

## Reconsidering the Indirect Dependency Approach to *Wh*-Scope Marking

The indirect dependency approach (IDA) presented in Dayal (1994) contributed greatly to the understanding of the syntax and semantics of *wh*-scope marking (WSM) questions such as (1a). I will show that we can improve on Dayal's approach by applying the partition theory of questions (Groenendijk & Stokhof 1982) to the syntactic analysis of WSM questions given in Stepanov (2000) (see (1b) for the structure of (1a) at Spell-Out).

- (1) a. Kak vy думаете, кого любит Иван? (Russian)  
 how you think whom loves Ivan  
 'Who do you think Ivan loves?'  
 b.  $[_{CP[+Q]} \text{ kak } [_{VP} t_{\text{kak}} [_{CP[+Q]} \text{ kogo } [_{VP} \text{ ljubit Ivan } t_{\text{kogo}} ]]]]]$

(1b) shows two characteristics of the IDA: (i) The (alleged) scope marker *kak* and the "true" *wh*-phrase *kogo* participate in two unrelated chains. (ii) The embedded CP is interrogative (+Q). What is specific to Stepanov's version of the IDA is the assumption that the *wh*-scope marker originates in the complement WP of the matrix verb. Thereby, WP is formed by the (trace of the) *wh*-scope marker and the embedded CP. These assumptions are well supported by syntactic evidence pertaining to case and movement theory (see also Stepanov & Stateva 2006).

The basic idea of the semantic analysis I am proposing can be described as follows. From a semantic point of view, it is natural to assume that the formation of WP is the syntactic reflex of a type mismatch that is characteristic of WSM questions: The matrix verb *s*-selects a proposition, i. e., an object of type *st*. The embedded CP, however, denotes a question – an object of type  $\langle s, st \rangle$  if we follow G&S (1982). Therefore, if the WP shell serves to resolve this type mismatch, the trace  $t_{\text{kak}}$  of the *wh*-scope marker must be of type *s* (assuming the smallest possible type). This means that the alleged *wh*-scope marker is a contentful *wh*-word that asks for possible worlds. On this assumption, (1b) denotes the propositional concept in (2).

$$(2) \quad \mathbf{Q}(\lambda k. \text{think}'(i)(\text{you}, [\mathbf{Q}(\lambda x. \text{love}'(i)(\text{ivan}, x)](k))))$$

Thereby,  $\mathbf{Q}$  is the denotation of the interrogative complementizer  $C^{[+Q]}$  as defined in (3).

$$(3) \quad \mathbf{Q}(\alpha) := \lambda i \lambda j (\alpha = [\lambda i. \alpha](j)), \quad \text{where } \alpha \text{ is of relational type}$$

To see how (2) is compositionally derived from (1b), note that according to G&S (1982) the chain  $[\text{kogo } [\dots t_{\text{kogo}} \dots]]$  translates as  $\lambda x (\dots x \dots)$ . Correspondingly, the chain  $[\text{kak } [\dots t_{\text{kak}} \dots]]$  translates as  $\lambda k (\dots k \dots)$  (where *k* is a variable of type *s*).

While it is far from obvious that (2) correctly represents the meaning of (1a), it can be easily shown that (2) defines the same partition of the set of possible worlds as (4) (on the assumption that to believe a proposition is to believe its entailments).

$$(4) \quad \mathbf{Q}(\lambda x. \text{think}'(i)(\text{you}, \lambda i. \text{love}'(i)(\text{ivan}, x))) = \llbracket \text{Who do you think Ivan loves?} \rrbracket_g$$

Here it must suffice to give the following suggestive paraphrase of what is expressed by (2): What are the possible worlds *k* such that you believe the proposition that is the exhaustive answer to the question of who Ivan loves at *k*?

The modified IDA sketched above improves over Dayal (1994) in the following domains:  
 1. In (1b), the embedded CP is c-commanded by the matrix subject, and (1b) reaches LF unaltered. Therefore, we correctly predict the Condition C effect between *er* and *Kai* if we apply the above analysis to (5).

- (5) \*Was sagt er<sub>i</sub>, wo Kai<sub>i</sub> wohnt? (German)  
 what says he where Kai lives

Furthermore, representations like (2) are structurally suited to account for this effect on purely semantic grounds (along the lines of Schlenker 2005).

2. The German verb *erzählen* is factive as a question-embedding verb, but non-factive otherwise: We can infer from (6b) that Kai told the truth about where he lives, but this inference cannot be drawn from (6a). Strikingly, however, *erzählen* is non-factive in WSM questions. That is, (6c) does *not* imply that Kai told the truth.

- (6) a. Kai hat erzählt, dass er in Paris wohnt.      b. Kai hat erzählt, wo er wohnt.  
 Kai has told that he in Paris lives      Kai has told where he lives  
 ‘Kai told that he lives in Paris.’      ‘Kai told where he lives.’  
 c. Ich weiss, was Kai erzählt hat, wo er wohnt.  
 I know what Kai told has, where he lives  
 ‘I know where Kai told he lives.’

The latter fact follows immediately from the semantics proposed above: Note that in (2) the index variable  $k$  is  $\lambda$ -bound. However, this variable must be assigned the index of the actual world to achieve the factive reading noted above (see Groenendijk & Stokhof 1990). This also provides the key for explaining why WSM does not occur with strong factive predicates in German (see 7).

- (7) \*Was weisst du, wen Kai liebt?  
 what know you who Kai loves

3. WSM questions show considerable cross-linguistic variation (see e.g. Stepanov & Stateva 2006). We can account (in part) for this variation by implementing the partition theory of questions in the way presented in Kratzer & Shimoyama (2002). E.g., we can deal with the affixal nature of *wh*-scope markers in languages like Albanian and Iraqi Arabic by providing a compositional semantics for the incorporation of the scope marker.

## References

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