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REMARKS ON BECK'S EFFECTS:  
LINEARITY IN SYNTAX  
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Investigating similar sets of data, exemplified in (1) and (2), Beck and Kim (1997; hereafter B&K) and Tanaka (1997; hereafter T) arrive at different conclusions.<sup>1</sup> (1a), which has a subject negative polarity item (NPI) and an object *wh*-phrase in situ, is ungrammatical, but its scrambled counterpart (1b) is grammatical. The same contrast exists in Korean, as shown in (2). The judgments on the Korean examples in (2) are B&K's.

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<sup>1</sup> T's analysis is based on a construction different from the one in (1). The examples in (1) are cited here to show the parallel between Japanese and Korean.

- (1) *Japanese*
- a. ?\*Dare-mo nani-o kawa-nakatta-no?  
anybody what-ACC buy-NEG.PAST-Q
- b. Nani-o<sub>i</sub> dare-mo t<sub>i</sub> kawa-nakatta-no?  
what-ACC<sub>i</sub> anybody t<sub>i</sub> buy-NEG.PAST-Q  
'Q nobody buys what?'
- (2) *Korean*
- a. \*Amuto mues-ul sachi-anh-ass-ni?  
anybody what-ACC buy-NEG.PAST-Q
- b. Mues-ul<sub>i</sub> amuto t<sub>i</sub> sachi-anh-ass-ni?  
what-ACC<sub>i</sub> anybody t<sub>i</sub> buy-NEG.PAST-Q  
'Q nobody bought what?'

After summarizing the two accounts of the contrast, I demonstrate that T's analysis is empirically superior to B&K's. I further show that T's S-Structure condition can be reduced to a condition on semantic representation Sem, if it is assumed, contra Saito (1992), that scrambling cannot be undone. This conforms to the elimination of traditional levels of representation in Chomsky 2001a.

### 1 Beck and Kim's (1997) Negation-Induced Barrier

Since B&K assume that local scrambling cannot be undone at LF, their analysis can capture the contrast in question at LF. B&K's analysis consists of the two statements in (3).

- (3) a. *Negation-induced barrier (NIB)*  
The first node that dominates a negative quantifier, its restriction, and its nuclear scope is an NIB.
- b. *Minimal Negative Structure Constraint (MNSC)*  
If an LF trace  $\beta$  is dominated by an NIB  $\alpha$ , then the binder of  $\beta$  must also be dominated by  $\alpha$ .

(4) is a schematic representation of (1a) and (2a). The NIB is italicized. (4) assumes that the *wh*-phrase undergoes movement at LF. Here and in (5), the trace created by LF movement is superscripted with *LF*.

- (4) \*<sub>[NIB anybody [t<sub>i</sub><sup>LF</sup> buy]-NEG]-PAST-Q-[what-ACC]<sub>i</sub></sub>

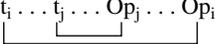
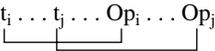
The trace of the *wh*-phrase, but not the *wh*-phrase itself, is dominated by the NIB in violation of the MNSC. For B&K, (1b) and (2b) have the structure in (5) at LF.

- (5) [t<sub>i</sub><sup>LF</sup> <sub>[NIB anybody t<sub>i</sub> buy-NEG]-PAST-Q]-[what-ACC]<sub>i</sub></sub>

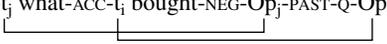
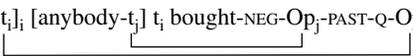
Given the added assumption that the NIB is not a barrier in overt syntax, t<sub>i</sub> in (5) is free from the MNSC. Since t<sub>i</sub><sup>LF</sup> is not dominated by the NIB, the MNSC is trivially satisfied in (5).

## 2 Tanaka's (1997) Linear Crossing Constraint

T's analysis of the contrast in (1)–(2) appeals to the Linear Crossing Constraint (LCC) on  $\bar{A}$ -dependencies: nesting  $\bar{A}$ -dependencies (6a) are permissible, but crossing  $\bar{A}$ -dependencies (6b) are not.

- (6) a.  $t_i \dots t_j \dots Op_j \dots Op_i$   
  
 b.  $?*t_i \dots t_j \dots Op_i \dots Op_j$   


Assuming that NPIs and *wh*-phrases in situ undergo invisible operator movement (see Watanabe 1992) to Spec,NegP and Spec,CP, respectively, (1a–b) have the structures in (7a–b), respectively.

- (7) a.  $?*\text{anybody-}t_j \text{ what-ACC-}t_i \text{ bought-NEG-}Op_j \text{-PAST-Q-}Op_i$   
  
 b.  $[\text{what-ACC-}t_i]_i [\text{anybody-}t_j]_j t_i \text{ bought-NEG-}Op_j \text{-PAST-Q-}Op_i$   


While (7a) is ruled out by the LCC, (7b) is correctly predicted to be grammatical.

## 3 Scrambled Quantificational Expressions

Other things being equal, B&K's analysis is more attractive than T's, since B&K do not appeal to linearity. Perhaps for this reason, B&K's analysis is adopted in modified forms in the recent literature (e.g., Hagstrom 1998, Pesetsky 2000),<sup>2</sup> and the contrasts in (1)–(2) (and some others reported in Beck 1996) have come to be known as *Beck's* (intervention) *effects*.<sup>3</sup> However, to the extent that the two analyses make different predictions, the choice between them must be made on empirical grounds.<sup>4</sup> In the remainder of this squib, I show that T's approach is empirically superior to B&K's and hence should be maintained. I will use Japanese data, but the same point can be made using Korean data (for which, see Sohn 1994). Let us consider (8). The lower clause of (8a) has a *wh*-phrase and a Q-marker, and the matrix clause has an NPI and a negation. The *wh*-phrase is scrambled

<sup>2</sup> Hagstrom (1998) proposes that the Q-marker, *ka*, moves out of a *wh*-phrase in Japanese *wh*-questions, a variant of Watanabe's (1992) proposal. Pesetsky (2000) proposes that *wh*-phrases in Japanese undergo feature movement. Both of these proposals encounter the same empirical difficulties as B&K's.

<sup>3</sup> The contrast is reported in earlier work: Hoji 1985, Sohn 1994, and Takahashi 1990.

<sup>4</sup> B&K's analysis also complicates the theory of grammar, as will become clear shortly.

across the NPI in (8b), resulting in ungrammaticality. The NIB is italicized in these examples.<sup>5</sup>

- (8) a. *Dare-mo* [*John-ga nani-o katta-ka*]  
 anybody [John-NOM what-ACC bought-Q]  
*sira-nakatta.*  
 know-NEG.PAST
- b. ?\**Nani-o<sub>i</sub> dare-mo* [*John-ga t<sub>i</sub> katta-ka*]  
 what-ACC<sub>i</sub> anybody [John-NOM t<sub>i</sub> bought-Q]  
*sira-nakatta.*  
 know-NEG.PAST  
 ‘Nobody knew Q John bought what.’

Since both the *wh*-phrase and its scope position (the specifier of Q-Comp) are dominated by the NIB, (8a) is correctly expected to be grammatical in B&K’s analysis. While B&K assume that local scrambling, as in (2), cannot be undone at LF, they also assume, with Saito (1992), that a *wh*-phrase scrambled out of the domain of its scope marker must be undone at LF.<sup>6</sup> Given this assumption, (8b) is identical

<sup>5</sup> B&K discuss the Korean example that corresponds to (8b), assuming it to be grammatical (see their (65)). However, Sohn observes the contrast in (i), which is parallel to the contrast in (8), assuming (ib) to be ungrammatical (see Sohn’s (11)).

- (i) a. *Amuto* [*John-i mues-ul sa-ss-nunchi*] *mutchi*  
 anybody [John-NOM what-ACC buy-PAST-Q] ask  
*anh-ass-ta.*  
 NEG-PAST-DECL
- b. \**Mues-ul<sub>i</sub> amuto* [*John-i t<sub>i</sub> sa-ss-nunchi*] *mutchi*  
 what-ACC<sub>i</sub> anybody [John-NOM t<sub>i</sub> buy-PAST-Q] ask  
*anh-ass-ta.*  
 NEG-PAST-DECL  
 ‘Nobody asked what John bought.’

B&K do not discuss examples like (ia). T provides examples like (i)/(8), where the sentence structurally parallel to (8b), T’s (79), is assumed to be ungrammatical, a judgment with which three native Japanese informants whom I recently consulted also agree. One of the *LI* reviewers finds (8b) grammatical (in his or her second review) if read with a proper intonation, but does agree on the contrast between (10b) and (10c), to be discussed below.

(8b) is less grammatical than (ii), which minimally departs from (8b) in not having an NPI in matrix subject position. (ii) is a little awkward because the *wh*-phrase scrambles out of the domain of the Q-marker.

- (ii) ?*Nani-o<sub>i</sub> Mary-ga* [*John-ga t<sub>i</sub> katta-ka*] *sira-nakatta.*  
 what-ACC<sub>i</sub> Mary-NOM [John-NOM t<sub>i</sub> bought-Q] know-NEG.PAST  
 ‘Mary didn’t know Q John bought what.’

<sup>6</sup> These assumptions are compatible with Saito’s (1992) conclusion that scrambling of a *wh*-phrase out of the domain of a Q-marker must be undone. Since local scrambling cannot move a phrase out of the domain of a Q-marker, it is not possible to conclude that local scrambling must also be undone. However, if it is indeed true that local scrambling, unlike long-distance scrambling, cannot be undone, the question obviously arises why this is so. The question is beyond the scope of this squib. In section 5, I propose that scrambling, be it local or long-distance, cannot be undone.

to (8a) at LF. Thus, the two examples in (8) should have the same grammatical status.

The LCC correctly distinguishes (8a) from (8b). Under T's analysis, the examples have the following structures:

- (9) a. [anybody  $t_i$ ] [John-NOM [what-ACC  $t_j$ ] bought-Q-Op<sub>j</sub>] know-NEG-Op<sub>i</sub>  
 b. ?\*[what-ACC  $t_j$ ] [anybody  $t_i$ ] [John-NOM  $t_j$  bought-Q-Op<sub>j</sub>] know-NEG-Op<sub>i</sub>

There is, however, a disagreement on the status of (8b). B&K in fact assume that the Korean sentence corresponding to (8b) is grammatical (the judgment is questionable, though; see footnote 5). For the sake of discussion, let us suppose that (8b) is indeed grammatical. If so, (8b) is evidence for B&K's analysis. However, their analysis of (8b) is paradoxical. Although the MNSC prevents a *wh*-phrase from moving out of an NIB, a scrambled *wh*-phrase can move back inside the NIB; if it cannot, then (8b), which B&K assume to be grammatical, is predicted to be ungrammatical. One way to avoid such a paradox is to assume that the MNSC is a condition on LF representations. Then LF undoing of scrambling, part of a derivational process, is free from the NIB, because the MNSC is not a derivational condition. This solution would create a new problem, however: if the MNSC is a condition on LF representations, then traces of scrambled phrases in examples like (1b) and (2b) violate the MNSC at LF unless traces created in overt syntax can be distinguished from those created at LF, presumably with superscripted LF, as B&K propose. However, introducing such a mechanism nontrivially complicates the theory of syntax.

#### 4 Multiple Scrambling

(8) illustrates an empirical difference between B&K's analysis and T's. The two analyses make different predictions when a *wh*-phrase or an NPI is scrambled out of its scope marker. Consider (10). (10a) contains a *wh*-phrase and a Q-Comp in its lower clause, which also contains an NPI and a negative head. (10b) and (10c) are scrambled counterparts of (10a). As shown, the LCC correctly predicts the actual grammaticality judgments.<sup>7</sup> The NIB is italicized in (10).

- (10) a. John-ga [Mary-ga [dare-ni  $t_j$ ] [*nani-mo*  $t_i$ ] *watasa-nai*-Op<sub>i</sub>-ka-Op<sub>j</sub>] siritagatteiru.  
 John-NOM [Mary-NOM [who-DAT  $t_j$ ] [*anything*  $t_i$ ] pass-NEG-Op<sub>i</sub>-Q-Op<sub>j</sub>] want.to.know  
 'John wants to know Q Mary does not pass anything to whom?'

<sup>7</sup> T's LCC is defined in terms of operators and their traces. Since scrambling does not involve operator movement, it is not subject to the LCC.

- b. ?[Dare-ni  $t_j$ ] [nani-mo  $t_i$ ] John-ga [Mary-ga  $t_j t_i$  *watasa-nai-Op<sub>i</sub>-ka-Op<sub>j</sub>*] siritagatteiru.  
 [who-DAT  $t_j$ ] [anything  $t_i$ ] John-NOM [Mary-NOM  $t_j t_i$  pass-NEG-Op<sub>i</sub>-Q-Op<sub>j</sub>] want.to.know
- c. ?\*[Nani-mo  $t_i$ ] [dare-ni  $t_j$ ] John-ga [Mary-ga  $t_j t_i$  *watasa-nai-Op<sub>i</sub>-ka-Op<sub>j</sub>*] siritagatteiru.  
 [anything  $t_i$ ] [who-DAT  $t_j$ ] John-NOM [Mary-NOM  $t_j t_i$  pass-NEG-Op<sub>i</sub>-Q-Op<sub>j</sub>] want.to.know

B&K's analysis predicts that (10a) is grammatical. Their analysis, which forces radical reconstruction of the scrambled phrases, also predicts (10b) to be grammatical (apart from mild awkwardness resulting from scrambling of quantificational phrases out of their scope marker). After reconstruction at LF, (10b) and (10a) are identical and hence should be equally grammatical. The problem with B&K's analysis arises with (10c). Since the *wh*-phrase and the NPI scramble out of the domain of their scope markers, they have to radically reconstruct (be undone) to the embedded clause, just like the scrambled phrases in (10b). However, when they move back to the embedded clause, (10c) is identical to (10a). Hence, under B&K's analysis, (10c) must be as grammatical as (10a) and (10b), a false prediction.

It is not difficult to construct other examples that point to the same conclusion. For instance, consider (11a), in which a *wh*-phrase, an NPI, and a Q-Comp are in the complement clause, but the negative head is in the matrix clause. (11a) is severely ungrammatical for reasons discussed in Tanaka 1998. The ungrammatical (11b) is derived from (11a) by scrambling both the NPI and the *wh*-phrase. In the initial position of this sentence, the *wh*-phrase precedes the NPI; nevertheless, the sentence is ungrammatical. In (11c), the scrambled NPI precedes the *wh*-phrase. The NPI in (11b–c) does not have to be reconstructed (undone) to the lower clause, since the negative head is in the matrix clause. However, the scrambled *wh*-phrase must be reconstructed, since the negative head is in the complement clause. Hence, according to B&K's analysis, (11b) and (11c) are identical at LF. Thus, their analysis predicts that the two sentences should be judged alike.

- (11) a. \*John-ga [Mary-ga [dare-ni  $t_j$ ] [nani-mo  $t_i$ ] *watasita-ka-Op<sub>j</sub>*] siritagara-nai-Op<sub>i</sub>  
 John-NOM [Mary-NOM [who-DAT  $t_j$ ] [anything  $t_i$ ] passed-Q-Op<sub>j</sub>] want.to.know-NEG-Op<sub>i</sub>
- ‘John does not want to know Q Mary passed anything to whom?’
- b. ?\*[Dare-ni  $t_j$ ] [nani-mo  $t_i$ ] John-ga [Mary-ga  $t_j t_i$  *watasita-ka-Op<sub>j</sub>*] siritagara-nai-Op<sub>i</sub>  
 [who-DAT  $t_j$ ] [anything  $t_i$ ] John-NOM [Mary-NOM  $t_j t_i$  passed-Q-Op<sub>j</sub>] want.to.know-NEG-Op<sub>i</sub>
- c. ?[Nani-mo  $t_i$ ] [dare-ni  $t_j$ ] John-ga [Mary-ga  $t_j t_i$  *watasita-ka-Op<sub>j</sub>*] siritagara-nai-Op<sub>i</sub>  
 [anything  $t_i$ ] [who-DAT  $t_j$ ] John-NOM [Mary-NOM  $t_j t_i$  passed-Q-Op<sub>j</sub>] want.to.know-NEG-Op<sub>i</sub>

The contrast between (11b) and (11c) therefore constitutes a problem for B&K's analysis. However, the LCC correctly accounts for the grammaticality judgments of these sentences with the links indicated.

### 5 Minimalist Considerations

So far, I have shown empirical problems that B&K's analysis encounters, from which T's analysis is free. T's analysis crucially relies on the assumption that the LCC applies at S-Structure. This assumption is necessary in T's account, which adopts Saito's (1992) assumption that quantificational expressions scrambled outside the *c*-command domain of their scope markers are radically reconstructed at LF: since the scrambled phrase in, for instance, (11c) must be undone, this example is indistinguishable from (11a) or (11b) at LF. Hence, the LCC must apply before LF, that is, at S-Structure.

Saito's argument for LF undoing of scrambling is based on the contrast in (12). In (12a), a *wh*-phrase is scrambled out of the domain of the Q-Comp. In (12b), a *wh*-phrase is base-generated in the matrix clause, but its scope marker is in the lower clause. Assuming that all *wh*-phrases move to a specifier of Q-Comp at LF, (12b) violates the Proper Binding Condition (PBC), which requires that traces be bound. The grammaticality of (12a) then shows that the trace of the scrambled *wh*-phrase, which would be left in the scrambled position at LF, does not count for the purposes of the PBC. This result is achieved if scrambling can be undone.

- (12) a. ?Nani-<sub>i</sub> Mary-ga [John-ga <sub>t<sub>i</sub></sub> katta-ka]  
 what-ACC<sub>i</sub> Mary-NOM [John-NOM <sub>t<sub>i</sub></sub> bought-Q]  
 sira-nakatta.  
 know-NEG.PAST  
 'Mary didn't know Q John bought what.'
- b. \*Dare-ga [John-ga kita-ka] siritai.  
 who-NOM [John-NOM came-Q] want.to.know  
 'Who wants to know Q John came.'

Given recent advances in the Minimalist Program (Chomsky 2000, 2001b), the contrast in (12) does not have to be attributed to the PBC. The difference between (12a) and (12b) lies in the fact that in (12b), none of the copies (traces) of the *wh*-phrase is *c*-commanded by the Q-Comp, while in (12a), the original trace is *c*-commanded by the Q-Comp. Since the original copy of the scrambled *wh*-phrase is *c*-commanded by, and hence is in the minimal search domain of, the Q-marker, the Q-marker can attract the invisible operator of the *wh*-phrase. However, since none of the copies of the *wh*-phrase in (12b) is *c*-commanded by the Q-Comp, the derivation is canceled if the *wh*-phrase is erroneously attracted to the embedded Q-Comp. Since (12) can be captured by the copy theory without recourse to LF undoing, Saito's proposal that scrambling can be undone seems to lose support. Furthermore, if scrambling is not undone, we might as well assume

that the LCC applies at LF, since scrambling is represented at this level.

Note that the fact that the LCC applies at LF does not affect the validity of the argument presented above against B&K's analysis. For instance, the scrambled phrases in (10b) and (10c) occupy their surface positions even at LF, and the LCC, but not the MNSC, can account for the contrast. Furthermore, the view that scrambling cannot be undone is consistent with Chomsky's (2000, 2001b) proposal that eliminates the LF component in the traditional sense. Chomsky argues that the propositional phrases CP and vP are phases and that all syntactic operations, including Merge, Move, and Agree, are completed within a given phase before the derivation proceeds to the next higher phase. Move and Agree correspond to overt and covert movement, respectively, in the traditional model. Within this model, there is no place for LF undoing of scrambling, since Spell-Out applies at the end of each phase.

Chomsky (2001a) takes this proposal a step further, arguing that grammar consists of three subcomponents— $\Phi$  (the phonological component, which derives Phon, phonological representation), NS (narrow syntax), and  $\Sigma$  (the semantic component, which derives Sem, semantic representation)—all of which are cyclic.  $\Phi$  and  $\Sigma$  apply to units (phases) transferred (Spell-Out, in the case of  $\Phi$ ) from NS. Crucially, this model dispenses with LF representations. Chomsky (2001a:8–11) recognizes at least three syntactic dependencies, listed here (see Pesetsky 2000):<sup>8</sup>

- (13) a. Internal Merge before Transfer (overt movement)  
 b. Internal Merge after Transfer (covert movement)  
 c. Agree

Examples like those in (10) and (11) show that the LCC cannot be defined in terms of Agree,<sup>9</sup> which requires that the probe, Q-Comp or Neg, c-command the goal, the *wh*-phrase or the NPI. In (11b–c), for instance, neither the NPI nor the *wh*-phrase is c-commanded by the licensing head. Of course, before scrambling, these phrases are in the minimal search (c-command) domain, but the LCC applies to the scrambled structure and is not sensitive to the structure before scrambling. What is required, then, is a syntactic mechanism that is pied-piped along with the scrambled phrase. I propose that the relevant pied-piped material is a trace (copy) of the invisible operator, as I have assumed so far. Since scrambling takes place before Transfer (Spell-Out), invisible operator movement, which feeds scrambling, must also be Internal Merge before Transfer in (13a). Given this hy-

<sup>8</sup> Unfortunately, Chomsky remains largely silent about the properties of these operations. Especially problematic seems to be (13b), Internal Merge after Transfer. It is not clear why this takes place if it does not feed either  $\Phi$  or  $\Sigma$ .

<sup>9</sup> This possibility is suggested by Chris Collins (personal communication).

pothesis, scrambling is represented in the Sem of (10) and (11), and these examples can be treated at Sem, provided that the LCC applies at this level. This forces us to posit that elements are linearly ordered at Sem, since the LCC is defined based on linear precedence. One uncontested fact about language is that Phon is linearly ordered. The conclusion that Sem is also linearly ordered seems to imply that NS is linearly ordered as well: if NS is not linearly ordered, both Phon and Sem must be ordered separately. However, if NS is linearly ordered, both Phon and Sem must also be ordered, since Phon and Sem are based on NS.

The present approach also accounts for some of the facts discussed in the literature that cannot be explained under T's analysis. For instance, as originally observed by Hoji (1985), a universal quantifier cannot c-command a *wh*-phrase.

- (14) a. ?\*Dono-hito-mo nani-o yonda-no?  
 every person what-ACC read-Q  
 'Q everyone read what?'  
 b. Nani-o<sub>i</sub> dono-hito-mo t<sub>i</sub> yonda-no?  
 what-ACC<sub>i</sub> every person t<sub>i</sub> read-Q  
 (same)

If we assume that universal quantifiers undergo Qu-feature (or operator) movement (Chomsky 2000:109) to vP, (14a–b) will have the representations in (15) at Sem. (15) assumes that QR (Quantifier Raising) is a rightward operation.

- (15) a. ?\*[<sub>CP</sub>[<sub>TP</sub>[[<sub>vP</sub>[every person t<sub>i</sub>] [what-ACC t<sub>j</sub>] read]-Qu<sub>i</sub>]]-Q-Op<sub>j</sub>]  
  
 b. [<sub>CP</sub>[<sub>TP</sub>[what-ACC t<sub>j</sub>]<sub>j</sub> [<sub>TP</sub>[[<sub>vP</sub>[every person t<sub>i</sub>] t<sub>j</sub> read]-Qu<sub>i</sub>]]]-Q-Op<sub>j</sub>]  


(14a) is ruled out because it violates the LCC.

To summarize, this squib has shown that the LCC accounts for the facts that B&K's analysis cannot. The problem facing their analysis is the assumption that the MNSC is a hierarchical constraint that applies at LF. The facts are better captured by linearity. The LCC, which T assumes to be a condition at S-Structure, can be regarded as a condition on LF or Sem. This is possible if scrambling cannot be undone. The present analysis implies that all of the subcomponents of grammar— $\Phi$ , NS, and  $\Sigma$ —have linear ordering, since the LCC crucially depends on linear order.

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