is that the IDA does not automatically exclude an interpretation that is unavailable for many speakers, whereas the DDA automatically rules in such an interpretation, unless it can be constrained in some independently motivated way. Since it is very unclear to me how such a constraint could be formulated within the DDA, I conclude that the above observations tend to speak in favor of the IDA.

Summarizing so far, we have seen that the standard data available from German do not permit for knock-down arguments in any direction, although, when it comes to more marginal constructions (where speaker’s intuitions may vary), it turned out that the IDA yields the semantically more adequate results.

6 Hungarian

Horvath’s (1997) data from Hungarian are particularly troublesome for both the IDA and the DDA. First consider:

- (37) a. **Mit** kérdeztek, hogy **kivel** találkoztam-e?
 what-ACC asked-3pl that who-with met-1sg-Q-prt
 ‘Who did they ask whether I had met?’
 b. **Mit** akartak tudni hogy **kit** láttál-e?
 what-ACC wanted-3pl know-inf that who-ACC saw-2sg-Q-prt
 ‘Who did they want to know whether you had seen?’

The parallel constructions in German are ungrammatical:

- (38) a. (i) ***Was** fragst du, ob ich **wen** getroffen habe?
 (ii) ***Was** fragst du, **wen** (ob) ich getroffen habe?
 b. (i) ***Was** willst du wissen, ob ich **wen** gesehen habe?
 (ii) ***Was** willst du wissen, **wen** (ob) ich gesehen habe?

Given Dayal's semantics, with choice functions turning questions into answers, i.e. into propositions, the ungrammaticality of (38) would be explained: since a choice function turns a question into an answer, and since the matrix verb subcategorizes for a question, we encounter a clash of semantical types. But for exactly the same reason, the construction in (37) should also be uninterpretable within the IDA. The problem seems to be that the IDA cannot establish a semantic relation between *Mit* and the in-situ *wh*-term **kivel/kit**. On the other hand, the DDA can do so by moving these terms into the matrix clause. However, Horvath strongly opposes against such a solution because this type of movement violates otherwise respected island constraints.

The second observation made by Horvath is that the morphology of the matrix *wh*-term agrees with the grammatical function of the embedded CP, cf.:

- (39) a. **Mi** zavarta Marit, [CP hogy **kinek**
 what-NOM disturbed Mary-ACC that who-DAT
 telefonáltál t] ?
 phoned-2sg
 'What disturbed Mary, to whom you phoned?'
 b. **Miért** vagy dühös [CP mert **kivel** talákoztál t] ?
 why are-2sg angry because who-with met-2sg
 Lit. 'Why are you angry, because who you had met?'

As regards the DDA these data pose two problems. One is that the agreement facts tell against the idea that the alleged expletive is an expletive for the morphologically unrelated *wh*-phrase within the CP, as would have been suggested by the movement theory embodied in the DDA. But above, we modified this theory in a way that becomes consistent with the above data: Given Herburger's theory, we can generate *was* as a correlate to the CP, which makes the agreement phenomenon not only understandable but completely natural.

Second, Horvath points out that the DDA cannot explain that the related *wh*-phrases of (39) are contained in what is usually considered an island in Hungarian, cf. the subject island in (40-a) and the adjunct island in (40-b).

- (40) a. ?***Kinek** zavarta Marit [CP hogy telefonáltál t] ?
 who-DAT disturbed Mary-ACC that phoned-2sg
 Lit. ‘To whom did that you phoned disturb Mary?’
 b. ***Kivel** vagy dühös [CP mert találkoztál t] ?
 who-with are-2sg angry because met-2sg
 Lit. ‘Who are you angry because you had met?’

And finally, considering the IDA, we do not yet know what a correct semantics for (37) and (39) within this theory looks like. For example, the adjunct CP in (39-b) itself cannot be interpreted as a proposition, nor can it be interpreted as a question. This is mirrored by the fact that the phrases in (41) cannot be interpreted as ordinary questions:

- (41) a. *Because you had met who?
 b. *Who because you had met?

Although Dayal’s semantics is unable to deal with (37) and (39), we can extend this semantics in a straightforward way in order to cover these cases as well. Above we assumed that question formation proceeds by forming sets of *propositions* out of a single open proposition. Generalizing this procedure, we could also form sets of *properties* out of a single open property, i.e., a property that contains a free variable. The free variable here corresponds of course to the translation of the *wh*-operators *kivel*, *kit*, and *kinek* (or their respective traces). Given that an ordinary *because*-clause denotes a property of propositions, the *because*-clause in (41) denotes a set of such properties. This set can be written as (42):

- (42) {the property of *p* such that *p* holds because you had met *a*, the property of *p* such that *p* holds because you had met *b*, the property of *p* such that *p* holds because you had met *c*, ...}

Given this natural generalization of the usual semantics for questions, it is easy to see that we now obtain the desired results. This is because the denotation in (42) is the result of a type shifting operation that builds *sets* of entities of type α , whereas choice functions *undo* this type-shifting operation, yielding entities of type α again. As a result, applying a choice function to the questioned *because*-clause regains the correct type for being interpreted in the usual way, as a property of propositions.

Given that *mit* and its allomorphs denote existentially quantified choice functions that select an element from the set denoted by its complement, and assuming that [*whether p*] denotes the set {*p*, *not p*}, we interpret [*whether I had met who*] of (37-a) as a higher order question (a set of questions) (43-a). The complement of *ask* is first generated as [*which (= mit) Q*]; after *wh*-movement of *mit* Reinhart’s

semantics yields (43-b):

- (43) a. $\mathcal{Q} := \{Q: \exists x \text{ person}(x) \ \& \ Q = \textit{whether I had met } x\}$
b. $\{p : \exists f \text{ choice-function}(f) \ \& \ p = \textit{they asked } f(\mathcal{Q})\}$

This represents the correct truth conditions for (37-a) within the IDA.

Given that *mit* can apply to complements α of various semantic types, the same works with (39-b), where α is formed by (non-standard) question formation, yielding the set (44-a). Accordingly, (39-b) denotes (44-b):

- (44) a. $\mathcal{R} := \{R: \exists x \text{ person}(x) \ \& \ R = \lambda p. p \textit{ because you had met } x\}$
b. $\{p : \exists f \text{ choice-function}(f) \ \& \ p = \textit{you are angry } f(\mathcal{R})\}$

Not surprisingly, this also works for the remaining cases. This proposal immediately solves the problem that we envisaged earlier, namely that on Dayal’s original account, (37) is not interpretable. It also solves Horvath’s problem that the embedded *wh*-terms are contained in an island; abandoning the DDA no more involves any syntactic relation between the embedded *wh*-phrase and the *wh*-expletive. Rather, within the modified IDA, we have to consider a syntactic relation between the matrix *wh*-operator and a choice function adjoined to the CP. Since the CP and the *wh*-operator are generated together at D-structure, no subjacency problems can arise.

7 Conclusion

Summarizing our findings we have shown that a simple extension of Dayal’s semantics and a straightforward modification in terms of Reinhart’s choice function approach yields the correct semantics for all of Horvath’s example sentences. By the same assumptions, Horvath’s most prominent problem of islandhood dissolved in a trivial way, because the issue is irrelevant in the theory proposed above. Moreover, the morphological form of the question marker in the matrix no longer contradicts its semantics.

As regards the standard examples in German, we noted that the range of grammatical sentences is very limited – for reasons still to be explored – so that theories are underdetermined for the clear cases. However, if we look for somewhat marginal data we find that the semantics of these is correctly accounted for by the IDA, not by the DDA as it stands (i.e. without non-trivial modification).

What remains to be explained within the IDA is cross linguistic variety, e.g., the fact that the semantically more complicated procedures illustrated in the last section are acceptable in Hungarian but not in German or Hindi. I have no idea

why this should be so, but I also firmly hold the opinion that the alternative DDA is not better off in this respect than ours.⁵

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⁵Despite recent claims to the contrary in Fanselow and Mahajan (1999), which I cannot evaluate here.

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