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Crossover and About-Movement in a Relational Grammar

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U.C. Berkeley

One of the central claims of a theory of relational grammar, as proposed by Perlmutter and Postal[1], is that underlying structures consist of unordered items. Consequently linear order plays a much less crucial role in relational grammar (RG) than it does in a non-relational grammar (which I will call linear grammar, or LG). So for example Passive is not a movement rule in RG, but rather a rule which changes grammatical relations. Since a number of phenomena have been described by crucially assuming the principles of LG, it is worth seeing whether or not these can be described within a relational framework.

One such case is the Crossover constraint (Postal, 1971), which has been formulated as a constraint on movement rules. In this paper I will propose a reformulation of this constraint within a relational framework; and will then show that the rule of About-Movement appears to be a counterexample to the reformulated constraint. It would therefore seem that RG cannot capture a generalization that can be captured in LG. But a closer look at About-Movement leads to a reformulation of this rule in such a way that the relational version of Crossover will work. It should be noted though that this paper does not constitute an argument <u>for</u> RG over LG, since either framework can handle the facts I will discuss.

1. <u>Crossover in Linear Grammar</u>

The term Crossover has been used to refer to a number of different phenomena. Postal's original constraint covered three kinds of cases:

A. For some speakers, Wh-Fronting and Relative Clause Formation cannot front an NP which is preceded by a coreferential NP:

1. a. *What$_i$ did the man who built it$_i$ destroy?
   b. *the house$_i$ which$_i$ the man who built it$_i$ destroyed

B. For all speakers, however, these rules are blocked if the fronted NP is preceded and commanded by a coreferential NP:

2. a. *Who$_i$ does he$_i$ think it will please?
   b. *the man$_i$ who$_i$ he$_i$ thinks it will please

C. Third, rules like Passive and Dative cannot re-

verse the order of two coreferential NP's which are clausemates:

3. a. The snake bit itself
   b.*The snake was bitten by itself

4. a. Sally sold the slave to himself
   b.*Sally sold the slave himself

The fact that non-clausemates are not affected by the constraint is shown by the following:

5. a. The monster$_i$ was destroyed by the scientist who created it$_i$
   b. The scientist who created it$_i$ was destroyed by the monster$_i$

Postal (1972) argues that these three cases are all separate phenomena. I will be assuming that this is correct, and by Crossover I mean only the constraint that blocks the C-cases. Of course there is a good deal of overlap between these cases; for example, any reasonable formulation of the constraint ruling out A will also rule out B. I will also be assuming that the C-cases are not blocked by a constraint on Reflexives, as in Jackendoff (1972), but, in LG terms, by some kind of movement constraint.[2]

Postal's formulation of the part of the constraint that applies in C was very roughly: No rule can reverse the order of two coreferential NP's if they are clausemates. However, another formulation could be:

I. If NP$_1$ precedes and commands a coreferential NP$_2$, then no rule can cause NP$_2$ to precede and command NP$_1$.

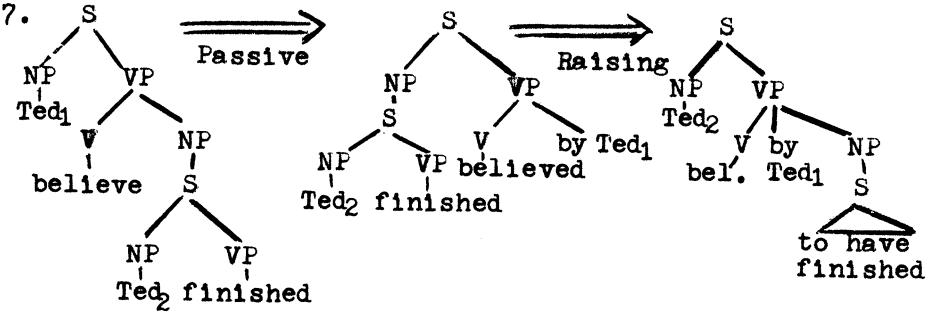
This formulation differs from Postal's in that it does not mention clausemates; the grammaticality of (5) as opposed to the ungrammaticality of (3) and (4) is accounted for by the command condition. I will not argue for this formulation as opposed to one mentioning clausemates; the point relevant to this paper is simply that the notion of linear order is crucial in either formulation.

However, two problems should be mentioned. Lakoff (1968) noted the ungrammaticality of the following:

6. *Ted was believed by himself to have finished

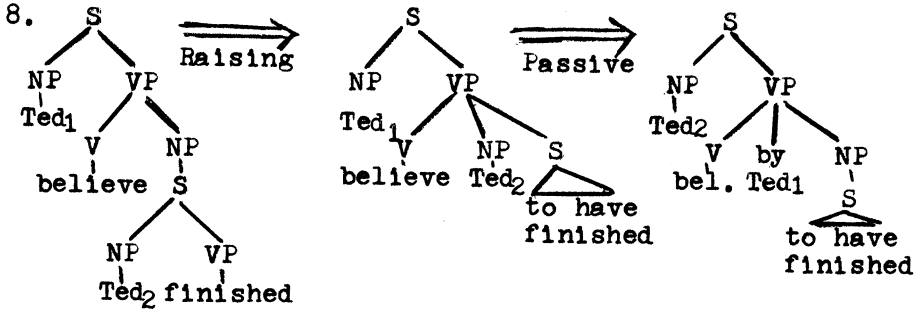
and used this to argue that Raising must precede Passive. If (6) were derived via Passive-Raising:

7.



then no violation should result. Neither the application of Passive nor that of Raising reverses precede-command. (Lakoff was actually assuming that the constraint blocks the application of a rule if it reverses the order of clausemates; but such a constraint is likewise not violated in (7)). A derivation in which the rules applied in the order Raising-Passive, on the other hand, is blocked by either version of the constraint, since the application of Passive violates the constraint:

8.



But if we assume that there is no extrinsic rule ordering, then (7) is a possible derivation. The constraint must therefore be formulated not as a constraint on rule application, but as a derivational constraint on trees which are not necessarily adjacent in a derivation:

II. If NP_1 precedes and commands a coreferential NP_2 at some point in a derivation, then at no later point can NP_2 precede and command NP_1.

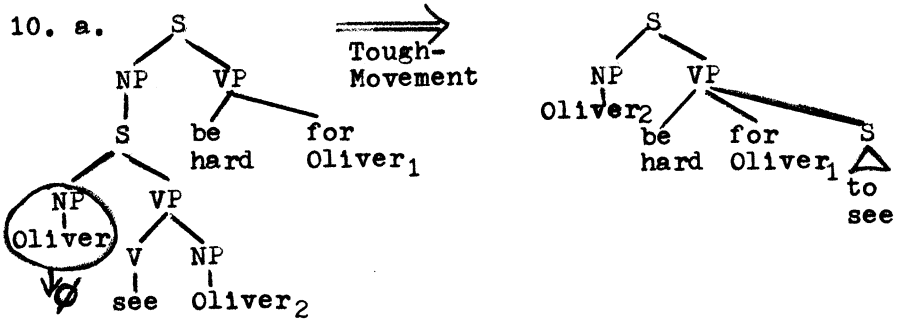
This constraint will block both of the above derivations. (In a theory in which all constraints on rules are essentially derivational constraints, then the only difference between I and II is that I refers to adjacent trees in a derivation, while II does not).

A second problem concerns cases involving Tough-Movement:3

9. a. To see himself is hard for Oliver
   b.*Oliver is hard for himself to see

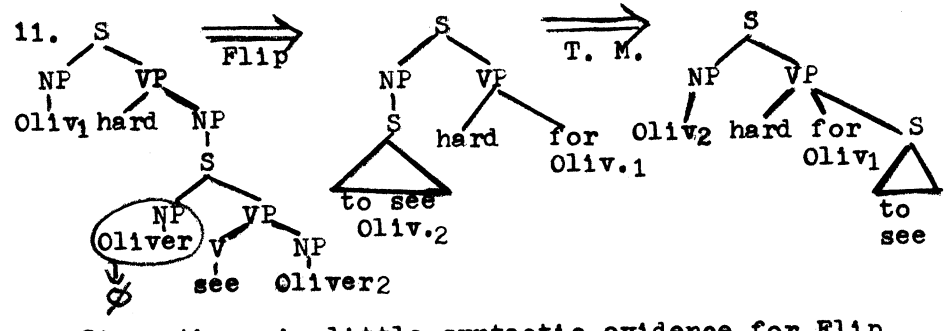
If we assume that (9b) is derived from an underlying structure (10a) by raising the object:

10. a.



then the constraint wouldn't hold, since the order of the two coreferential NP's hasn't been reversed. This problem can be solved by assuming that the dative <u>for Oliver</u> is the underlying subject, and that Flip has applied. Given this, the derivation of (9b) is exactly parallel to the Passive-Raising case, and violates constraint II:

11.



Since there is little syntactic evidence for Flip (and especially for its application in these cases), it may be objected that this is not a real solution. In (3) I will reformulate the constraint in such a way that Flip need not be assumed.

2. <u>Relevant Principles of Relational Grammar</u>

Before looking at this constraint in a relational framework, I will briefly sketch some of the relevant principles of RG that Perlmutter and Postal (hereafter P&P) have proposed:

A. A sentence consists of a verb and various associated nouns. Some of these nouns bear a grammatical relation to the verb, these are terms. Subjects, Direct Objects and Indirect Objects are terms; all other nouns, such as Locatives and Benefactives are non-terms.

B. There is a hierarchy among nouns as follows:

Sub. > D.O. > I.O. > Non-Terms

C. Linear order does not exist in underlying structure. Rather it is fixed at some point in the derivation by language-particular rules. Thus the rule for word order in English will yield:

Sub. - V - D.O. - I.O. - Non-Terms

With these principles, certain rules which have standardly been formulated as movement rules can be reformulated as relation-changing rules. So P&P have proposed that the universal formulation of Passive is:

D.O. $\longrightarrow$ Sub.

The old subject becomes a non-term by the principle:

D. If a term is displaced by the application of a rule, it becomes a non-term.

Passive therefore need not mention the fate of the underlying subject, since D is a convention applying to all rules.

Principle C together with D predicts the fact that there is a word order difference between actives and passives in English. An active sentence is linearized as Sub. - V - D.O.; whereas a passive is linearized as: Sub. - V - Non-Term. Both are predicted by the English word-order rule.

Dative Movement has also been formulated by P&P as a relation-changing rule: I.O. $\longrightarrow$ D.O. Again the old direct object automatically becomes a non-term, and since terms precede non-terms, the word order difference is predicted. P&P also formulate raising rules, such as Raising and Tough-Movement, as relation-changing rules. In all raising rules, the raised NP assumes the grammatical relation of the "host" NP (the NP out of which it is raised), the host then becomes a non-term by Principle D.

However, it is not the case that all rules are reformulated as relation-changing rules, and thus RG makes a distinction between relation-changing rules and movement rules. The latter only change linear order, while keeping grammatical relations constant. P&P have claimed that Topicalization, for example, is a movement rule; Heavy NP Shift is presumeably another.

The aspect of relational grammar which is crucial here is that rules like Passive and Dative apply to unordered structures. P&P have suggested, and Johnson (1974) has explicitely argued for, a principle by which linear order is fixed post-cyclically. This principle entails that

all movement rules are post-cyclic, since they cannot apply to unordered structures. But another theory, which is consistent with all of the above principles, would be one in which linear order was fixed cyclically. This theory would allow movement rules to be cyclic. For example, it could be that linear order is fixed on each cycle after the application of all relation-changing rules; at which point movement rules are free to apply. In either theory though, relation-changing rules apply to unordered structures.

3. A Relational Formulation of Crossover

Given a theory in which Passive and Dative apply to unordered structures, the Crossover constraint as formulated in I or II - in which the reversal of precede and command is blocked - will have no effect. Neither constraint will rule out (3b) or (4b).

There is however a natural translation of the constraint into relational terms. Basically, it would block a reversal of the hierarchy of two coreferential NP's, rather than an order reversal. To state this more formally, P&P have given the following definition:

An NP_a outranks an NP_b if:

i.) NP_a assymetrically commands NP_b, or

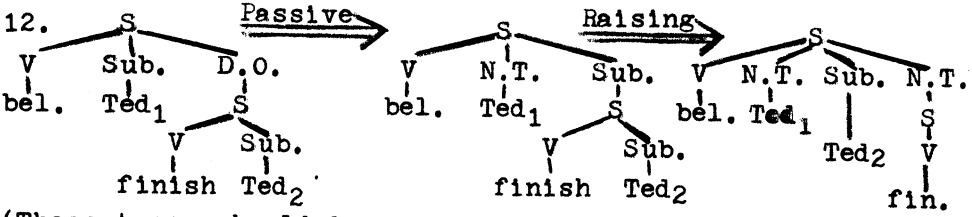
ii.) NP_a commands and is higher in the hierarchy than NP_b

Thus a subject outranks a clausemate object; but a subject does not outrank the object of a higher clause. With this definition, we can reformulate the constraint:

III. If at some point in a derivation NP_1 outranks NP_2, then at no later point can NP_2 outrank NP_1

This is a reformulation of II; i.e., the constraint is not restricted to adjacent trees in a derivation. But we should note that with the above definition of rank, there is no evidence for this kind of constraint (as opposed to a constraint on rule application, or, equivalently, a derivational constraint referring to adjacent trees). That is, we were led to a formulation like II by the fact that in a derivation of (6) in which Passive precedes Raising, no single rule reverses precede-command. But let us look at this derivation in a relational framework:

12.



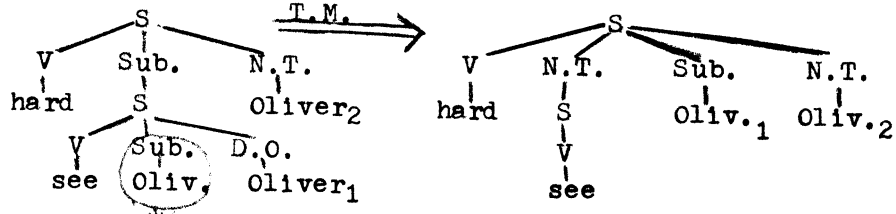
(These trees should be construed as mobiles)

The above constraint is violated simply by the application of Raising. At the input to Raising, $\underline{Ted_1}$ assymetrically commands and thus outranks $\underline{Ted_2}$, whereas at the output $\underline{Ted_2}$ outranks $\underline{Ted_1}$, since it commands and is higher in the hierarchy than $\underline{Ted_2}$ (Sub. > Non-Term). We could then restate the constraint as:

IV. If an NP_1 outranks a coreferential NP_2, then no rule can cause NP_2 to outrank NP_1

Moreover, it is no longer necessary to assume that Flip applies in a Tough-Movement case like (9b). The application of Tough-Movement itself, like the application of Raising in (12), will cause a rank reversal:

13.



At the input, $\underline{Oliver_2}$ outranks $\underline{Oliver_1}$ (by assymetrical command), and at the output $\underline{Oliver_1}$ outranks $\underline{Oliver_2}$ (by commanding and being higher in the hierarchy).

Thus, depending upon one's feelings about Flip, it may appear that a RG formulation is actually preferable to the LG formulation. But this is simply a consequence of the fact that the notion <u>outrank</u> is broader than the notion <u>precede and command</u>, since the former also includes <u>assymetrical command</u>.

The facts could therefore be captured in an equivalent way in LG. We can in LG define the notion <u>outrank</u> as follows:

An NP_a outranks NP_b if:

i.) NP_a assymetrically commands NP_b, or

ii.) NP_a commands and precedes NP_b

This definition is equivalent to the RG definition; we have simply substituted <u>precede</u> for <u>be higher in the</u>

hierarchy. With this definition, the same constraint - IV - can be the LG formulation. The application of Tough Movement in derivation (10) will violate IV; since at the input $\underline{\text{Oliver}}_1$ assymetrically commands $\underline{\text{Oliver}}_2$, while at the output $\underline{\text{Oliver}}_2$ precedes and commands $\underline{\text{Oliver}}_1$. Thus in LG as well as in RG the assumption that Flip has applied is unnecessary. Likewise, the application of Raising in (7) will violate the constraint, and so we need not assume that the constraint refers to non-adjacent trees.

In other words, the constraint is the same in the two grammars, it is simply the definition of outrank which differs. It begins to look as if we have equivalent theories - at least for this portion of the grammar - where we are simply using two different terms: precede vs. be higher in the hierarchy.

But the two grammars are making different predictions. Since RG does have movement rules in addition to relation-changing rules, the relational formulation predicts:

> Movement rules which do not reverse assymetrical command will not be affected by the constraint.

In other words, if a rule keeps grammatical relations constant, but reverses the precede-command relationship of two coreferential NP's, then no violation should result. LG does not make a parallel distinction, and so the LG constraint would hold in a larger class of cases.

4. The Apparent Problem

Earlier it was mentioned that Heavy NP Shift is probably a movement rule; another similar looking rule is About-Movement (Postal, 1971), which applies in

14. a. I talked to everyone about that movie
    b. I talked about that movie to everyone

Since there is a fair amount of word-order freedom among items occuring after the verb, we might suppose that there is no separate rule of About-Movement, but a general post-verb Scrambling rule. Whether or not this is the case, the assumption that (14b) is related to (14a) by movement means that the grammatical relations are held constant. Thus in both sentences, everyone is an I.O., while that movie is a non-term.

This assumption, combined with the RG formulation of Crossover, makes the following prediction:

> The constraint will not apply to About-Movement (i.e., this rule can reverse the order of coreferential NP's).

But this prediction appears to be wrong. Postal (1971) argued that About-Movement is subect to the constraint

on the basis of examples like:

15. a. I talked to him about himself
    b.*I talked about him to himself

Within RG there is an alternative explanation for the above contrast. P&P have proposed that only terms can trigger Reflexive. Since in this analysis the about-phrase is a non-term, the ungrammaticality of (15b) is predicted. But this explanation will not account for:

16. *I talked about himself to him

and so the problem remains. The LG formulation of Cross-over does account for both (15b) and (16); since in both cases About-Movement reverses the precede-command relationship of two coreferential NP's. But the RG formulation fails because the assumption that About-Movement is a movement rule means that relational hierarchy is not reversed.

In other words, in LG, Passive, Dative and About-Movement are all movement rules, and so it follows that they behave the same with respect to the constraint. In RG we are assuming a distinction between Passive and Dative on the one hand, and About-Movement on the other. But this distinction makes exactly the wrong prediction. In order to account for (16), RG would have to either (a) posit a separate constraint that applies to About-Movement, or (b) keep the same constraint, and add precede and command to the definition of outrank. Either way represents a complication not necessary in LG, and makes the distinction between movement rules and relation-changing rules look dubious.

5. A Reformulation of About-Movement

But the problem may lie not in the distinction per se between movement rules and relation-changing rules, but in the assumption that About-Movement is a movement rule. P&P have proposed that there are rules which make terms out of non-terms. Such rules are needed to handle pseudo-passives like (17b):

17. a. George Washington slept in this bed
    b. This bed was slept in by George Washington

Since Passive can be formulated in LG to front the first NP after the verb, the existence of (17b) presents no problem for LG. But this sentence looks like a counterexample to the RG formulation (D.O. $\rightarrow$ Sub.), since the passivized NP is apparently a locative. To account for this sentence, P&P have suggested that there is a rule: Loc. $\rightarrow$ D.O. Once this rule applies, Passive is free to apply. (17a) is

therefore derivationally ambiguous; this bed is either a locative, or an ex-locative turned object.

A slightly different approach to pseudo-passives is taken by Johnson (1974). In his account, the preposition incorporates into the verb (by Predicate-Raising, where in is treated as a predicate). A consequence of this process is that the object of the preposition becomes the object of the derived verb - sleep in. This account predicts that whenever incorporation takes place, there could be a lexical item corresponding to the derived verb. Thus Johnson suggests that inhabit is derived from live in by this process.

We can now ask whether About-Movement might not be a similar kind of rule. The answer is not only that it can be, but that given the P&P formulation of Passive, it must be. That is, About-Movement feeds Passive, as is shown by the contrast between (18b) and (19b):

18. a. I talked to everyone about that movie
    b.*That movie was talked to everyone about

19. a. I talked about that movie to everyone
    b. That movie was talked about to everyone

In LG, where we can formulate Passive to front the first NP after the verb, the grammaticality of (19b) is predictable. But if we assume a movement formulation of About-Movement, this sentence is a counterexample to the RG formulation of Passive. Since grammatical relations are not changed by movement rules, that movie is a nonterm in both (18a) and (19a). This means that a nonterm has become a subject by Passive.

Therefore, within this framework we must conclude that About-Movement is parallel to the locative case. Either there is a rule which takes about-NP's and turns them into D.O.'s, or, as in Johnson's formulation, there is a rule which incorporates about into talk. This incorporation yields the derived verb talk about, whose object in (19a) is that movie.

By formulating About-Movement as an object-creating rule, we predict that it feeds Passive. In addition, the following predictions are made:

1. It follows that About-Movement appears to be a movement rule in the same way that Passive and Dative do. Thus, in (14a) the items are linearized: Sub. - V - I.O. - Non-Term; in (14b) we have the order: Sub. - V - D.O. - I.O.

2. In the incorporation analysis, it is predicted that there is a possible lexical item corresponding to the derived verb talk about. The existence of discuss bears out this prediction.

3. Most pertinently, the relational formulation of

Crossover now makes the correct prediction. Since About-Movement is a relation-changing rule, it will obey the constraint in the same way that Passive and Dative do. Thus in

15. a. I talked to NP_1[him] about NP_2[himself]

NP_1 outranks NP_2, since it commands NP_2 and is higher in the hierarchy (I.O.>Non-Term). In (15b):

15. b.*I talked about NP_2[him] to NP_1[himself]

the rank has been reversed; NP_2 now commands and is higher in the hierarchy than NP_1 (D.O.>I.O.). We see then that RG does not need to include an additional constraint to cover About-Movement; nor is there any need to include precede in the definition of outrank.

One more case should be noted. The following pair shows the same contrast as (15a) and (15b):

20. a. I talked with him about himself
b.*I talked about him with himself

The ungrammaticality of (20b) is predicted by the LG formulation of the constraint, since About-Movement has reversed the precede-command relationship of the coreferential NP's. At first glance, the ungrammaticality of (20b) looks like a counterexample to the RG formulation. With him appears to be a non-term (as opposed to to him in (15). If so, then neither of the coreferential NP's are terms in (20a). Hence, neither outranks the other, and so the constraint wouldn't hold. But given the P&P principle that only terms can trigger Reflexive, we must conclude that with him is in fact a term, since it has triggered Reflexive in (20a). We can assume then that it is an I.O., and so the constraint will block the derivation of (20b) in the same way that it blocks (15b).

Whether we consider the RG or the LG formulation of the constraint, there is an interesting consequence to the interaction of Crossover and About-Movement. It was hypothesized that discuss is a lexicalization of talk about, where about has incorporated into the verb. And just as (20b) is bad, the corresponding sentence with discuss is also bad:

21. *I discussed him with himself

Given the central assumption of this paper - that Crossover is a constraint on the application of syntactic rules - the constraint will not block (21) in a theory in which all lexical insertion occurs before the application of syntactic rules. In such a theory, the existence of discuss would not depend on the prior applica-

tion of About-Movement (or About-Incorporation); and so the ungrammaticality of (21) cannot be attributed to a constraint which is violated by this rule. But of course this argument works both ways; and could be used instead as evidence that Crossover is not a constraint on the application of syntactic rules.

Footnotes

[1]All references in this paper to Perlmutter and Postal are from their course on relational grammar at the LSA Institute, Summer, 1974.

[2]Evidence for this assumption comes from cases involving Tough-Movement and Dative Deletion. Thus the ungrammaticality of (i):

i. *Sam is hard for himself to shave

can be attributed either to a constraint on reflexives, or to a movement constraint (which is violated by Tough-Movement). But if the dative for himself is deleted, the sentence is still bad:

ii. *Sam$_i$ realized that he$_i$'d be hard to shave

(ii) is of course good on an irrelevant reading, where the deleted dative is unspecified. But it cannot have the reading of:

iii. Sam$_i$ realized that it would be hard for him$_i$ to shave himself$_i$

To show this more clearly, we can put (ii) in a context where the (iii)-reading is preferred:

iv. Sam will be late because he still has to shave {himself / Bill}, and

(a) he says it's always hard to shave {himself / Bill} in less than five minutes

(b) he says that {*he / Bill} is always hard to shave in less than five minutes

A constraint on reflexives won't account for the above contrast, or for the ungrammaticality of (ii) on the (iii)-reading.

[3]I am assuming that Tough-Movement is a raising rule, rather than a deletion rule. The interaction between

Crossover and Tough-Movement bears on this issue. If we assume that Crossover is, in LG terms, a movement constraint, then we must conclude that (i):

i. *Sam is hard for himself to shave

is derived by movement.

But in view of the ungrammaticality of (ii):

ii. *Sam is too hairy for himself to shave

where deletion is clearly involved, it would seem that our assumption about the nature of Crossover is wrong. But this follows only if the derivation of (ii) does not involve movement in addition to deletion. There is a plausible analysis of (ii) involving Tough-Movement. That is, the too Adj. to V construction is closely related to a construction with impossible. A rough paraphrase of (iii) is (iv):

iii. The rock is too heavy to move
iv. The rock is so heavy that it's impossible to move the rock

But impossible is a Tough-Mover; and so (iii) might be derived from something like (iv) where Tough-Movement applies in the lower S to give

v. The rock is so heavy that the rock is impossible to move

The derived subject would then be deleted.

This analysis is not meant to be taken too literally, since the so construction itself needs further analysis. The crucial point is simply that in a decomposition analysis of the too Adj-construction, Tough-Movement will apply in the derivation. Given this, a movement analysis of Crossover will predict the ungrammaticality of (iii), since the derivation of this sentence is in part the same as the derivation of

vi. *Sam is impossible for himself to shave

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