Dahl’s Paradigm: In defense of the crossover analysis

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Fox (2000) and Reinhart (2006) develop analyses of Dahl’s paradigm — illustrated in (1) — which share two key assumptions. First, that the constraint which blocks reading (1d) is the same constraint responsible for Strong Crossover (SCO). Second, that this constraint is an economy condition stated over a set of interpretatively-equivalent comparison derivations. Both Fox’s and Reinhart’s analyses have been challenged in recent work by Roelofsen (2008 and subsequent). Roelofsen rejects the first assumption while maintaining the second. I argue that we should rather maintain the second while rejecting the first. My analysis is based on a modified Rule H (“Rule J”) stated in terms of Reinhart’s (2006) notion of covaluation.

(1) The worker said that he dropped his tools and the boss did too. (Dahl 1973)
   a. . . say that TW dropped TW’s tools.  b. . . say that TB dropped TB’s tools.
   c. . . say that TB dropped TW’s tools.  d. * . . say that TW dropped TB’s tools.

1 Fox and Roelofsen on Dahl’s paradigm

Fox accounts for Dahl’s paradigm using Rule H. Rule H blocks the LF in (3), where the worker binds his across a coreferential pronoun. Given Fox’s formulation of parallelism, this is the only LF for the first conjunct which could derive the unavailable reading (1d). Rule H also blocks co-binding in (4) and the SCO configuration in (5). The motivation for stating Rule H as an economy condition comes not from (3)–(5), but from cases of “exceptional co-binding” (Heim 1998). In (6), co-binding is permitted because transitive binding would not yield the same interpretation:

(2) Rule H: A pronoun, $\alpha$, can be bound by an antecedent, $\beta$, only if there is no closer antecedent, $\gamma$, such that it is possible to bind $\alpha$ by $\gamma$ and get the same semantic interpretation. (Fox 2000:115)

(3) *[TW$_1$]$_2$ said that [he$_1$] dropped [his$_2$] tools.  (4) *[TW]$_1$ said that [he$_1$] dropped [his$_1$] tools.

(5) *[Who]$_1$ did [he$_1$] say $t_1$ loves John  (6) [Every devil]$_1$ worries that only [HE$_1$] loves [him$_1$]

Roelofsen shows that co-binding LFs are sometimes available. In particular, (4) is a licit LF for the first conjunct of (1). The main evidence for this comes from the variation on Dahl’s paradigm in (7). Given the parallelism constraint on VP ellipsis, every student can bind his in the elided VP only if no student binds his directly in the first conjunct. I.e., only if the first conjunct has a co-binding LF:

(7) [No student]$_1$ said that [he$_1$] liked [his$_1$] paper but [every st.]$_2$ hoped Jane would [like [his$_2$] paper].

Roelofsen’s replacement for Rule H, Free Variable Economy (FVE), permits co-binding in the first conjunct of (7). As a consequence, it is too lax to block SCO configurations.

2 Rule J

Reinhart (2006) extends the notion of “coreference” to a broader notion of “covaluation”. Two DPs can be covalued without either one being coreferential with or bound by the other. For example, (8a) can be assigned the interpretation in (8b), in which his is translated as a variable $y$ which is formally distinct from, but covalued with, the $x$ variable bound by every boy:

(8) a. Every boy said that he likes his mother.  b. Every boy ($\lambda x$ ($\lambda y$ ($x$ said that $x$ likes $y$’s mother))).

According to Reinhart, only the $wh$-trace in an SCO configuration can be translated as a variable formally bound by the $wh$-phrase. The pronoun is merely covalued with the trace:

(9) a. *Who$_1$ did he$_1$ say $t_1$ likes John?  b. *Who ($\lambda x$ ($\lambda y$ ($y$ (did $y$ say $x$ likes John))))

Reinhart constrains covaluation via a modified of Rule I. Roelofsen (2010) notes a technical problem with this version of Rule I. However, the problem is tied to Reinhart’s definition of Rule I in terms of a comparison set of competing LFs, and we have seen that Dahl’s paradigm itself doesn’t motivate a definition of this sort. The constraint in (10) suffices to block the LFs in (3) ($\alpha$=TW, $\beta$=his, $\gamma$=he) and (9) ($\alpha$=who, $\beta$=$t$, $\gamma$=he). It therefore accounts for both Dahl’s paradigm and SCO, while nonetheless permitting co-binding in (7).
(10) **Rule J**: $\alpha$ cannot bind $\beta$ as a variable if there is a $\gamma$ such that (i) $\alpha$ c-commands $\gamma$ c-commands $\beta$, (ii) $\gamma$ is covalued with $\beta$, and (iii) $\alpha$ does not bind $\gamma$ as a variable.

3 **The embedded Dahl paradigm**  The pattern of available readings shown in (1) remains if *the worker* is replaced by a pronoun bound by a quantifier:

(11) Every worker said that he knew when he dropped his tools and the boss did too.
    a. . . . know when TB dropped TB’s tools.  b. . . . know when TW dropped TW’s tools.
    c. . . . know when TB dropped TW’s tools.  d. * . . . know when TW dropped TB’s tools.

While Roelofsen’s FVE neatly accounts for (7), Roelofsen notes that (11) still poses a problem. The problematic reading is (11c). The LF shown in (12) is the only LF compatible with parallelism that derives the required reading. However, due to the availability of alternate LFs for the first conjunct where *his* is bound by one of the other pronouns, (12) violates both Rule H and FVE:

(12) $\text{[EW]}_1 \text{ said } [\text{he}_2 \text{ knows when } [\text{he}_3 \text{ dropped } [\text{his}_1 \text{] tools},$
    
    \hspace{1cm} \text{and } [\text{TB}]_4 \text{ does } k\text{. when } [\text{he}_3 \text{ dropped } [\text{his}_1 \text{] tools too.}}$

The embedded Dahl paradigm therefore poses a problem for both Fox’s and Roelofsen’s analyses. Roelofsen addresses this problem by relaxing the parallelism requirement somewhat to permit the relevant interpretation to be derived if in the first conjunct *his* is bound by the first *he*.

An analysis in terms of Rule J permits the analogy between the embedded and standard Dahl paradigms to be maintained. No relaxation of parallelism is required. Just as *his* in (1) can take *John* as an antecedent without being bound by it (via coreference), *his* in (12) can covary with the first *he* without being bound by it. Using Reinhart’s (2006) notation this plays out as follows:

(13) $\text{EW (} \lambda x (x \text{ said that } x \hspace{1cm} [\lambda z (z \text{ knew when } z \text{ dropped } y\text{'s t.s})$
    
    \hspace{1cm} \text{and that TB } [\lambda a (a \text{ knew when } a \text{ dropped } y\text{'s t.s)}])])$

The $\lambda$-abstractions corresponding to the two VPs are in ] brackets. These are identical modulo alphabetic variance, and parallelism is clearly satisfied. Though Rule J permits (13), it still blocks the unavailable reading (11d). Given parallelism, this reading can be derived only if *his* in the first conjunct either is a variable bound by EW or covaries with one. The simplest case (where EW binds *his*) is shown in (14). In the first conjunct, the three pronouns ($y$, $x$ and $y$ respectively) stand in a c-command relation. Taking these as $\alpha$, $\beta$ and $\gamma$ respectively, (i) of Rule J is therefore satisfied. The second *he* is covalued with *his* (since $x$ and $y$ covary), and yet *his* is not bound as a variable by the second *he*. Thus, all of (i)-(iii) are satisfied, so the first *he* cannot bind *his*. The logic is the same if *his* is merely covalued with a variable bound by EW.

(14) $\text{EW (} \lambda x (x \text{ said that } x \hspace{1cm} [\lambda y (y \text{ knew when } x \text{ dropped } y\text{'s t.s})$
    
    \hspace{1cm} \text{and that TB } [\lambda z (z \text{ knew when } x \text{ dropped } z\text{'s t.s})])])$

4 **Conclusion**  Rule J, together with Reinhart’s notion of covaluation, offers a unified analysis of Dahl’s paradigm and Strong Crossover. The analysis is compatible with a strict parallelism constraint on VP ellipsis. In contrast to Rule H, Rule I and FVE, Rule J is not an economy condition. Neither Dahl’s paradigm nor standard SCO phenomena motivate the use of an economy constraint. Condition B/C obviation phenomena provide a motivation in the case of Rule H and Rule I. However, economy analyses of these phenomena have recently been called into question by Heim (2007), Roelofsen (2008).