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### Anaphora resolved

Roelofsen, F.

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## Chapter 3

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# Pushing the Limit

In this chapter I will try to resolve the issues that were left open by the theories discussed in the previous chapter. Section 3.1 provides a reformulation of Reinhart’s Interface Rule that perfectly matches (the simplicity of) the underlying intuition. This rule will be referred to as *Rule S*; it literally prohibits *sneaking in* interpretations that are ruled out by restrictions on binding. It will be shown that Rule S, together with Fox’s Locality constraint, straightforwardly accounts for all the data discussed in chapter 2.

However, sections 3.2–3.4 show that, upon closer inspection, Locality is both empirically and conceptually problematic. Several alternative principles will be considered. Eventually, the problems raised by Locality will not only be overcome, but the empirical coverage of the overall theory will also be broadened significantly.

### 3.1 A Simpler Interface Rule

Recall, again, the basic intuition underlying Reinhart’s Interface Rule:

*Interpretations which are ruled out by restrictions on binding cannot be sneaked in via other anaphoric mechanisms.*

Let me first consider, and slightly revise, Reinhart’s formal rendering of *other anaphoric mechanisms*. Reinhart assumes that these mechanisms are all instances of covaluation (cobinding and coreference). But the notion of covaluation does not cover all the relevant instances of anaphoric relatedness. In particular, it does not cover the *indirect* instances of anaphoric relatedness *via third parties*, so to speak. In section 2.6, we saw that it took various recursive applications of the Interface Rule to rule out logical forms like (3.1) below, whereas (3.2) was ruled out in one simple step.

(3.1) [Max]<sup>1</sup> [t<sub>1</sub> said that he washed him<sub>1</sub>] he = Max

(3.2) [Max washed him] him = Max

Essentially, this is because the indirect way in which [he] and [him] are anaphorically related in (3.1) does not count as covaluation. The complication can easily be avoided by adopting Heim's notion of *codetermination* instead of Reinhart's notion of covaluation. The definition is repeated here for convenience.

**3.1. DEFINITION.** [Codetermination]

Let  $C$  be a context, let  $LF$  be a logical form, and let  $A$  and  $B$  be two NPs in  $LF$ . We say that  $A$  and  $B$  are codetermined in  $LF/C$  iff:

- $A$  binds  $B$  in  $LF$ , or
- $A$  and  $B$  corefer in  $C$ , or
- There is a third NP which is codetermined with  $A$  and  $B$  in  $LF/C$ .

Next, I propose the following simplified interface rule:

**3.2. DEFINITION.** [Rule S]

A logical form is illicit if it is semantically indistinguishable from one of its binding alternatives  $LF'$ , and  $LF'$  is ruled out by constraints on binding (Condition B).

The notion of a *binding alternative* has to be revised slightly. The only difference between definition 2.7 and definition 3.3 is that in the former  $A$  and  $B$  are supposed to *corefer*, while in the latter  $A$  and  $B$  are supposed to be *codetermined*.

**3.3. DEFINITION.** [Binding Alternatives]

Let  $C$  be a context, let  $LF$  be a logical form, and let  $A$  and  $B$  be two noun phrases such that  $A$  c-commands  $B$  in  $LF$ ,  $A$  and  $B$  are codetermined in  $LF/C$ , but  $A$  does not bind  $B$  in  $LF$ . Then the structure obtained from  $LF$  by:

- Quantifier raising  $A$  in case it has not been raised yet;
- Replacing  $B$  with a pronoun or trace bound by  $A$ .

is called a binding alternative of  $LF$ .

Notice that Rule S is in exact correspondence with Reinhart's original intuition. Also, the workings of Rule S are as straightforward as we would like them to be. In particular, (3.1) is now dealt with just as (3.2): codetermination is ruled out in one simple step.

Rule S is weaker than the Interface Rule. In particular, it does not account for Strong Crossover effects, and it allows too *many* (instead of too *few*) readings of the target clause in Dahl's puzzle. To see this, first consider the typical Strong Crossover effect exhibited by example (2.34), repeated here as (3.3):

- (3.3) Who did he say we should invite?
- a. [who]<sup>1</sup> [[he<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> said we should invite t<sub>1</sub>]]
  - b. [who]<sup>1</sup> [[he<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> said we should invite t<sub>2</sub>]]

The Interface Rule correctly rules out (3.3a) because its binding alternative, (3.3b), does not preserve the binding relations that are present in (3.3a). Rule S does not require that binding relations be preserved, so it has no ground on which to rule out (3.3a) and other cases of Strong Crossover.

Next, consider Dahl's puzzle. Recall the source clause:

- (3.4) Max said that he called his mother.

Rule S does not rule out *any* of the relevant logical forms of (3.4), because none of their respective binding alternatives violates Condition B. As a consequence, unlike the Interface Rule, Rule S wrongly permits the unavailable reading of the target clause. On the other hand, Rule S correctly permits all the other readings of the target clause, which the Interface Rule fails to do.

The next subsection shows that the empirical shortcomings of Rule S are naturally accounted for if it is combined with Fox's Locality constraint.

### 3.1.1 Rule S plus Locality

We have already seen, in section 2.4, that Locality accounts for Strong Crossover effects and for Dahl's puzzle. We only need to verify that Rule S and Locality *together* are not too strong. In particular, they should not rule out any of the first three readings in Dahl's puzzle. The relevant logical forms are repeated here:

- (2.18) Max said that he called his mother.
- a. [Max]<sup>1</sup> [t<sub>1</sub> said [he<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> called his<sub>2</sub> mother]] (2.17a)
  - b. [Max]<sup>1</sup> [t<sub>1</sub> said [he<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> called his<sub>1</sub> mother]] (2.17a)
  - c. [Max]<sup>1</sup> [t<sub>1</sub> said [he]<sup>2</sup> [t<sub>2</sub> called his mother]] he=his=Max (2.17b)
  - d. [Max]<sup>1</sup> [t<sub>1</sub> said [he]<sup>2</sup> [t<sub>2</sub> called his<sub>2</sub> mother]] he=Max (2.17b)
  - e. [Max]<sup>1</sup> [t<sub>1</sub> said [he<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> called his mother]] his=Max (2.17c)
  - f. [Max]<sup>1</sup> [t<sub>1</sub> said [he]<sup>2</sup> [t<sub>2</sub> called his<sub>1</sub> mother]] he=Max (2.17d)

We have seen that Rule S does not rule out any of these logical forms and that Locality rules out (2.18b) and (2.18f). As a result, the three possible readings of the target clause are correctly permitted and the one unavailable reading is correctly ruled out (assuming that VP ellipsis is governed by VP Identity<sup>1</sup>). Thus, Rule S and Locality, together with Condition B, account for all the data we have seen so far and are compatible with the VP Identity condition on VP ellipsis.

<sup>1</sup>Incidentally, the same result would be obtained if we assumed NP Parallelism instead of VP Identity. But we are not *forced* to do so. Thus, the present proposal overcomes the main drawback of Büring's theory.

Finally, let me compare Rule S with Heim's Exceptional Codetermination Rule.

### 3.1.2 Rule S and Heim's ECR

It turns out that Rule S, in combination with the standard version of Condition B, is empirically equivalent with Heim's ECR together with her own, stronger version of Condition B. The standard version of Condition B is only concerned with *binding*: it rules out logical forms in which a pronoun is bound by one of its coarguments. Rule S, then, extends this restriction to *codetermination*: it rules out logical forms in which a pronoun is codetermined with one of its coarguments, *except* when such logical forms are semantically distinguishable from their binding alternatives. In Heim's system, the division of labour between Condition B and the ECR is just a little bit different. Heim's version of Condition B is directly concerned with *codetermination*: it rules out any logical form in which a pronoun is codetermined with one of its coarguments. The ECR, then, takes care of the exceptions to this rule: it says that a logical form in which a pronoun is codetermined with (but not bound by) one of its coarguments is exceptionally allowed if it is semantically distinguishable from its binding alternative. Thus, both systems make exactly the same predictions. The fact that they were arrived at via different routes is, I think, a positive sign in itself.

There are two reasons to prefer Rule S over the ECR. First, it allows us to stick to the light version of Condition B, which is only concerned with binding. This relieves syntax from a significant burden. Second, Rule S is derived from the general principle that hearers minimize interpretive options. It seems plausible that such a principle is at work in human communication, and Reinhart (2006) argues that its effects are not only exhibited by the interpretation of anaphora but also by the assignment of quantifier scope. The ECR cannot be derived from any such general principle. Thus, Rule S reconciles the empirical adequacy of Heim's ECR with the attractive explanatory outlook underlying Reinhart's Interface Rule.

At this point, all the problems that were left open in chapter 2 seem to be resolved in a satisfactory manner. The resulting theory has three components:

- Condition B: a syntactic constraint, which we may try to derive from more general syntactic mechanisms (cf. Reuland, 2001, 2008), accounts for Condition B effects on binding;
- Locality: a syntactic constraint, which instantiates the general idea that syntactic derivations are subject to *economy* principles (cf. Fox, 1999a), accounts for Strong Crossover effects and Dahl's puzzle;
- Rule S: an interpretive principle, which is derived from the general idea that hearers *minimize interpretive options* (cf. Reinhart, 2006), accounts

for Condition B effects on coreference, cobinding, and more intricate kinds of codetermination.

The theory as a whole is compatible with the VP Identity condition on VP ellipsis.

It seems, then, that we may stop here. Unfortunately, however, there are certain problems with Locality that have been overlooked so far. The following sections discuss these problems and will eventually lead to the conclusion that Locality must be replaced by other principles.

## 3.2 Free Variable Economy

**A Problem for Locality.** Consider the following sentence:

(3.5) Every man said that he called his mother and that Bill did too.

This sentence has the following two readings:

- (3.6) a. Every man  $x$  said that  $x$  called  $x$ 's mother  
and that Bill called Bill's mother too. [sloppy]
- b. Every man  $x$  said that  $x$  called  $x$ 's mother  
and that Bill called  $x$ 's mother too. [strict]

The problem with Locality is that it wrongly prohibits the strict reading in (3.6b). To see this, consider the logical form corresponding to this reading:

(3.7) [Every man]<sup>1</sup> [t<sub>1</sub> said [  
[that [he<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> called his<sub>1</sub> mother]] and  
[that [Bill]<sup>2</sup> [t<sub>2</sub> called his<sub>1</sub> mother]] too]]

This logical form has the following Locality alternative:

(3.8) [Every man]<sup>1</sup> [t<sub>1</sub> said [  
[that [he<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> called his<sub>2</sub> mother]] and  
[that [Bill]<sup>2</sup> [t<sub>2</sub> called his<sub>1</sub> mother]] too]]

The difference between these two logical forms is this: in (3.7), the pronoun [his] in the first conjunct of the embedded clause is bound by [every man]; in (3.8), it is bound by [he] (more locally). The two logical forms are semantically indistinguishable so Locality rules out (3.7) and therefore wrongly predicts that (3.5) does not have the strict reading in (3.6b).

Notice that (3.5) is very similar to Dahl's example. If we strip off the clauses in which ellipsis takes place, we are left with:

- (3.9) a. Max said that he called his mother.  
 b. Every man said that he called his mother.

The only difference is that the subject of (3.9a) is a referential noun phrase, whereas the subject of (3.9b) is a quantifying noun phrase. Locality predicts that non-local binding of [his] is impossible in both sentences. In the case of (3.9a) this is a welcome prediction, as it accounts for Dahl's puzzle. But in the case of (3.9b) it is not, because it wrongly rules out the strict reading of (3.5).

It should be noted that this problem carries over to alternative accounts of Dahl's puzzle such as those of Kehler (1993), Fiengo and May (1994), and Schlenker (2005).

**Possible Solution.** I will try to overcome this impasse in a way that preserves the general idea that syntactic derivations are subject to economy principles. Locality was derived from this general idea by assuming that the grammar considers one logical form to be *simpler* (more economical) than another if the binding relations it encodes are more local. This particular assumption seems to be problematic, but that does not mean that the general idea must be given up. There may be other criteria for simplicity. Below, I will formulate such a criterion. This criterion is concerned with *free variables*, which are defined as follows:

**3.4. DEFINITION.** [Free Variables]

The free variables in a constituent X are the indices on pronouns in X whose binder is not contained in X.

Let me give some examples:

- (3.10) a.  $[[\text{Max}]^2 [\text{t}_2 \text{ called his}_2 \text{ mother}]]$   
 b.  $[[\text{Max}]^2 [\text{t}_2 \text{ called his}_1 \text{ mother}]]$   
 c.  $[[\text{he}_1]^2 [\text{t}_2 \text{ called his}_1 \text{ mother}]]$   
 d.  $[[\text{he}_1]^2 [\text{t}_2 \text{ called his}_2 \text{ mother}]]$

(3.10a) does not contain any free variables, because the pronoun is bound within the given constituent. (3.10b) does contain a free variable, because the pronoun [his] has a binding index, and is not bound within the given constituent. (3.10c) also contains one free variable. Notice that we are not counting *occurrences* of free variables. The constituent contains two unbound pronouns, but both have the same index, so there is only one free variable. If one of the pronouns is bound, as in (3.10d), the number of free variables does not change, it is still one.

Now, we could think of one constituent as being more *economical* than another if it contains fewer free variables, and more generally, we could think of one logical form LF as being more economical than another logical form LF' (which is identical to LF modulo binding indices) if some constituent in LF contains fewer free variables than the corresponding constituent in LF', and all the other

constituents in LF contain at most as many free variables as the corresponding constituents in LF'. Given this notion of economy, we could formulate the following principle.

**3.5. DEFINITION.** [Free Variable Economy]

A logical form is ruled out if it has a more economical, semantically indistinguishable v-alternative.

**3.6. DEFINITION.** [v-alternatives]

A v-alternative of a logical form LF is a structure which is identical to LF modulo binding indices on pronouns.

Free Variable Economy accounts for Dahl's puzzle without ruling out the strict reading of (3.5). That is, it prohibits non-local binding in (3.9a) but not in (3.9b). To see this, first consider the logical form of (3.9a) that should be ruled out in order to account for Dahl's puzzle:

$$(3.11) \quad [\text{Max}]^1 [t_1 \text{ said that } [[\text{he}]^2 [t_2 \text{ called his}_1 \text{ mother}]]] \quad \text{he} = \text{Max}$$

This logical form has the following v-alternative:

$$(3.12) \quad [\text{Max}]^1 [t_1 \text{ said that } [[\text{he}]^2 [t_2 \text{ called his}_2 \text{ mother}]]] \quad \text{he} = \text{Max}$$

The only difference between these two logical forms is that [his] is bound by [Max] in (3.11) and by [he] in (3.12). The two are semantically indistinguishable, and, crucially, (3.12) is more economical than (3.11). To see this, consider the embedded clause in both logical forms. In (3.11), the embedded clause contains a free variable; in (3.12) it doesn't. This is enough for (3.12) to be considered more economical than (3.11), and thus for Free Variable Economy to account for Dahl's puzzle.

Now consider the logical form of (3.9b), which should *not* be ruled out by Free Variable Economy (otherwise the strict reading of (3.5) cannot be derived).

$$(3.13) \quad [\text{Every man}]^1 [t_1 \text{ said that } [[\text{he}_1]^2 [t_2 \text{ called his}_1 \text{ mother}]]]$$

This logical form has the following v-alternative:

$$(3.14) \quad [\text{Every man}]^1 [t_1 \text{ said that } [[\text{he}_1]^2 [t_2 \text{ called his}_2 \text{ mother}]]]$$

But this v-alternative is *not* more economical. Consider, in particular, the embedded clause. In (3.13), neither [he] nor [his] is bound within the embedded clause, but both carry the same index, so the embedded clause contains *one* free variable. In (3.14), [his] is bound within the embedded clause, but [he] is not, so the clause still contains one free variable. Thus, the embedded clause in (3.14) is *not* more economical than the one in (3.13). It can be shown that no other constituent in (3.14) is more economical than the corresponding constituent in



(3.13) either, and that the same holds for other v-alternatives of (3.13). Thus, Free Variable Economy does not rule out (3.13) and correctly derives the strict reading of (3.5).

It seems, then, that we have resolved the problem raised at the beginning of this section. Replacing Locality by Free Variable Economy, however, raises a new issue. The responsibility of Locality was more than just dealing with Dahl's puzzle. It also dealt with Strong Crossover effects. The next section shows that Free Variable Economy does not and suggests that part of Locality should therefore be preserved.

### 3.3 Trace Locality

Free Variable Economy does not account for Strong Crossover effects. To see this, consider example (2.34), repeated here as (3.15):

(3.15) Who did he say we should invite?

The logical form that must be ruled out is:

(3.16) [who]<sup>1</sup> [[he]<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> said we should invite t<sub>1</sub>]

In order for (3.16) to be ruled out by Free Variable Economy, it must have a more economical v-alternative. The v-alternatives of (3.16) are all identical to (3.16), apart from the binding index on the pronoun. But this means that the v-alternatives all contain a free variable, while (3.16) does not. Thus, (3.16) does not have a more economical v-alternative, and therefore it is not ruled out by Free Variable Economy.

Maybe, then, part of Locality should be preserved. Notice that Locality can be decomposed into two sub-constraints: one about traces and one about pronouns. Let us call these two sub-constraints Trace Locality and Pronoun Locality, respectively. Roughly speaking, Trace Locality says that traces must be bound locally, and Pronoun Locality says that pronouns must be bound locally.

Next, observe that Trace Locality accounts for Strong Crossover effects, but has nothing to say about Dahl's puzzle. On the other hand, Pronoun Locality is concerned with Dahl's puzzle, but has nothing to say about Strong Crossover effects. So there is a strict division of labor: Trace Locality accounts for Strong Crossover effects, while Pronoun Locality is concerned with Dahl's puzzle.

We have seen above that Pronoun Locality is problematic, because it prohibits the strict reading of (3.5). But that does not mean that Trace Locality should be thrown overboard as well. We could simply adopt Free Variable Economy instead of Pronoun Locality to account for Dahl's puzzle, and maintain Trace Locality to account for Strong Crossover effects.

The definition of Trace Locality is spelled out below. Notice that this definition only differs from the definition of Locality (definition 2.12 on page 56) in that it is exclusively concerned with traces.

**3.7. DEFINITION.** [Trace Locality] A logical form is ruled out if it is semantically indistinguishable from one of its trace locality alternatives.

**3.8. DEFINITION.** [Trace Locality Alternatives]

Let LF be a logical form, let T be a trace in LF, and let A and B be two other nodes in LF such that A c-commands B and B c-commands T, and such that A, but not B, binds T. Then the structure obtained from LF by:

- Quantifier raising B in case it has not been raised yet;
- Adjusting T's binding index so that it's bound by B instead of A.

is a trace locality alternative of LF.

Trace Locality and Free Variable Economy account for Strong Crossover effects and Dahl's puzzle. However, it will be pointed out below that Trace Locality inherits a conceptual problem from Fox's original Locality condition. Eventually, an alternative principle will be adopted which does not only overcome the problem that Trace Locality faces, but also has a much wider empirical coverage.

### 3.4 Movement Economy

An objection that may be raised against Trace Locality (and against Fox's original Locality constraint as well) is that it compares logical forms to structures which may not be proper logical forms in their own right. To see what is at stake, consider again the basic strong crossover case in (2.34), repeated here as (3.17).

- (3.17) Who did he say we should invite?
- a. [who]<sup>1</sup> [[he<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> said we should invite t<sub>1</sub>]]
  - b. [who]<sup>1</sup> [[he<sub>1</sub>]<sup>2</sup> [t<sub>2</sub> said we should invite t<sub>2</sub>]]

(Trace) Locality compares the logical form in (3.17a) with the alternative in (3.17b). But (3.17b) is not an independently derivable logical form. The idea that motivated economy principles like (Trace) Locality was that some syntactic structures may be ruled out because they have simpler alternatives. But why should (3.17b) be considered as an alternative of (3.17a) if it isn't a proper syntactic structure in its own right?

To overcome this problem, I will consider an alternative account of crossover effects, due to Eddy Ruys (1994), which is very close in spirit to Trace Locality, but does not refer to underivable structures. Ruys' idea is best explained by means of an example. Consider again the case of (3.17). The logical form that should be ruled out is:

(3.18) [who]<sup>1</sup> [he<sub>1</sub> said we should invite t<sub>1</sub>]

Ruys suggests that this logical form should be compared with the following alternative:

(3.19) [who]<sup>1</sup> [t<sub>1</sub> said we should invite he<sub>1</sub>]

Notice that (3.19) only differs from (3.18) in that the pronoun and the trace have swapped places. Moreover, note that (3.19) is a logical form in its own right, and that (3.18) and (3.19) are semantically indistinguishable.

Ruys suggests that (3.19) may be considered more economical than (3.18) because the movement operation involved in its derivation is more local. In (3.19), [who] has moved to its position at LF from the matrix subject position. In (3.18), [who] has moved to its position at LF all the way from the embedded object position. On this ground, (3.19) is more economical than (3.18) in Ruys' system, and (3.18) is ruled out. This idea can be formalized as follows.

**3.9. DEFINITION.** [Movement Economy]

A pair  $\langle \text{PF}, \text{LF} \rangle$  is ungrammatical if there is a grammatical pair  $\langle \text{PF}', \text{LF}' \rangle$  such that (i) LF' is an m-alternative of LF, (ii) LF' and LF are semantically indistinguishable, and (iii) the movement involved in the derivation of LF' is more local than the movement involved in the derivation of LF.

**3.10. DEFINITION.** [m-alternatives]

Let LF be a logical form, and let T and P be a trace and a pronoun, respectively, which are cobound in LF. Then the logical form obtained from LF by swapping T and P is an m-alternative of LF.

Recall that Strong Crossover effects are considered to be a special case of crossover effects more generally (see section 2.1.2). We saw that it is not entirely clear when crossover effects obtain. In particular, the “textbook” generalization, which says that pronouns can only be cobound with traces that c-command them (generalization 2.3 on page 47), is plagued by many counterexamples.

Now, Ruys claims that Movement Economy does not only account for Strong Crossover cases, but also for all the other cases that are supposed to be captured by generalization 2.3, *and* for its counterexamples. To support this claim, let me go through some examples from section 2.1.2. First consider example (2.6d), repeated here as (3.20a), which was one of the examples correctly captured by generalization 2.3, even though it does not exhibit a Strong Crossover effect.

(3.20) a. Who does his mother love?  
 b. [who]<sup>1</sup> [he<sub>1</sub> 's mother loves t<sub>1</sub>]

(3.21) a. Whose mother loves him?  
 b. [who]<sup>1</sup> [t<sub>1</sub> 's mother loves him<sub>1</sub>]

Movement Economy establishes the ungrammaticality of the ⟨PF,LF⟩ pair in (3.20) by comparing it to the pair in (3.21). (3.21b) can be obtained from (3.20b) by swapping the trace and the pronoun, which are cobound in (3.20b). Thus, (3.21b) is an m-alternative of (3.20b). Moreover, (3.20b) and (3.21b) are semantically indistinguishable. Finally, (3.21b) is more economical than (3.20b) because the movement operation involved in its derivation is more local. Thus, the pair in (3.20) is correctly ruled out by Movement Economy.

Next, let us consider some of the counterexamples to generalization 2.3. Two types of counterexamples will be discussed here. Many more can be found in Ruys' paper. First consider the class of counterexamples discovered by Higginbotham (1980). One representative of this class is the pair in (3.21). Generalization 2.3 wrongly predicts that the logical form in (3.21b) should be illicit, because the pronoun in it is cobound with a non-*c*-commanding trace. Movement Economy does not make this prediction, because (3.21b) does not have a more economical m-alternative. Another case discussed by Higginbotham is:

- (3.22) a. Every senator's portrait was on his desk.  
 b. [every senator]<sub>1</sub> [t<sub>1</sub> 's portrait was on his<sub>1</sub> desk]

Again, generalization 2.3 wrongly predicts that the logical form in (3.22b) should be illicit. Movement Economy does not make this prediction, because (3.22b) does not have a more economical m-alternative.

(3.23) represents another type of counterexample considered in section 2.1.2 (originally discussed by Reinhart (1983) with attribution to Ross).

- (3.23) a. That people hate him disturbs every president.  
 b. [every president]<sub>1</sub> [[that people hate him<sub>1</sub>] disturbs t<sub>1</sub>]

Generalization 2.3 wrongly predicts that the logical form in (3.23b) is out, because the pronoun in it is cobound with a trace that doesn't *c*-command it. Movement Economy doesn't make this prediction, because (3.23b) does not have a grammatical, more economical m-alternative. In particular, the m-alternative in (3.24b) is ungrammatical, because it violates constraints on movement.

- (3.24) a. That people hate every president disturbs him.  
 b. [every president]<sub>1</sub> [[that people hate t<sub>1</sub>] disturbs him<sub>1</sub>]

Thus, Movement Economy does not only avoid the problem that Trace Locality runs into. It also has much wider empirical coverage: it does not only account for Strong Crossover effects, but for crossover effects in general.

Finally, I would like to point out that Movement Economy could be seen as an economy principle, as Ruys did, but it can also be taken to follow from a general assumption about speakers' behavior in discourse, similar to the one underlying Reinhart's (1983) theory of Condition B effects on coreference. The general assumption is that a speaker always tries to make the hearer's life as

easy as possible. This is in the speaker's own interest, because the harder it is to interpret his utterances, the more likely it is that he will be misunderstood at some point. One way to make the hearer's life easier is to use syntactic structures which involve local movement rather than structures which involve long-distance movement. If this is indeed a principle that guides the speaker's behavior, then a hearer will never assign an interpretation M to a structure involving long-distance movement, if M could also be expressed using a structure involving local movement. After all, if the speaker had wished to convey M he would have used the latter structure instead of the former. This, then, is how the effects of Movement Economy could come about.

I will leave open at this point whether Movement Economy should be thought of as a reflex of general assumptions about speakers' behavior in discourse, or whether it should be seen as a grammatical economy principle. In any case, it is important to know that both options are, in principle, open.

### 3.5 Summary

In this chapter we set out to resolve the issues that were left open by the theories discussed in chapter 2. Section 3.1 introduced Rule S, a much simplified version of Reinhart's Interface Rule. Rule S is a straightforward implementation of the intuition that interpretations which are ruled out by constraints on binding cannot be sneaked in via other anaphoric mechanisms. It was shown that Rule S, together with the standard version of Condition B, is empirically equivalent with Heim's Exceptional Codetermination Rule combined with Heim's stronger version of Condition B. Rule S has two advantages over the ECR. First, it can be derived from the general principle that hearers minimize interpretive options, and second, it presupposes the standard, "light" version of Condition B (which is concerned with binding only), and not Heim's stronger version (which is concerned with codetermination). Finally, it was shown that Rule S, together with Locality, accounts for all the data discussed in chapter 2.

Section 3.2 presented additional data, which was problematic for Locality. Free Variable Economy was proposed as an alternative account of Dahl's puzzle. But section 3.3 showed that Free Variable Economy does not account for Strong Crossover effects. Thus it was suggested that a restricted version of Locality—Trace Locality—be preserved. In section 3.4, however, it was pointed out that Trace Locality inherits a conceptual problem from Locality: it compares logical forms to structures which may not be proper logical forms in their own right. Eventually, an alternative account of crossover effects, due to Ruys (1994), was considered. This account, which we called Movement Economy, avoids the problem that Trace Locality was facing, and also has a much broader empirical coverage: it does not only account for Strong Crossover effects, but for crossover effects in general. Finally, it was observed that Movement Economy could be seen as

an economy principle, as Ruys did, but it could also be taken to follow from the general assumption that speakers try to minimize the processing load imposed on their audience. This means, in particular, that they avoid structures involving long-distance movement whenever possible.

Thus, we have arrived at a theory consisting of the following four components:

- Condition B: a syntactic constraint, which we may try to derive from more general syntactic mechanisms (cf. Reuland, 2001, 2008), accounts for Condition B effects on binding;
- Rule S: an interpretive principle, which is derived from the general idea that hearers *minimize interpretive options* (cf. Reinhart, 2006), accounts for Condition B effects on coreference, cobinding, and more intricate kinds of codetermination.
- Free Variable Economy: a syntactic constraint, which instantiates the general idea that syntactic derivations are subject to *economy* principles (cf. Fox, 1999a), accounts for Dahl's puzzle;
- Movement Economy: a constraint which can either be thought of as a syntactic economy principle (cf. Ruys, 1994) or as a consequence of the idea that speakers try to minimize the processing load imposed on their hearer, accounts for crossover effects.

The theory as a whole is compatible with the assumption that VP ellipsis is governed by Focus Match and a Semantic Identity condition.

