SCRAMBLING, RECONSTRUCTION AND SUBJECT BINDING*

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Many recent investigations of word order variation or *scrambling* have suggested that such variation is due to the application of transformational movement in the syntax rather than to stylistic or PF movement[1]. A natural question to ask concerns the nature of this movement, particularly whether it is analogous to NP-movement, and therefore proceeds to an A-position, or whether it is like wh-movement, and proceeds to an A'-position. A number of authors have investigated this topic, using diagnostics such as pronominal and reflexive binding and the licensing of parasitic gaps Yet in spite of careful scrutiny, no clear consensus has emerged. While Saito (1989) and Müller and Sternefeld (1991) argue that scrambling is A'-movement, others suggest that it is better analyzed as A-movement (Fanselow 1990, Miyagawa 1990, Lee and Santorini 1991, Haider 1991, Lee 1993). Still others propose that scrambling is movement to a position of mixed A/A' character (Webelhuth 1989), or that it is not a unitary phenomenon

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[1] We leave aside here the possibility that the variation is the result of multiple possible base orders. Analyses along this line have indeed been proposed (Fanselow 1993, Neeleman 1994, Rambow 1994), but a thorough comparison between these two approaches is unfortunately beyond the scope of this paper.

and may move either to an A- or an A'-position (Deprez 1989, Mahajan 1990). In this paper, we focus on the paradox for the A/A' distinction raised by the patterns of crossover phenomena induced by scrambling in German and Korean. It has been widely noted that certain instances of scrambling but not others license what has been called "reconstruction", i.e., the scrambled element behaves for the purposes of binding as though it were in its canonical base position. This has led to the conflicting analyses we noted in the previous paragraph. In the first section of this paper, we examine how scrambling behaves with respect to the phenomena of strong crossover (SCO) and weak crossover (WCO). We consider the entire paradigm of SCO and WCO data involving all possible binding relations among arguments in a double object construction, a range of data which has not, to our knowledge, been fully presented elsewhere. The pattern which emerges from these data is quite striking: with respect to SCO and WCO, scrambling patterns with A-movement in that it uniformly introduces new binding possibilities, i.e., the scrambled element may bind an element it c-commands in its derived position. Moreover, we observe that a scrambled element generally may not reconstruct to its base position so as to be bound, a property usually associated with A-movement. The sole exception to this last statement obtains when the binding relation that is disturbed by scrambling involves a subject binder. Then and only then do reconstruction effects obtain. In section 2, we review previous analyses which have somehow attempted to capture this split nature of reconstruction effects in scrambling, but we find that none is adequate. We make our proposal in section 3: instances of reconstruction in cases involving subject binders are only apparent and do not imply anything about the A/A' status of scrambling. Instead, we suggest that scrambling should be seen as analogous to A-movement in that it uniformly introduces new binding possibilities, and that the apparent reconstruction effects should be understood in terms of a special status accorded to subject binders. We instantiate this insight in a reformulation of the binding theory. Our analysis is then shown to have desirable empirical effects when applied to cases of long distance scrambling in section 4. In section 5, we review a number of empirical and technical problems which arise for a uniform A-movement analysis of scrambling. In order to resolve these, in section6 we adopt the proposal in Saito (1992) to extend the typology of movement types with an additional distinction of operator vs. non-operator movement. Adopting Saito's suggestion that scrambling is uniformly non-operator A'-movement, we suggest that the property which is crucial for the introduction of new binding possibilities, as observed under WCO and SCO, is the non-operator status of the landing site of scrambling. We also show how this approach can be extended to account for the divergent anaphor binding data in German and Korean. Our revised binding theory enables us to eliminate the

unattractive appeal to multiple possibilities for the LF reanalysis of a scrambled element which Saito is forced to make. In the final section, we do however pursue the intuition that the dependency created by non-operator movement is ill-formed at LF. We sketch a view of reconstruction which distinguishes between semantic reconstruction, responsible for scope interpretation, and syntactic reconstruction, responsible for binding. All non-operator moved elements must undergo semantic reconstruction at LF, while operator-moved elements undergo syntactic reconstruction at the level of representation at which binding applies.

1. Scrambling and Crossover

In this section, we discuss a body of data involving two binding phenomena, which have come to be known by the names of "strong crossover" (SCO) and "weak crossover" (WCO) (Postal 1971, Wasow 1972). Both cases of crossover involve two co-indexed elements, the first normally a pronoun and the second either an R-expression or a quantificational expression, one of which is moved past the other. In the case of SCO, the base configuration has the pronominal c-commanding the other element, resulting in a violation of principle C of the binding theory (cf. example (1)a). When the lower R-expression moves past ("crosses over") the co-indexed pronoun, one might expect the sentence to become grammatical, since at S-Structure there is no configuration which violates principle C. However, if the movement which obtains is an instance of *wh*-movement, the sentence remains ungrammatical:[2]

(1) a. ***He*** thinks Mary likes ***John's*** mother (Strong Crossover)
b.* [***Whose*** mother]$_i$ does ***he*** think Mary likes t_i?

Consequently, we say that *wh*-movement shows SCO effects. In WCO, no c-command relation holds between the two elements in their base order, because the pronoun is embedded within some complex nominal structure (which in turn c-commands the quantifier or R-expression). The base configuration is ungrammatical in the desired bound-variable reading, presumably because no configuration is present which licenses bound-variable readings (c-command). Here, one might expect that fronting the quantified expression ("crossing it over the bound variable") would have the effect of making the sentence grammatical: at S-Structure the quantifier c-commands the pronoun, presumably a configuration in which the bound-variable reading can be obtained. However, if the element is

[2] In all of our examples, we will represent intended co-reference through an italicized boldface font. We reserve subscripting for co-indexation of moved elements and their traces.

fronted through *wh*-movement, the sentence remains ungrammatical under the bound-variable reading:

(2) a. ***His*** mother loves ***every boy*** (Weak Crossover)
b. *[***Which boy***]$_i$ does ***his*** mother love t_i

We say therefore that *wh*-movement shows WCO effects. As is well known, two types of movements have been discerned in the literature which differ with respect to how they behave under WCO and SCO. We have seen that *wh*-movement shows both WCO and SCO effects: instances of A'-movement do not appear to affect binding relations in either WCO or SCO (but cf. Lasnik and Stowell 1991); the elements are interpreted as though they were in their base positions. Thus, if quantifier pronoun binding is unavailable or if a principle C effect obtains in the base position, applications of wh-movement do not change binding possibilities. In the case of A-movement, however, the leftward movement of a quantifier across a non-c-commanding co-indexed pronoun (WCO) or of an R-expression across a c-commanding pronoun (SCO) does *not* preserve the ungrammaticality of the base order, but rather licenses binding of the pronoun by the quantifier or coreference between the R-expression and pronoun. This is demonstrated in the following examples involving subject to subject raising:

(3) a. *It seems to ***his*** mother that ***every boy*** is intelligent. (Weak Crossover)
b. [***Every boy***]$_i$ seems to ***his*** mother [t_i to be intelligent]
(4) a. *It seems to ***him*** that ***John's*** brother is intelligent. (Strong Crossover)
b. [***John's*** brother]$_i$ seems to ***him*** [t_i to be intelligent]

We conclude that A-movement shows neither SCO nor WCO effects. Hence, we can take the presence or absence of WCO and SCO effects to be diagnostics for movement type. In our discussion we will use the notions of SCO and WCO in a slightly generalized sense to include all cases where binding is possible either in the base or derived orders, but not in both. In our cases of generalized SCO, we use a bare pronoun as the binder and an R-expression embedded within a complex NP as the bindee. If binding obtains between these two elements, this should result in a principle C violation. Our use of generalized WCO involves a quantified expression as binder and a possessive pronoun as bindee. Here, if binding does **not** occur, we will be unable to interpret the pronoun as a bound variable, and hence the coindexed reading is ungrammatical. Thus, alongside of examples like those in (3) and (4) above, we consider cases like the following:

(5) a. It seems to ***every boy*** that ***his*** mother is intelligent. (Generalized Weak Crossover)

b. ?? [***His*** mother]$_i$ seems to ***every boy*** [t_i to be intelligent][3]

(6) a. It seems to ***John's*** brother that ***he*** is intelligent. (Generalized Strong Crossover)

b. * [***He***]$_i$ seems to ***John's*** brother [t_i to be intelligent]

Here, we see again that for A-movement, binding effects for A-movement are determined by that which obtains on the surface.

For the discussion of the data in this section, we will refer to the effect of moved elements being interpreted in their base positions as "reconstruction". We will not, as yet, give this term a technical meaning, but instead use it in a purely descriptive manner. In general, then, WCO and SCO tell us something about the "reconstruction" properties and hence might help us in determining the character of the movement involved in scrambling. However, these data must be interpreted with care: the fact that reconstruction effects obtain in a particular configuration does not mean that they always obtain, or that they are obligatory. We will use the following metric to interpret the results:

- If a sentence is ungrammatical in the base order, but becomes acceptable after movement, then we conclude that reconstruction is *not obligatory*. If it were, it would be impossible to "rescue" the sentence through movement. From such data, however, we cannot tell whether reconstruction ever takes place at all.
- If a sentence is ungrammatical in the base order, and remains ungrammatical even after movement to a position such that the surface configuration does not violate binding requirements, then we conclude that reconstruction is in fact *obligatory*. Otherwise, the movement would have rescued the sentence from the violation which occurred in the base order.
- If a sentence is grammatical both in the base order and in the derived order, then reconstruction is *possible* since such reconstruction will allow the restoration of the grammatical status of the base order sentence. Note that from this type of data, we know nothing about whether reconstruction must always occur.
- If a sentence is grammatical in the base order, but becomes ungrammatical after movement, then reconstruction must be *impossible*, since if it were

[3] The bound variable interpretation is not so impossible in this case as we would expect, particularly with focal stress on *seems*. Nonetheless, we will assume that reconstruction for the purposes of binding is impossible under A-movement. See section 7.2 for further discussion.

possible, we would have a possible derivation of the sentence by reconstructing the moved element, and it would therefore be ruled in.

These criteria have been summarized in Table 1. We now proceed on to the (generalized) SCO and WCO data. In each case (SCO and WCO), we will consider binding by each of three sentence elements, subject, direct object (DO) and indirect object (IO), and binding of each of the remaining two sentence elements, for a total of six cases. In the cases where binding is possible in the base order, we scramble the bound element past the binder so as to potentially interrupt the binding relationship. When the binding does not obtain in the base order, the potential binder is scrambled past the bindee into a position from which it c-commands the bindee, and therefore might be able to bind it. For each of the six cases, we give both German and Korean examples. Following Lenerz (1977) we take the base order for German to be subject-IO-DO. We take this to be a linguistic universal and therefore assume that Korean is identical in this respect.[4] Sentences without scrambling are shown in the (a) examples, sentences with the relevant element scrambled appear in the (b) examples. Strikingly, for the data we consider, the judgments for German and Korean coincide throughout.[5]

Table 1. The interpretation of reconstruction effects

Base Order	Reversed Order	Interpretation
*	OK	reconstruction is not obligatory
*	*	reconstruction is obligatory
OK	OK	reconstruction is possible
OK	*	reconstruction is impossible

[4] It is interesting to note that the analysis we propose in section~3 remains unaffected if alternative assumptions about the base order of the two objects are made, in particular, if it is assumed that the DO precedes the IO (Larson 1988), or that the two can be generated in either order (Haider 1991).

[5] There are at least three items which have been identified as bound pronouns in Korean: *caki* 'self', the overt pronoun *ku/kukes* 'he/it', and the empty pronoun *pro*. For [+human] entities, *caki* is highly preferred with a subject antecedent, and *ku* with a dative antecedent. For [– human] entities, *kukes* is used regardless of the status of the antecedent. The empty pronoun *pro* can occur in any environment that overt pronouns can occur, though there seem to be subtle differences between overt and empty pronouns with regard to the availability of a bound pronoun interpretation. Throughout this paper, we use these three lexical items interchangeably to facilitate the naturalness of the examples.

1.1. Strong Crossover and Scrambling

For cases of SCO, the binder we use is a pronoun and the bindee a co-indexed R-expression. If the binding relation holds, there is a principle C violation. Note that in cases where the binding relation involves two objects as in (7), the judgments are the same regardless of whether the scrambled element moves beyond or before the subject.

Binding by IO

Case 1: The IO binds the DO.[6], [7]

(7) a. *daß Jörg ihm [die Bilder vom ***Hans***] gezeigt hat
that John-NOM him-DAT the pictures-ACC of Hans shown has
'that John has shown him the pictures of ***Hans***'
b. ? daß der Jörg [die Bilder vom ***Hans***]$_i$ ihm t$_i$ gezeigt hat
c. ? daß [die Bilder vom ***Hans***] der Jörg ihm t$_i$ gezeigt hat.

(8) a. * Younghee-ka ***ku***-eykey [***Minswu***-uy sacin]-ul poyecwuessta
Younghee-NOM him-DAT Minswu-GEN picture-ACC showed
'Younghee showed him Minswu's picture'
b. Younghee-ka [***Minswu***-uy sacin]i-ul it ku-eykey t$_i$ poyecwuessta
[Minswu-uy sacin]i-ul Younghee-ka it ku-eykey t$_i$ poyecwuessta

Conclusion: Reconstruction is not obligatory.
Case 2: The IO binds the subject.

(9) a. daß [die Brüder vom ***Hans***] ***ihm*** das Bild gezeigt haben
that the brothers-NOM of Hans him-DAT the picture-ACC shown have
'that ***Hans'*** brothers have shown ***him*** the picture'
b. * daß ***ihm***$_i$ [die Brüder vom ***Hans***] t$_i$ das Bild gezeigt haben.
(10) a. [***Minswu***-uy tongsaynng]-i ***ku***-eykey sacin-ul poyecwuessta

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[6] In cases such as this where the binding relation which is being examined is between the two objects, we show the element scrambled to positions both after (as in the b. examples) and before (as in the c examples) the subject.

[7] In some of the German sentences, a pronoun appears in final position in the *Mittelfeld*, markedly decreasing the acceptability of the sentence. We take this effect to be independent of the relevant syntactic issues. One might try to fix such examples by utilizing an epithet instead of a pronoun as the (potentially) bound expression rather than the pronoun, but we have refrained from doing this.

Minswu-GEN brother-NOM him-DAT picture-ACC showed
'***Minswu's*** brother showed ***him*** a picture.'

b. * ***ku***$_i$-eykey ***Minswu***-uy tongsayng-i ti sacin-ul poyecwuessta

Conclusion: Reconstruction is impossible.

1.1.2. Binding by DO

Case 3: The DO binds the IO.

(11) a. ? daß der Lehrer [den Eltern ***des Schülers***] ***ihn*** zurückgeschickt hat
that the teacher-NOM the parents-DAT of the Student him-ACC sent back has
'that the teacher sent him back to the student's parents'

b. * daß der Lehrer ***ihn***$_i$ [den Eltern des Schülers] ti zurückgeschickt hat.

c. * daß ***ihn***$_i$ der Lehrer [den Eltern ***des Schülers***] t$_i$ zurückgeschickt hat.

(12) a. sensayngnim-i [***Minswu***-uy pwumo]-eykey ***ku***-lul tolyeponayssta
teacher-NOM Minswu-GEN parent-DAT he-ACC returned
'The teacher returned him to Minswu's parents.'

b. * sensayngnim-i ***ku***$_i$-lul [***Minswu***-uy pwumo]-eykey t$_i$ tolyeponayssta

c. * ***ku***$_i$-lul sensayngnim-i [***Minswu***-uy pwumo]-eykey ti tolyeponayssta

Conclusion: Reconstruction is impossible.

Case 4: The DO binds the subject.

(13) a. daß [der Brüder vom ***Hans***] ***ihn*** besucht hat
that the brother-NOM of Hans him-ACC visited has
'that Hans' brother visited him'

b. * daß ***ihn***$_i$ [der Brüder vom ***Hans***] t$_i$ besucht hat.

(14) a. ***Minswu***-uy pwumonim-i ***ku***-lul pangmwunhayssta
Minswu-GEN parents-NOM he-ACC visited
'Minswu's parents visited him.'

b. * ***ku***$_i$-lul [***Minswu***-uy pwumonim]-i t$_i$ pangmwunhayssta

Conclusion: Reconstruction is impossible.

1.1.3. Case III: binding by Subject

Case 5: The subject binds the IO.

(15) a. * daß ***er*** [dem Vater vom ***Hans***] die Bilder gezeigt hat
that he-NOM the father-DAT of ***Hans*** the pictures-ACC shown has
'that he has shown Hans' father the pictures'

b. * daß [dem Vater vom ***Hans***]$_i$ ***er*** t_i die Bilder gezeigt hat.

(16) a. * ***ku***-ka [***Minswu***-uy apeci]-eykey sacin-ul poyecwuessta
he-NOM Minswu-GEN father-DAT picture-ACC showed
'He showed Minswu's father a picture.'

b. * [***Minswu***-uy apeci]$_i$-eykey ***ku***-ka ti sacin-ul poyecwuessta

Conclusion: Reconstruction is obligatory.

Case 6: The subject binds the DO.

(17) a. * daß ***er*** [die Bilder vom ***Hans***] gekauft hat
that ***he***-NOM the pictures-ACC of ***Hans*** bought has
'that he has bought the pictures of Hans

b. * daß [die Bilder vom ***Hans***]$_i$ ***er*** t_i gekauft hat.

(18) a. * ***ku***-ka [***Minswu***-uy emma]-lul coahanta
he-NOM Minswu-GEN mother-ACC like
'***He*** likes ***Minswu***'s mother.'

b. * [***Minswu***-uy emma]i-lul ***ku***-ka ti coahanta

Conclusion: Reconstruction obligatory

1.2. Weak Crossover and Scrambling

For cases of WCO, we use a quantified expression as binder and a pronoun as bindee. Here, if binding does bf not occur, the pronoun may not be interpreted as a bound variable, and hence the coindexed reading is ungrammatical. Just as in strong crossover, the judgments are the same regardless of whether the scrambled element moves beyond or before the subject, if the binding relation involves two objects as in (19).

1.2.1. Binding by quantifier in IO

Case 1: The IO quantifier binds the DO.

(19) a. daß der Jörg ***jedem*** [***seinen*** Vater] gezeigt hat.
that John-NOM everyone-DAT his father-ACC shown has
'that John has shown ***everyone his*** father'

b. * daß der Jörg [***seinen*** Vater]$_i$ ***jedem*** t_i gezeigt hat.
* daß [***seinen*** Vater]$_i$ der Jörg ***jedem*** t_i gezeigt hat.

(20) a. Kim pancang-i ***nwukwu-eykey-na*** [***pro*** iwus]-ul sokayhayssta.
Kim district chair-NOM everyone-DAT-UQ pro-GEN neighbor-ACC introduced

'The district chair Kim introduced ***everyone*** to ***his*** neighbor.'

b. * Kim pancang-i [***pro*** iwus]-ul$_i$ ***nwukwu-eykey-na*** t$_i$ sokayhayssta.

c. * [***pro*** iwus]-ul$_i$ Kim pancang-i ***nwukwu-eykey-na*** t$_i$ sokayhayssta.

Conclusion: Reconstruction is impossible

Case 2: The IO quantifier binds the subject.

(21) a. * daß [***sein*** Vater] ***jedem*** das Bild gezeigt hat.
that his father-NOM everyone-DAT the picture-ACC shown has
'that ***his*** father has shown ***everyone*** the picture'

b. daß ***jedem***$_i$ [***sein*** Vater] t$_i$ das Bild gezeigt hat.

(22) a. * [***pro*** apeci]-ka ***nwukwu-eykey-na*** yongton-ul cwunta
pro-GEN father-NOM everyone-DAT-UQ money-ACC gives
'***His*** father gives ***everyone*** money '

b. ***nwukwu-eykey-na***$_i$ [***pro*** apeci]-NOM ti yongton-ul cwunta

Conclusion: Reconstruction is not obligatory.

1.2.2. Case II: Binding by quantifier in DO

Case 3: The DO quantifier binds the IO.

(23) a. * daß der Jörg [***seinem*** Vater] ***jeden*** gezeigt hat.
that John-ACC his father-DAT everyone-ACC shown has
'that John has shown ***his*** father ***everyone***'

b. daß der Jörg ***jeden***$_i$ [***seinem*** Vater] t$_i$ gezeigt hat.

c. daß ***jeden***$_i$ der Jörg [***seinem*** Vater] t$_i$ gezeigt hat.

(24) a. * Kim pancang-i [***pro*** iwus]-eykey ***nwukwuna-lul*** sokayhayssta.
Kim district chair-NOM pro-GEN neighbor-DAT everyone-ACC introduced
'The district chair Kim introduced ***everyone*** to ***his*** neighbor.'

b. Kim pancang-i ***nwukwuna-lul***$_i$ [***pro*** iwus]-eykey t$_i$ sokayhayssta.

c. ***nwukwuna-lul***$_i$ Kim pancang-i [***pro*** iwus]-eykey t$_i$ sokayhayssta.

Conclusion: Reconstruction is not obligatory.

Case 4: The DO quantifier binds the subject.

(25) a. * daß [***sein*** Vater] jeden besucht hat.
that his father-NOM everyone-ACC visited has
'that ***his*** father visited ***everyone***'

b. daß ***jeden***$_i$ [***sein*** Vater] ti besucht hat.

(26) a. * [***pro*** chinkwu]-ka ***nwukwu-lul*** paypanhayss-ni
pro-GEN friend-NOM who-ACC betrayed-Q
'***Who*** did ***his*** friend betray?'
b. ***nwukwu-lul***$_i$ [pro chinkwu]-ka t$_i$ paypanhayss-ni

Conclusion: Reconstruction is not obligatory.

1.2.3. Case III: Binding by quantifier in Subject

Case 5: The subject quantifier binds the IO.

(27) a. daß ***jeder*** [***seinem*** Vater] die Bilder gezeigt hat.
that everyone-NOM his father-DAT the pictures shown has
'that ***everyone*** has shown ***his*** father the pictures'
b. daß [***seinem*** Vater]$_i$ ***jeder*** t$_i$ die Bilder gezeigt hat.

(28) a. ***nwukwuna***-ka [***pro*** chinkwu]-eykey komin-ul thelenohnunta
everyone-NOM pro-GEN friend-DAT problem-ACC tell
'***Everyone*** tells ***his*** friend problems.'
b. [***pro*** chinkwu]$_i$-eykey ***nwukwuna***-ka t$_i$ komin-ul thelenohnunta

Conclusion: Reconstruction is possible.
Case 6: The subject quantifier binds the DO.

(29) a. daß ***jeder*** [***seinen*** Vater] besucht hat.
that everyone-NOM his father-ACC visited has
'that ***everyone*** has visited ***his*** father'
b. daß [***seinen*** Vater]$_i$ ***jeder*** t$_i$ besucht hat.

(30) a. ***nwukwuna-ka*** [***pro*** uymwu]-lul chwungsilhi ihaynghayssta.
everyone-NOM pro-GEN duty-ACC faithfully carried-out
'***Everyone*** carried out ***his*** duty faithfully.'
b. [***pro*** uymwu]-lul$_i$ ***nwukwuna-ka*** t$_i$ chwungsilhi ihaynghayssta.

Conclusion: Reconstruction is possible.

1.3. Conclusions

Table 2 summarizes our conclusions. Each cell in the table represents the reconstruction possibilities according to the evaluation metrics we discussed above. There is a sharp contrast in reconstruction possibilities based upon which element functions as the binder. When the subject is the binder, reconstruction appears to be obligatory, while it appears to be impossible otherwise. Note also that the WCO data does not license conclusions as strong as those licensed by the SCO data. For

instance, we cannot arrive at the conclusion that reconstruction is obligatory in the case of subject binder from just looking at WCO data, since the relevant WCO data implies only that reconstruction is possible. Furthermore, in WCO the only case that allows us to infer that reconstruction is impossible is the one in which an indirect object quantifier binds a direct object pronoun (example (19)), since this is the only case in which a grammatical sentence becomes ungrammatical by scrambling. On the other hand, in SCO all the cases which have objects as binders allow us to infer that reconstruction is impossible. WCO data is thus not as powerful a diagnostic as SCO data. Finally, note that the strict dichotomy between binding by the subject and binding by one of the objects can easily be overlooked if one does not consider all cases of binding between the objects of ditransitive verbs in the WCO and SCO data.

Table 2: Interpretation of SCO and WCO data

	Subj binder	IO/DO binder IO/DO bindee	IO/DO binder Subj bindee
Strong Crossover	OBLIG cf. (15), (17)	IMPOSSIBLE cf. (7), (11)	IMPOSSIBLE cf. (9), (13)
Weak Crossover	POSSIBLE cf. (27), (29)	IMPOSSIBLE cf. (19), (23)	not oblig CF. (21), (25)
Summary	OBLIG	IMPOSSIBLE	IMPOSSIBLE

2. Previous Proposals

Before presenting our own analysis, let us consider how a number of proposals from the literature on scrambling fare with these data. Webelhuth's (1989, 1992) work is seminal in that it brought to light for the first time the ambiguous nature of scrambling with respect to the A/A' distinction. Working with German data, Webelhuth argues that scrambling patterns with *wh*-movement, on the basis of a single case of SCO (corresponding to our example (17)), which shows obligatory reconstruction, and a number of other data, but at the same time displays properties of A-movement, as evidenced by WCO data. He proposes a mixed position, which has properties of both types of movement. However, his own SCO example involves a subject binder, which, as we have seen, exhibits obligatory reconstruction. Webelhuth's proposed "mixed position" cannot account for this case, since reconstruction ought be optional from such a position. Mahajan (1990) proposes that Hindi local scrambling is either A- or A'-movement, but not simultaneously both as in Webelhuth's proposal. He considers WCO and SCO effects but only cases involving binding by objects, so that the role of binding by subject does not

become apparent. Like Webelhuth, therefore, he does not account for the obligatory nature of reconstruction evidenced in certain cases of SCO[8].

Lee and Santorini (1994) examine the complete paradigm of WCO data (but no SCO data). They relate the observed differences in reconstruction behavior to the landing site of the scrambled constituents, namely, whether it is before or beyond the subject. But sentences such as (7)c and (8)c on the one hand, and (19)c and (20)c on the other, show that in fact the landing site is irrelevant; instead, the relevant issue is whether the subject is the binder. Saito (1992) proposes that scrambling is movement to a non-operator A' position, which at LF must either be reanalyzed as an A-position or an operator position, or else eliminated (cf. Tada 1990). The effect of the reanalysis options would be that scrambling should behave like either A- or A'-movement, freely. Taking the elimination route would mean that scrambling should not have any LF interpretive effects whatsoever. Though Saito bases his analysis mainly on anaphor binding data, he does look at WCO data involving binding of the subject by a long-distance scrambled direct object, and concludes that reconstruction is impossible He accounts for this fact -- at odds with his analysis of long-distance scrambling as uniformly A'-movement (since a well-formed A-chain could not be formed under reanalysis) -- by speculatively proposing that WCO is checked at S-Structure. This proposal cannot account for cases in which the subject is the binder, where reconstruction does occur obligatorily. Saito also considers a subset of our SCO data, particularly the cases in which the subject is the binder, precisely where the Principle C violation cannot be undone by local scrambling.[9] He recognizes this as a problem for Mahajan's analysis, since Mahajan proposes that for local scrambling an A-movement analysis is always available. His solution is analogous to his solution to the WCO problem: he suggests that SCO effects are not checked at LF, and since he considers only cases which exhibit reconstruction effect, he speculates that SCO effects are checked at D-Structure or NP-Structure (van Riemsdijk and Williams 1981). In the case of SCO, he cannot account for data involving binding by one of the objects, since in these cases Principle C violations can in fact be undone.[10]

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[8] Scrambling in Hindi appears to behave somewhat differently from scrambling in German and Korean. For the purposes of this paper, we are interested in Hindi only to the extent that it parallels the German and Korean data, and we do not propose an exhaustive analysis of the relevant phenomena in Hindi.

[9] The Japanese data patterns with our German and Korean data.

[10] Cho (1991) also proposes that scrambling is movement to a non-operator A'-position, on the basis of WCO and SCO facts in Korean. His analysis, however, is unable account for

None of the studies we have thus far considered correctly characterize the crucial parameter governing reconstruction in the WCO and SCO data, namely whether the binder is the subject or an object. Two types of problematic analyses can be found. First, Webelhuth, Mahajan and Saito propose analyses in which (local) scrambling can have either A or A' properties. Under such an analysis, sentences can only be improved by scrambling. New binding can always be created and old binding lost by exploiting A-movement, while old binding may always be retained through A'-movement. However, the data involving binding by an object show that sentences can indeed become ungrammatical by scrambling. Second, Mahajan, and Lee and Santorini propose that what is relevant for the distribution of the apparent reconstruction effects is the landing site of scrambling, i.e., whether it is before or beyond the subject position. However, the WCO and SCO data show that reconstruction is independent of the landing site of the scrambled element. Instead, reconstruction effects are licensed by a subject binder. There are, however, a number of studies which have detected that the factors determining reconstruction should be distinguished from the issue of movement type. Müller and Sternefeld (1994) take facts concerning the creation of anaphor binding possibilities as decisive in determining the character of the movement type of scrambling, and conclude that scrambling is uniformly A'-movement, since it introduce no new possibilities for anaphor binding.[11] They also consider a subset of the WCO data (though not SCO data), that in which the binder is an object, and observe that scrambling of the direct object across the subject (i.e., examples like (25)) does in fact induce a WCO effect in their dialect of German,[12] i.e., it introduces no new quantifier-pronoun binding possibilities, while scrambling across an object (i.e., examples like (23)) does not, i.e., it does create new binding possibilities.[13] On this basis, they assume that movement of one object across another is to what they call an extended A-position (i.e., a case- or theta-marked position), and it is from such positions that pronominal variables must be bound by quantifiers at LF. It follows, then, that scrambling an object past the subject should not introduce any possible

cases where pronoun binding by a quantifier is destroyed by scrambling (cf. examples in (20)), or where principle C effects are avoided by scrambling (cf. examples in (8)).

11 We will return to these data below in section 5.

12 Our judgments are shared, for instance, by Haider (1989, p.199). At present, we have no explanation for Müller and Sternefeld's dialect.

13 Since they assume that the underlying order has the direct object preceding the indirect object, their example involves what they take to be scrambling of the indirect object across the direct object. The conclusions from the facts remain identical. See note 4.

quantifier-pronoun binding since there is no extended A-position that c-commands the subject. Addressing the problem of reconstruction very briefly, they consider a WCO case with an object binder, and observe that reconstruction does not appear to take place. They find that this contrasts with the case of an object anaphor scrambled past its subject antecedent in which binding is retained. Though they leave this puzzle unsolved, Müller and Sternefeld conclude that the issue of the creation of binding must be handled independently from the issue of reconstruction, the line we will pursue in the remainder of this paper.[14]

Santorini (1990) looks at four of the six cases involving WCO, and comes to the correct descriptive conclusion that the crucial issue is the grammatical function of the binder. She accounts for these facts by proposing that a pronominal INFL can act as a binder.[15] Since this INFL is coindexed with the subject and c-commands any potential landing sites of local scrambling (which Santorini assumes to be adjunction to VP), binding by the subject cannot be "undone" as there will always be a c-commanding binder. However, as Lee and Santorini (1994) point out, taking this approach for Korean would be unappealing, since Korean has none of the rich agreement morphology which make the postulation of a pronominal INFL plausible (Lapointe 1990, Lee 1990; cf. Fukui 1986 for Japanese). On the basis of Hindi data, Jones (1993) also finds that reconstruction effects in SCO depend upon the presence of a subject binder.[16] He proposes that local scrambling is an instance of permutation without movement, but also assumes that the subject moves to the specifier of CP position at LF, a movement triggered by raising of Tense to C. This movement of the subject has an effect quite similar to Santorini's pronominal INFL, in that it assigns the subject (or subject related element) the highest structural position in the clause at the relevant level. Jones' proposal does, however, have the advantage that it could carry over more easily to languages like Korean, in which it is difficult to motivate pronominal INFL, while positing the category CP is fairly standard.

Although Santorini and Jones identify subject binding as the crucial property for reconstruction, both of their analyses predict that long scrambling should not show

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[14] Müller (1993) proposes an analysis for this case similar in spirit to that which we present in the next section.

[15] Frey (1990) provides a similar analysis; our remarks apply equally well to his analysis.

[16] He finds no reconstruction effects for WCO, a fact for which we have no explanation at present. Recall that in this paper, we do not propose an account for Hindi data.

reconstruction effects.[17] This follows since neither the INFL of an embedded clause (in Santorini's proposal) nor the embedded specifier of CP position (in Jones' proposal) will c-command the argument positions of the higher clause to allow binding to persist. However, scrambling a bound pronoun past a quantifier subject into a higher clause has no effect on the reconstruction effect, even if the matrix verb is an object-control verb or a causative, in which cases the matrix INFL (or specifier of CP) cannot be related to the embedded INFL (or specifier of CP): binding continues to hold, as shown in (31) and (32).[18]

(31) a. daß die Direktorin ***jedem Vater*** [***seine*** Tochter abzuholen] erlaubt hat
that the female-principal-NOM every father-DAT his daughter-ACC pick-up allowed has
'that the principal has allowed ***every father*** to pick up ***his*** daughter'

b daß die Direktorin [***seine*** Tochter]$_i$ ***jedem Vater*** [t$_i$ abzuholen] erlaubt hat

(32) a na-nun [***enu haksayng-eykey-na caki***-uy pwumo-lul top-key] hayssta
I-TOP every student-DAT-UQ self-GEN parent-ACC help-CE made
'I made ***every student*** help ***his*** parents.'

b. na-nun [***caki***-uy pwumo]$_i$-lul [***enu haksayng-eykey-na*** t$_i$ top-key] hayssta

We return to long scrambling in section 4.

3. β-marking and the Special Status of Subjects

The data from section~refsec:data have led us to the following conclusion: the factor which determines the possibility or impossibility for reconstruction of scrambled elements is neither an inherent property of the scrambled element itself, e.g. case or grammatical function, nor a property of the position to which the scrambling takes place, e.g. preceding or following the subject. Instead, the sole

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[17] By "long scrambling", we mean movement of an NP out of its thematic domain into the domain of a higher predicate. Thus, scrambling out of infinitival complements constitutes long scrambling. We will not address the differences between German and Korean with respect to their abilities to scramble out of tensed clauses, and we will not explicitly address the issue of "clause union" in German. Our remarks will be largely independent of the particular analysis of embedded infinitival clauses in German that is chosen, though we take our data to rule out certain of the proposed analyses.

[18] These examples also demonstrate that the embedded subjects, in these cases PRO in the German object-control construction, and the dative causee in the Korean causative construction, behave as true subjects for the purposes of the reconstruction asymmetries under discussion.

factor seems to be whether the binding relation which would be restored by the reconstruction is one in which the binding is by an element in a subject position.[19] On the face of it, this seems an exceedingly bizarre result. Traditionally, the availability of reconstruction is associated with the type of movement which is to be reconstructed, whether A or A'. Thus, in order to maintain this linkage between reconstruction and movement type, we would have to tie the availability of certain movements or landing sites to the presence of a binding relation between a subject and the element. We find this prospect extremely unattractive on theoretical grounds. In the theory, movement is often restricted on the basis of properties of the element to be moved, or on the domain from which the movement takes place. However, to our knowledge, it has never been proposed that the property of an element's being bound by another element of a certain type can impose restrictions on the types of movement available. To avoid such unattractive stipulations, we instead propose that the cases of reconstruction we have seen above are only apparent, and do not constitute true instances of syntactic reconstruction. From this perspective, scrambling is similar to A-movement in that neither allow reconstruction for WCO and SCO effects. We attribute apparent cases of reconstruction to a special property of subject binding which we state as follows:[20]

(33) **Subject Binding Generalization**: If X in subject position binds Y at some point in the derivation, then X binds Y at all levels of representation.

Now, let us consider how this subject binding generalization might be derived from the theory of binding. Consider the usual definition of binding given in (34).

(34) X **binds** Y iff X and Y are co-indexed and X c-commands Y.

Suppose that the configuration of c-command is just one of a number of ways in which the element X can serve to identify Y. We can view this as analogous to the multiple possibilities for satisfying the conditions imposed within government theory under the ECP. To guarantee that non-pronominal empty categories are properly governed, Lasnik and Saito (1984) require that they be γ-marked. Lasnik and Saito allow the assignment of the feature $[\pm \gamma]$ in one of two configurations: either under head government or antecedent government. In a similar spirit, we

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19 We leave open the question of the proper definition of subject. See Heycock (1991) for relevant discussion.

20 Thus far, we have only seen evidence for such subject binding holding in case of D-structure subjects. Examples can be constructed involving subject to subject raising of a quantified DP which show that even derived subjects exhibit the immutable binding we have seen.

will generalize the definition of binding: we require only the presence of a more general structurally defined relation, which we will call β-marking, along with co-indexation.

(35) X **binds** Y iff X and Y are co-indexed and X β-marks Y at some level of representation.

Pursuing the analogy with government theory, we must now specify the conditions under which β-marking obtains, just as we must specify the conditions under which γ-marking is possible. One case of β-marking, of course, will be just where X c-commands Y at the level at which binding relations are checked, which we will assume to be NP-structure, a level at which the dependencies formed by A-movement (including, for the moment, scrambling), but not those formed by A'-movement, obtain (cf. van Riemsdijk and Williams 1981).[21] This corresponds exactly to the cases of binding allowed under the classical definition in (34). The other context for β-marking incorporates the generalization in (33). We allow subjects to β-mark other elements which they c-command, at some levels of representation, and we will also allow such β-marking to persist across levels. Note that we must guarantee that the first, non-subject type of β-marking does not take place anywhere but NP-structure. Otherwise, since we assume that β-marking persists once it has taken place, an element which is c-commanded by its binder at DS could be β-marked by the binder at that level and henceforth be bound given the definition in (35). Thus, we would wrongly predict the grammaticality of sentences such as (36), since the pronoun *sein* would be β-marked at D-Structure by the quantified NP *jedes Kind*.

(36) * daß Maria [in ***sein*** Zimmer]$_i$ ***jedes Kind*** t_i geschickt hat
that Maria-NOM in his Room every child-ACC sent has
'that Maria has sent ***every child*** to ***his*** room.'

The conditions for β-marking are given in (37).[22]

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[21] For now, the assumption that binding relations are checked at NP-structure is made simply for the sake of concreteness. Nothing in the idea of β-marking rests on this assumption. In particular, we could define non-subject β-marking to take place at LF instead. In section~refsec:syntactic-reconstruction, we will present an empirical argument for our choice of NP-structure.

[22] One technicality involves cases with a reflexive in subject position such as (i):

(37) X **β-marks** Y iff
i. (At D-structure or NP-structure) X c-commands Y and X is a subject; or
ii. (At NP-structure) X c-commands Y

We can now apply this mechanism to the examples in the previous section. First, consider example (17), repeated below as (38), in which binding obtains between a subject and a direct object.

(38)a. * daß ***er*** [die Bilder vom ***Hans***] gekauft hat.
that he-NOM the pictures-ACC of Hans bought has
'that ***he*** has bought the pictures of ***Hans***'
b. * daß [die Bilder vom ***Hans***]$_i$ ***er*** t$_i$ gekauft hat.

In its D-Structure position, the subject pronoun *er* c-commands the co-indexed R-expression *Hans* and therefore β-marks it by (37). This yields ungrammaticality in the unscrambled version (38)a., since the β-marking results in the R-expression being bound by (35), and hence a principle C violation at the level at which binding theory is checked, NP-structure by hypothesis. Scrambling of the *NP die Bilder vom Hans* has no effect on this binding violation since once *Hans* is β-marked at D-Structure, β-marking, and hence binding, will continue to obtain at all levels. Example (7), repeated below as (39), where the binding is by the indirect object of the direct object, behaves differently.

(39) a. * daß der Jörg ***ihm*** [die Bilder vom ***Hans***] gezeigt hat.
that John-NOM him-DAT the pictures-ACC of Hans shown have

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i. * ***casin-i John-ul*** kewul-ey pichwue poassta
self-NOM John-ACC mirror reflect
'Himself saw John in the mirror'

On our account, this example is ungrammatical for two reasons. First, the reflexive is unbound yielding a principle A violation. Additionally, the R-expression em John is β-marked and hence bound by the subject reflexive, yielding a principle C violation. On the account given in the text, scrambling the R-expression past the subject will eliminate only one of these binding violations, namely that of principle A. The R-expression will have been β-marked at D-Structure since it is bound by a subject, and hence will continue to be bound at all levels of representation, yielding the principle C violation. However, such scrambling results in grammaticality as shown in (ii). The slight marginal status is due only to the awkwardness of this construction.

ii. ? *John-ul$_i$ casin-i t$_i$* kewul-ey pichwue poassta

We could account for this by restricting the possible β-marking elements to non-anaphors, though we leave this question for future work.

'that John has shown ***him*** the pictures of ***Hans***'

b. daß der Jörg [die Bilder vom ***Hans***]$_i$ ***ihm*** t_i gezeigt hat.

In the unscrambled version (39)a., the R-expression *Hans* is c-commanded by the co-indexed pronoun *ihm* at NP-structure, thereby allowing β-marking and hence binding to obtain. This results in the principle C violation. However, when the R-expression is scrambled out of the c-command domain of the co-indexed pronoun, it can no longer be β-marked: β-marking by non-subjects can take place only at NP-structure! Therefore, there is no principle C violation, and the sentence is grammatical.

While the β-marking mechanism we have proposed appears empirically adequate to cover the range of cases discussed in the previous section, there is something unsatisfying about it as a component of a principle of universal grammar. It leaves us with no clear insight about what it is about subjects that drastically alters their binding possibilities. We acknowledge the preliminary status of this investigation, and leave a deeper explanation of these facts for future work.

4. Implications for Long Scrambling

The analysis we proposed in the previous section does not in any way distinguish cases of local scrambling from those of so-called long or inter-clausal scrambling. Therefore, we expect that the two types of scrambling should behave identically. This runs counter to the analyses of Mahajan (1990) for Hindi and Saito (1991) for Japanese who argue explicitly that, while local scrambling can have an ambiguous character as movement to either an A- or A'-position, long scrambling must uniformly be to an A'-position. In this section, we will see, however, that the data for German and Korean support our position and not that of Mahajan or Saito. That is, we will see that in German and Korean, instances of long scrambling can create new binding possibilities as well as destroy old ones -- behavior typical of A- and not A'-movement. Let us turn first to the case where binding is impossible in the base order as shown in (40) and (41). The quantifier in the embedded clause does not c-command the co-indexed pronoun and hence cannot β-mark it.

(40) * daß ***seine*** Kinder [***jeden Greis*** zu pflegen] versprechen
that his children-NOM every old-man to take-care-of promise
'that ***his*** children promise to take care of ***every elder***'

(41) * na-nun ***ku***-uy pwumo-eykey [PRO ***enu haksayngina*** cal tolpokeyssta-ko]
I-TOP he-GEN parent-DAT every student well take care of-COMP
yaksokhayssta

promised
'I promised ***his*** parents that I would take care of ***every*** student.'

If, however, we scramble the quantified expression past the co-referential pronoun, the binding becomes possible, exactly as predicted on our account, since β-marking can now obtain.

(42) daß [***jeden Greis***]$_i$ ***seine*** Kinder [t_i zu pflegen] versprechen

(43) na-nun ***enu haksayngina***$_i$ ***ku***-uy pwumo-eykey [PRO t_i cal tolpokeyssta-ko] yaksokhayssta

Next, consider a case where a matrix dative object binds an accusative object in an embedded clause. This is possible in the base positions as in (44) and (45)

(44) daß die Direktorin ***jedem Vater*** [***seine*** Tochter abzuholen] versprochen hat
that the female-principal-NOM every father-DAT his daughter-ACC pick-up promised has
'that the principal has promised ***every father*** to pick up ***his*** daughter'

(45) na-nun ***enu haksayng-eykey-na*** [PRO ***ku***-uy pwumo-lul manna pokeyssta-ko]
I-TOP every student-DAT-UQ he-GEN parent-ACC meet and see-COMP
yaksokhayssta
promised
'I promised ***every*** student to meet ***his*** parents.'

Since the matrix verbs ('promise') are subject-control verbs, this binding is not by an element in subject position, and therefore the relevant β-marking must take place at NP-structure.[23] Hence, we predict that scrambling of the pronoun past the quantifier should disrupt the binding relation since the conditions necessary for β-marking will no longer obtain. This prediction is borne out as shown in the following examples.

(46) *daß die Direktorin [***seine*** Tochter]$_i$ ***jedem Vater*** [t_i abzuholen] versprochen hat

(47) *na-nun [***ku***-uy pwumo]$_i$-lul ***enu haksayng-eykey-na***
[PRO t_i manna pokeyssta-ko] yaksokhayssta

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[23] These sentences should be compared to those in~refLD-subject-bind and~refLD-subject-bind-K, in which an object-control verb (German) and a causative (Korean) are used. In particular, the German sentences form a striking minimal pair, since in the object-control case, the scrambling leads to an acceptable sentence under the desired bound-variable reading.

This last paradigm is again mysterious under a view where long scrambling is obligatorily A'-movement since such movements do not typically disturb binding relations as seen in the following:

(48) [How many pictures of ***his*** children]$_i$ does ***every father*** carry around t_i?

The examples in (44) through (47) demonstrate that the binding effects of scrambling are not determined simply on the basis of whether the scrambling has been local or long. Why, then, have many authors been led to the conclusion that this is the case? Whenever an object is scrambled across a clausal boundary, it must necessarily cross the embedded subject on its way into the higher clause. Now, if the object is bound by the subject which is crossed, it will appear to undergo reconstruction as a result of being β-marked at D-structure, and hence it will seem as though A'-movement has taken place. However, what we have shown here is that when one controls for the grammatical function of the binder, all distinctions in the effects on binding between long and local scrambling disappear.

Problems for Scrambling as A-movement

Given our proposed mechanism of β-marking, the crossover data can now be explained by postulating that all cases of scrambling are instances of A-movement, thereby assimilating the creation of binding possibilities and lack of reconstruction to that in raising constructions.[24] There are, however, problems with this proposal of both an empirical and technical nature, that have been pointed out in the literature. Let us consider these in turn.

The empirical problems concern two types of data which we have to this point ignored: parasitic gaps and anaphor binding. Parasitic gaps pose a problem since they have traditionally been analyzed as being licensed through an instance of A'-movement (Taraldsen 1981; Engdahl 1983). Yet, it is well known that scrambling licenses parasitic gaps (Felix 1985) as shown in the following example:[25]

(49) Ich habe die Artikel$_i$ [ohne e_i zu lesen] t_i weggeworfen
I have the article without to read thrown away
'I threw away the article without reading it.'

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[24] See note 3.

[25] It is difficult to detect the presence of parasitic gaps in Korean as a result of the widespread presence of null objects. We therefore focus on the German examples.

If scrambling is an instance of A-movement, then this result is rather surprising since A-movement is generally assumed not to license parasitic gaps as seen in the following English example:

(50) * That article$_i$ was filed t_i [without my having read e_i]

An example of the following type, given originally in Webelhuth (1989), makes this problem even more acute since it demonstrates that a single scrambled element can play the role of binder at the same time as licensing a parasitic gap.

(51) Ich habe [***jeden Gast***]$_i$ [ohne e_i anzuschauen] ***seinem*** Nachbarn t_i vorgestellt.
I have every guest-ACC without to look at his neighbor-DAT introduced
'I introduced ***every guest*** to his neighbor without looking at ***him***.'

One potential solution to the parasitic gap problem is to allow parasitic gaps to be licensed by elements occupying A-positions. If this is true, then the parasitic gap data including Webelhuth's example pose no difficulty at all. Of course, this must be done in such a way as to rule out (50). This has been attempted in Neeleman (1994) who argues for the even stronger claim that parasitic gaps in Dutch and German do not require any movement at all, either A or A', to be licensed.

The second empirical problem lies in cases of anaphor binding. Binding of anaphors in German is much more restricted than the binding we saw in the cases of SCO and WCO which we discussed in section~refsec:data, i.e. binding which induces principle C effects and quantifier-pronoun binding. The only instance of scrambling which allows creation of anaphor binding among argument NPs involves an anaphor in indirect object position with the direct object scrambled past:[26]

(52) Gestern habe ich die Gäste einander t_i vorgestellt
yesterday have I the guests-ACC each other-DAT introduced
'Yesterday, I introduced the guests to each other.'

Other instances of scrambling, whether local or long-distance, simply fail to create new binding between a scrambled antecedent and an anaphoric argument. Most strikingly, an anaphor in direct object base position cannot be bound by the indirect object:

(53) * Gestern habe ich den Gästen einander vorgestellt
yesterday have I the guests-DAT each other-ACC introduced
'Yesterday, I introduced the guests to each other.'

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[26] We put aside here cases of binding into adjuncts as well as picture NPs.

If scrambling is truly an instance of A-movement, this behavior is rather surprising. Santorini (1990), in the context of an A-movement account of scrambling, has provided a way of accounting for these facts by positing two restrictions which apply to anaphor binding in German. She suggests that anaphor binding in German obeys thematic and co-argument constraints on binding, which require that anaphors must be arguments of the same predicate as their antecedent and must also be lower in the thematic hierarchy. While these constraints seem to capture the data (but cf. Müller 1993), they are somewhat ad hoc. Moreover, it seems at least a bit strange that such constraints would apply in German, but not in other languages such as English, Korean, Japanese or Hindi.

In addition to these empirical problems, there also exist technical problems with the claim that both long distance and local scrambling involve A-movement. The first of these involves the definition of A-position. Chomsky (1981) defines an A-position as a potential *theta* position, yet it is not clear how to define the position to which scrambling proceeds as qualifying as a potential theta position. Even more troubling is the definition of A-chain given in Chomsky (1986) which requires that the head of an A-chain be a position to which case is assigned. As many authors have pointed out, it is to some degree implausible to claim that all instances of scrambling are movement for the purposes of case assignment (but cf. Lee 1993). Such association with case assignment in the specification of a functional projection might lead one to expect a rigid word order. Further, if an element which is scrambled long distance receives case in its final position, it becomes extremely difficult to maintain any sort of locality of case assignment, particularly in situations where case is determined by verb which assigns the thematic role to the scrambled element.

Finally, the locality conditions on NP-trace also present a problem. In the theory of Chomsky (1982), for example, NP-traces are assumed to be [+ anaphoric, – pronominal]. Therefore, restrictions on the locality domain in which they must be bound should pattern with overt anaphors. This is often used in order to explain the absence of super raising as in example (54) since in such cases the NP-trace would be unbound in its local domain, however defined, labeled bf **D** in the example.

(54) * John$_i$ is likely for [$_{\mathbf{D}}$ it to appear [t$_i$ to be sincere]]

In German, anaphors are not of the long-distance variety; the reflexive pronoun *sich*, for example, must be bound within its local domain, as seen in the following:[27]

[27] In this example, we break with our convention of indicating co-reference by boldface italics, and instead use co-subscripting.

(55) Hans$_i$ hat [seine Tochter$_j$ sich$_{*i/j}$ im Spiegel sehen] lassen
Hans has his daughter self in the mirror see let
'Hans let his daughter see *himself/herself in the mirror.'

Therefore, we expect all instances of A-movement to be similarly bounded. However, as we have seen, long distance scrambling may proceed outside of this domain, as in examples like (31).

We have run into a bit of a trouble, then. The data we considered in the previous sections suggested that scrambling that was A-movement, yet there are a number of problems with maintaining this position. In the next section, we will see our way out of this quagmire by reconsidering the implications of the data presented above.

6. Scrambling as Non-Operator A'-Movement

In interpreting our data, we have limited our conjectures for the character of the landing site for scrambling to either A- or A'-positions. If we consider the role in the theory of A and A' positions closely, though, we see that in fact two things are being conflated in this single binary distinction.[28] First, the idea of A-position is supposed to correspond to the notion of argument as in the "classical" definition of Chomsky (1981): a position to which a theta role can be assigned. The set of A'-positions, then, is just the complement of the set of A-positions, i.e., those to which theta roles cannot be assigned. The second conception of the A/A' distinction is tightly rooted in ideas associated with the level of Logical Form. A'-positions represent positions filled by elements which are to be interpreted as logical operators, e.g., quantifiers. This intuition is evidenced in the common alternative terminology for A'-position: "operator position". In this conception, A-positions are simply those which are not filled by logical operators.

A priori there is no reason to expect that these two conceptions of the A/A' distinction will coincide. Saito (1992) suggests that we should separate these two conceptions of position type by classifying positions in terms of two independent features: A versus A' and operator versus non-operator. What have been called A-positions up to now, i.e., the landing sites for raising and passive, become the class of non-operator A-positions. On the other hand, the class of classical A'-positions, i.e. the landing sites for wh-movement and quantifier raising, are now labeled operator A'-positions. Saito suggests that the landing sites for scrambling constitute a third possibility in this space, that of non-operator A'-positions.

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28 See Dobrovie-Sorin (1990) for relevant discussion.

This proposal immediately solves the technical problems raised above. The locality restrictions on the trace of scrambling can now be distinguished from those of NP-movement, since scrambling leaves behind a trace of A'-movement.[29] Moreover, this proposal allows us to maintain an intuitive definition of A-position along with a local system of case assignment, since we no longer require the landing site of scrambling to be a position to which case is assigned: it is no longer an A-position.

Let us now see how the empirical data can be addressed under this proposal. If we return to the binding facts in the SCO and WCO data, we can see that what is actually crucial is the distinction between scrambling on the one hand and classical A'-movement on the other, rather than the identification of scrambling with A-movement. Under the non-operator A' proposal, scrambling is distinguished from classical A'-movement since landing sites for scrambling are non-operator positions, whereas landing sites for wh-movement and the like are operator positions. If we now reformulate the theory of binding as constraints on non-operator binding, rather than A-binding, the SCO and WCO facts follow exactly as before, utilizing the mechanism of β-marking.

If we continue to associate the ability to license parasitic gaps with A'-movement, then our non-operator A' analysis correctly predicts that scrambling does, in fact, license parasitic gaps. Moreover, this analysis does not suffer from the problem raised by Webelhuth's paradoxical sentence involving a single scrambled NP which simultaneously licenses a parasitic gap and functions as a binder. The scrambled element licenses the parasitic gap as a result of being in an A'-position, and is able to bind since it is in a non-operator position.

The remaining empirical problem is that of anaphor binding. The introduction of two independent distinctions, A and A'-movement on the one hand and operator and non-operator movement on the other, allows us a finer-grained analysis of this problem. We can separate reconstruction behavior for crossover effects from the ability to enter into new binding relations. We will now look at several proposals that have been made to account for the German anaphor data, and will briefly discuss their merits. We need not, however, make a choice among them on theoretical grounds.

Observe first that with our proposed analysis, we could still adopt the analysis of Santorini (1990) which utilizes the thematic and co-argument constraints mentioned above: scrambling of the direct object across an indirect object anaphor will create new binding since the scrambled element can non-operator bind the

[29] We leave open the important task of clarifying the typology of empty categories in this system.

anaphor, and this is the type of binding we have just suggested to be relevant for the binding theory.

Another analysis of these data is presented by Müller and Sternefeld (1994) and Müller (1993). They argue that the German anaphor data demonstrate that the base order of a German sentence is subject-DO-IO and that scrambling is uniformly A'-movement. Scrambling can never create new anaphor binding. Thus, example (52) is reanalyzed as the base configuration, hence binding is expected, while example (53), which is taken to involve A' scrambling is unproblematically ruled out. We could integrate Müller and Sternefeld's analysis of these data into our current framework as follows: First, we follow them in assuming the base order to be subject-DO-IO.[30] Then, we slightly modify our revision of the binding theory to require that anaphors be A-bound, in contrast to quantifier-pronoun binding which requires non-operator binding. Thus, for anaphor binding, the relevant property of scrambling is its A' status, rather than its non-operator status, and Müller and Sternefeld's analysis applies: scrambling can introduce no new anaphor binding possibilities.

Anaphor binding in Korean (Lee 1990b), Japanese (Saito 1992) and Hindi (Mahajan 1990) behaves quite differently from that of German, though, in that scrambling can create new anaphor binding possibilities. In particular, nominative anaphors in these languages can be bound by direct objects scrambled past them.

(56)a ***Chelswu-lul casin-i*** t_i miwuehanta (Korean)
Chelswu-ACC self-NOM hates
'***Chelswu*** hates ***himself***.'
b. ***Karera-o*** [***otagai-no*** sensei]-ga t_i hihansita (Japanese)
They-ACC each other-GEN teacher-NOM criticized
'***Each other's*** teachers criticized ***them***.'
c. ***mohan-ko***$_i$ [***apne*** baccoN]-nej ghar se t_j t_i nikaal diyaa (Hindi)
Mohan-ACC self-GEN children-NOM house from throw give-perf
'***Self's*** children threw ***Mohan*** out of the house.'

To account for this difference, we postulate that there is parametric variation in principle A of the binding theory: certain languages, like Korean, Japanese and Hindi, require that anaphors be non-operator bound, while others, like German, require that anaphors be A-bound. Our revision of the binding theory, then, looks as follows:[31]

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[30] See note 4.

[31] We leave aside the problem of defining the appropriate binding domains.

(57)a. Principle A (German): Anaphors must be A-bound in their binding domain.

Principle A (Korean): Anaphors must be non-operator bound in their binding domain.

Principle B: Pronouns must be non-operator free in their binding domain.

Principle C: R-expressions must be non-operator free.

Note that the parametric variation we see here in principle A appears impossible under the formulation of Müller and Sternefeld, and hence the data from languages which possess the Korean value of this parameter would remain unexplained under their analysis. A third way of dealing with the anaphor data is suggested by Saito (1992). Following Tada (1990), he assumes that non-operator A'-positions are not well-formed at LF: they are reanalyzed as either an operator or an A-position, or else disappear because the scrambled element returns to its base position. Saito allows for the creation of new anaphor binding possibilities as in example (56) by assuming that the scrambled position is reanalyzed at LF as an A-position, which can bind the anaphor and satisfy principle A. In order to analyze the German anaphor data, where new binding is not created through scrambling, it would appear that Saito would have to parameterize the list of reanalysis possibilities at LF, since in the current system such positions may always be reanalyzed as A-positions, so long as the scrambling has been local. Notice that our analysis predicts that long-distance scrambling creates new binding of anaphors. This prediction is indeed borne out as evidenced by the following Korean example:

(58)a. * [***caki***-uy tongsayng]-i [motwu-ka ***Chelswu***-lul silehanta-ko] sayngkakhanta

self-GEN brother-NOM everyone-NOM Chelswu-ACC dislike-COMP think

b. ***Chelswusub***$_i$-lul [***caki***-uy tongsayng]-i [motwu-ka t_i silehanta-ko] sayngkakhanta

Chelswu-ACC self-GEN brother-NOM everyone-NOM dislike-COMP think

'***Self's*** brother thinks that everyone dislikes ***Chelswu***.'

This runs contrary to the analysis presented in Saito (1992) where long-distance scrambled expressions will be unable to bind anaphors since they cannot be reanalyzed as A-positions at LF and thus cannot satisfy Principle A at that level. For Saito, this is a welcome conclusion since he takes his data to indicate that such binding is unavailable. However, our data from Korean seems to suggest otherwise.

In addition, Saito acknowledges that certain Japanese speakers also allow such binding of anaphors by long-distance scrambled elements.[32]

7. Scrambling and Reconstructions

Semantic Reconstruction

In the previous section, we examined Saito's proposal that scrambling moved to a non-operator A'-position and saw how this addressed certain empirical problems. In this section, we return to the question of reconstruction, in particular, what we mean by the term "reconstruction" and what grammatical processes are sensitive to it.

Saito (1989, 1992) suggests that scrambling is a semantically vacuous movement. This is represented in his proposal, which we have adopted here, that scrambling is movement to a non-operator A'-position, since these positions do not have logical content as a result of their non-operator status. If they are semantically empty, they ought not to be licit at the level of Logical Form, assuming something like Full Interpretation to hold. As briefly mentioned in the last section, Saito (1992) deals with this by allowing these non-operator A'-positions to change their status to either true operator positions or A-position, positions which are semantically contentful, or alternatively to disappear entirely, with the scrambled element element reverting to its pre-scrambling position.

The metamorphosis of positions at LF which Saito allows and crucially exploits does not seem to us to be particularly well motivated. The possibility of such metamorphosis runs into the same difficulties that we saw in the analyses of Mahajan and Webelhuth; namely, there is no principled way to prevent any of the options from applying when the movement is clause local, and therefore all instances of local scrambling should be able to behave like either of A- or A'-movement. The mechanism of β-marking which we have proposed obviates the need for this metamorphosis since "reconstruction" effects for the purpose of establishing binding of scrambled elements are handled by β-marking.

In contrast, a view in which em all such non-operator A'-positions should disappear at LF seems to us to have much intuitive appeal (cf. Chomsky 1995, p. 323). We propose that all elements in non-operator positions must reconstruct to their base positions at LF. As a consequence, we predict that all elements which undergo non-operator movement in the overt syntax will behave with respect to

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[32] See footnote 8 of Saito (1992). Note also that Saito's data for his dialect of Japanese present a problem for our analysis.

semantic processes as though they were in their base positions.[33] This prediction is borne out in data involving quantifier scope, wh-scope marking in Korean and Japanese, and the scope of multiple wh-questions in English and German. We will examine these three cases in turn.

It has often been observed that A-movement allows reconstruction in sentences like the following:

(59) A unicorn$_i$ seems t_i to be in the garden

The subject NP *a unicorn* may take scope over the predicate em seems, in which case we get the so-called 'specific' reading, or alternatively may take scope within it, in which case we get the non-specific reading, a reading which is obligatory when an expletive associate construction is used instead:

(60) There seems to be a unicorn in the garden.

If A-movement truly disallows reconstruction as we argued in the cases of WCO and SCO, then this is rather mysterious. However, given the fairly standard assumption that quantifier scopes are determined at LF, the mystery disappears: the NP which is raised to a non-operator position at S-structure reconstructs at LF, at which point it can optionally undergo QR to take scope over the matrix predicate or remain within its scope.

A similar case is discussed by Aoun and Li (1991). They observe that scope ambiguities between an existential subject and a universal object persist even if the subject is raised out of its clause. That is to say, to the degree that (61)a. and (61)b. are ambiguous, so to is (61)c.[34]

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[33] This runs contrary to Hornstein's (1994) analysis of antecedent contained deletion. In this analysis, circularity is avoided through raising of the object to the specifier of Agr_0, an operation we assume to be non-operator movement. However, see Kennedy (1995) for arguments against Hornstein's analysis.

[34] Chomsky (1995, ch.4) discusses a related paradigm, but comes to divergent conclusions, namely that reconstruction is impossible in cases of A-movement. His examples are the following:

(i) (it seems that) everyone isn't there yet
(ii) I expected [everyone not to be there yet]
(iii) everyone seems [t not to be there yet]

He points out that while the universal may have either wide or narrow scope with respect to the negation in (i), it may only have wide scope in (iii). He suggests that this would imply that reconstruction of *everyone* to the position of the trace in (iii) is blocked, if there is ambiguity in examples like (ii), where the subject remains in its position in the infinitival

(61)a. Someone loves everyone.
b. I expected [someone to love everyone]
c. Someone seems to love everyone.

Aoun and Li also note that this case contrasts with that in which the subject undergoes wh-movement after raising. Here, the subject is not able to take scope below the universal:

(62) Who seems to love everyone?

This pattern is directly explained under the assumption that instances of non-operator movement, e.g., raising, may be reconstructed to their base positions at LF, while operator movement, e.g., wh-movement, may not. The scope of the subject in (62) is therefore "trapped" upstairs.[35]

We turn next to wh-scope marking. As Saito (1992) points out for Japanese and Kim (1989) points out for Korean, the scope of a wh-element is indicated by the presence of a Q-morpheme on the verb of the clause in which it takes scope. It is usually assumed that at LF, a process of LF wh-movement applies which moves the wh-elements to the position of these Q-morphemes. If the wh-element is scrambled out of the clause containing its corresponding Q-morpheme in the syntax, one might expect that it would be impossible to perform LF wh-lowering, and hence that such examples would be ungrammatical. This is, however, contrary to fact as shown in the Korean example (63)

(63) nwukwu-lul$_i$ Chelswu-nun [Younghee-ka t$_i$ coaha-nunci] mwulessta
who-ACC Chelswu-TOP Younghee-NOM like-Q asked
'Chelswu asked who Younghee likes.'

On the non-operator A' account, this is not surprising since scrambling proceeds to a non-operator position which reconstructs at LF. From the base position, the wh-element is of course free to proceed with LF wh-movement to the location of the Q-morpheme.[36]

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complement clause. Though we agree with the line of argument, we disagree on the facts. Our judgments tell us that (ii) allows only the wide scope reading for the universal. Thus, the lack of ambiguity in (iii) tells us little about whether or not the subject can reconstruct.

35 This also provides a potential argument for pre-LF wh-movement in subject questions.

36 For an alternative view that wh-phrases are quantifiers, hence need not move to the location of the Q-morpheme, see Kim (1989). This alternative view, however, does not affect the substance of the argument given here.

Certain English multiple wh-questions exhibit pair interpretations where an answer requires values for both *wh*-elements. So, in examples (64) below, both question words must be answered.

(64)a. Who$_i$ [t$_i$ bought what]?

b. Who$_i$ [t$_i$ saw [John buy what]]?

We represent this by saying that both *wh*-words have matrix scope. Thus, at LF, the embedded element *what* must move to a position in which it can have matrix clausal scope, presumably the same specifier of CP position occupied by *who*. In contrast, in questions such (65), only the *wh*-word *who* may be answered.

(65) Who$_i$ [t$_i$ knows [what$_j$ [John bought t$_j$]]]?

What, having been *wh*-moved at S-structure, takes scope over the subordinate clause, and therefore may not be answered. This can easily be explained if we adapt the proposal in Aoun et al. (1981). We suggest that what Aoun et al. call *Wh*-R, i.e., LF *wh*-movement, affects only *wh*-phrases in non-operator positions. It is not clear what the semantic import would be of raising an operator to another operator position at LF. Thus, in (65), *what* is in an operator A'-position at S-structure, and therefore does not reconstruct at LF, so that LF *wh*-movement cannot apply. This analysis predicts that scrambled elements should still be capable of LF *wh*-movement, since, being in a non-operator A'-position, they can be reconstructed at LF to an A-position, and be subsequently raised. This prediction appears to us to be correct. First, we observe along with Geilfuss (1991) that *wh*-elements can indeed scramble:[37]

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[37] This runs against the claims of Engel (1972), Lenerz (1977), Grewendorf and Sternefeld (1990), Webelhuth (1989), Fanselow (1990) and Müller and Sternefeld (1994). We suspect that the reason for this divergence in acceptability judgments has to do with the information structure requirements imposed upon elements in the Mittelfeld. Loosely speaking, elements at the right of the Mittelfeld must be more rhematic than elements which appear at the left. This yields a certain degree of oddness when *wh*-elements are scrambled as they are inherently highly rhematic. A possible situation for example (66) would be one in which the speaker was asking for a group of people who they gave what, iterating over each member of the group: "And peter, who did he give what? And what about mischa, who did HE give what?"

A related point is that even among the authors who deny the possibility of scrambling of *wh*-elements, it has been observed that changing the element which does not scramble into a *wh*-element improves acceptability (cf. Müller 1993):

(66) Wem$_i$ hat was$_j$ der Mischa t$_i$ t$_j$ gegeben?
whom-DAT has what-ACC Mischa-NOM given
'To whom did Mischa give what?'

Here, *was*, the direct object, has scrambled past the subject *der Mischa*. As predicted, we still obtain the pair reading. Identical effects also obtain in cases of *wh*-phrases which undergo long distance scrambling.

7.2. Syntactic Reconstruction

Note that the LF reconstruction of elements in non-operator positions we have been discussing here must be distinguished from the intuitive notion of reconstruction which we discussed in section 1. This latter notion dealt only with an element behaving as though it were in its base position for the purposes of syntactic binding, and not for semantic processes such as determination of scope. Let us suppose then that there is another form of reconstruction, syntactic reconstruction, which applies only to elements in operator positions. This results in a level of representation which is in essential respects like NP-structure of van Riemsdijk and Williams (1981): a level at which the results of non-operator, but not operator, movements are preserved.[38] We propose that it is at this level of representation that binding relations are assessed. Thus, only elements in operator positions at S-structure may reconstruct for the purpose of binding, while elements which are moved to non-operator positions reconstruct only for the purpose of semantic interpretation.

This proposal makes two quite clear predictions. First of all, any binding relations which obtain in the base configuration will be lost if they are disturbed by non-operator movement, leaving aside the effects of β-marking. We have seen instances of this in the scrambling data, as well as in examples (4) and (5). Another

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(i) Wem hat was$_i$ wer ti gegeben?
whom-DAT has what-ACC who-NOM given
Who gave what to whom?

This is explicable in terms of information status since it is much easier for two *wh*-elements to be comparably rhematic. Similarly, acceptability improves if the scrambled *wh*-element is D-linked.

[38] This is somewhat different from the original NP-structure proposal in which it formed a level intermediate between D-structure and S-structure, and was a component of a model of grammar which lacked LF, a level which we employ.

case arises when a reflexive is raised past its binder. In this situation, we see that binding of the reflexive via its base position is not possible:[39]

(67) * I expect [***himself*** to seem to John [*t* to be intelligent]]

A second prediction is that if two elements are in non-operator positions and are in the structural configuration appropriate for a binding relation, then binding must obtain. Apart from the scrambling data, a supporting case has already been cited in example (6). A similar case is mentioned by Chomsky (1995, ch. 4):

(68) * ***John*** expected him to seem to me [*t* to be intelligent]

Here, coreference between *John* and ***him*** is impossible, since they are too close to one another, a principle B effect. Chomsky notes that if the pronoun were able to reconstruct to its base position in the lower clause, this effect would be eliminated, assuming that *John* lies outside of the binding domain of the lower subject position.

The recognition of these two distinct reconstruction processes allows us to account for a striking contrast between topicalization and scrambling in German. Webelhuth and den Besten (1987) argue that prior to VP topicalization in German, an argument may scramble out to the Mittelfeld. The so-called remnant VP may then topicalize, yielding a fully grammatical sentence.

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39 There are a number of apparent counterexamples to our prediction. One involves sentences of the following type, discussed by Barss (1986):

(i) Those pictures of himself seem to John to be the most beautiful of all.

Here, in contrast to (67), the raised reflexive does appear to be able to be bound by an antecedent which c-commands only the base position. Though we have no explanation for this fact, we suspect that this binding possibility has little to do with reconstruction of the non-operator dependency and much to do with the ill-understood binding properties of the "picture-NP" construction. Note, for example, that it also appears to be possible to obtain a bound variable interpretation for a pronoun embedded within a complex NP, even when the quantifier is not in a c-commanding position (examples (ii) through (iv) are from Reinhart 1995, (v) is from Aoun and Sportiche 1983, the judgments are theirs):

(ii) A copy of his speech was placed in front of every speaker.
(iii) ? A friend of his mother praised every speaker.
(iv) ? Someone paid by his mother praised every speaker.
(v) Good books from his family could be sent to every prisoner.

We suspect that whatever phenomenon is at work here is also responsible for the fact that example (5)b. is not fully ill-formed.

(69) [PRO t_i zu reparieren]$_j$ habe ich das Fahrrad, der Helga t_j versprochen
to repair have I-NOM the bicycle-ACC Helga-DAT promised
'I promised Helga to repair the bicycle.'

The apparent problem with this structure lies in the fact that the trace of *das Fahrrad* is unbound since its antecedent does not c-command it. Such antecedent-trace configurations are typically ruled out in some fashion, so as to prevent move-alpha from producing instances of lowering. However, if the remnant VP scrambles rather than topicalizes, the result is quite bad as the following example shows.

(70) * Gestern habe ich [PRO t_i zu reparieren]$_j$ das Fahrrad$_i$ der Helga t_j versprochen
Yesterday have I-NOM to repair the bicycle-ACC Helga-DAT promised
'I promised Helga to repair the bicycle.'

In this structure, the trace of *das Fahrrad* is also unbound. Yet, here this results in ungrammaticality while for some reason it did not in the topicalization case. Note that there is nothing wrong with scrambling of VPs generally:

(71) Gestern habe ich [PRO das Fahrrad zu reparieren]$_j$ der Helga t_j versprochen

The reader will no doubt guess that we propose to reduce the difference between these two cases to a difference in the character of the position to which the remnant VP is moved. In the topicalization case, we claim that this is movement to an operator A'-position, while in the scrambling case, to a non-operator A'-position. According to the analysis of reconstruction we have just sketched, topicalization, but not the scrambling will reconstruct at NP-structure. Since, by hypothesis, it is at NP-structure that binding relations are checked, including those of empty categories, we correctly predict that remnant topicalization will not yield ungrammaticality as a result of an unbound trace, whereas remnant scrambling will.[40]

Note that our assumption that there are two distinct levels of representation for determining of scope (LF) and for assessing binding relations (NP-structure) renders our analysis incompatible with the minimalist framework sketched in Chomsky (1995), in which there is only a single level of representation relevant to interpretation, LF. If both our analysis and the minimalist endeavor to eliminate all but interface levels are on the right track, our arguments here can be understood as

[40] See Müller (1993) and Grewendorf and Sabel (1994) for alternative analyses of the remnant topicalization/scrambling distinction.

providing empirical motivation for an additional interpretive interface level, dealing specifically with anaphoric dependencies.

Appendix: Cross-linguistic Variation

Bresnan (1995) investigates weak crossover in a large number of languages, namely Palauan, Malayalam, German, Korean, Chichewa, Kiswahili, Hindi, and English. She finds variability in behavior that calls for parameterization, an issue we have not addressed in this paper (in which we have explicitly restricted our attention to German and Korean, where the phenomena appear to behave identically). Bresnan identifies different prominence relations which affect pronominal binding, namely linear precedence, syntactic rank, and thematic prominence. Different languages are parameterized with respect to how the constraints derived from these relations interact to affect WCO (and SCO) binding. For example, German and Korean are affected by the disjunct of linear precedence and syntactic rank constraints. That is to say, an element alpha may bind an element β if alpha either precedes β or outranks it on a hierarchy of grammatical relations. This formulation recalls our disjunctive definition of β-marking, and we speculate that the parametric variation explored by Bresnan can be expressed in our framework in terms of different definitions of β-marking for different languages. We leave this issue for future work.

As formulated, Bresnan's analysis for German and Korean does not account for the asymmetry between subjects and objects with respect to persistence of binding. In fact, Bresnan assumes a different set of acceptability judgments from those we have presented here, citing Choi (1995) for Korean, who argues that no such asymmetry exists. She does nonetheless consider the pattern of judgments we present in this paper, and suggests that cumulating prominence on all three scales - linear precedence, syntactic rank, and thematic prominence - will yield the desired result. However, the cumulative approach fails to account for cases in which an object binder precedes and binds a subject bindee. Under this analysis, we expect instead that only the subject should bind the object (and not vice versa), since it outranks it both in syntactic rank and in thematic prominence, violating only the single constraint of precedence. We conclude that the observed subject/object asymmetries must be (descriptively) accounted for by specifically mentioning the subject as a privileged grammatical function.

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