# A Note on the Proper Binding Condition and Lowering

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## 1. Introduction

The deviance of examples such as (1) can be attributed to the Proper Binding Condition (PBC) (see Fiengo (1977), May (1977), among many others):

(1) *John asked $t_i$ [who$_i$ Mary left]
(2) Proper Binding Condition: Traces must be bound.

In (1), *who* has lowered into the embedded [Spec, CP], so that its trace is not bound, inducing a violation of the PBC. Compare this example with (3):

(3) I wonder who$_i$ John asked $t_i$ [why Mary left]

Here, the PBC is satisfied, because *who* has undergone upward movement and its trace is bound. Thus, the PBC succeeds in capturing contrasts such as the one between (1) and (3) appropriately. In this paper, I assume without any further discussion that the PBC is descriptively correct and that it does take effect in the syntactic computation.[1]

The PBC was originally proposed within the pre-Minimalist framework(s), and when it is viewed from a Minimalist perspective, several issues arise. First of all, in the definition of the PBC given in (2), the notion of "trace" is employed. However, under a copy theory of movement, which has been adopted within the Minimalist Program, such a notion does not exist: although a moved phrase leaves a trace in its original position under a trace theory, under a copy theory, movement leaves a copy, not a trace. Thus, the PBC has to be reinterpreted so that we can dispense with the concept of "trace."

Second, consider the following example:

[1] See, for example, Takahashi (2001).

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(4) *[[Mary-ga $t_i$ yonda to]$_j$ [sono hon-o$_i$ [ John-ga $t_j$ itta]]]
Mary-NOM read COMP that book-ACC John-NOM said
'John said that Mary read that book.' (Saito's (1989) (28))

In the derivation of (4), first, the embedded object *sono hon-o* "that book" is scrambled out of the embedded clause, and then, the embedded clause itself is scrambled to the initial position of the matrix clause. In the resulting structure, the trace of *sono hon-o* is not bound, hence a violation of the PBC. Saito (1989) argues that since scrambling is semantically vacuous, a scrambled phrase can be "radically reconstructed" into its base position at LF. If this is the case, the ungrammaticality of (4) indicates that the PBC must be a condition (at least) on S-structure: because there is no unbound trace in the LF representation of (4) after radical reconstruction, if the PBC were at work only at LF, (4) would be acceptable (Saito 1989, 1992). In the Minimalist Program, however, there is no intermediate level such as S-structure (Chomsky 1993). Thus, the effect of the PBC at S-structure must be recaptured somehow without referring to the level of S-structure. An interesting question to ask in this connection is "Is it possible to attribute effects of the PBC to interface conditions?"

Finally, since the current line of minimalist research asks "not only *what* the properties of language are, but *why* they are that way (Chomsky 2001b: 2)," a deeper question about the PBC we have to ask is why on earth we have a condition like it. Can we find out any motivation for it?

The main aim of this paper is to reinterpret the PBC taking the above issues into consideration and to propose a decomposition of the PBC into two separate conditions which may be considered to come from legibility requirements at the interface levels.[2] The organization of this paper is as follows. In the next section, I will argue that the PBC should be replaced with two interface-related conditions: one is an LF interface condition and the other is a condition on Spell-Out. Although we will face an apparent problem, it will be resolved by assuming multiple Spell-Out and covert phrasal movement, following Chomsky (2001b). In section 3, I will discuss a consequence of the proposal made in the previous section. It will be seen that some of the problems with Bošković and Takahashi's (1998) lowering theory of scrambling can be resolved if the reinterpretation of the PBC is on the right track. Section 4 is a brief summary.

## 2. Reinterpreting the PBC

Violations of the PBC can be classified into two cases: in Case I, traces of

[2] See also Kuno (2000) and Takahashi (2001) (and fn.3 below). For derivational approaches to the PBC, which are not discussed in this paper, see Collins (1994), Kitahara (1997), and Boeckx (in press), among others.

operator-variable chains are not bound, as seen in (1), repeated below as (5); in Case II, traces of other types of chains fail to be bound, as seen in (4), repeated here as (6), and (7):

(5) *John asked $t_i$ [who$_i$ Mary left]

(6) *[[Mary-ga $t_i$ yonda to]$_j$ [sono hon-o$_i$ [ John-ga $t_j$ itta]]]
Mary-NOM read COMP that book-ACC John-NOM said
'John said that Mary read that book.'

(7) a. *[How likely $t_i$ to be a riot]$_j$ is there$_i$ $t_j$?
(cf. *There is likely to be a riot.*) (Lasnik and Saito's (1992: ch.4) (165))

b. *[How likely $t_i$ to be taken of John]$_j$ is advantage$_i$ $t_j$?
(cf. *Advantage is likely to be taken of John.*) (Lasnik and Saito's (166))

These two cases will be examined in turn below.

First, let us consider Case I. Under a copy theory, the "trace" of an operator-variable chain can be considered to be a copy interpreted as a variable. If so, what the PBC amounts to saying in Case I is that variables must be bound. Because no copies of a *wh*-phrase are marked "operator" or "variable," whether a given copy is interpreted as an operator or a variable must be determined by the position of the copy: it is sufficient for our present purposes to assume that when a copy of a *wh*-phrase appears in [Spec, CP], it is interpreted as an operator, and when it occurs in any other position, it is interpreted as a variable. Because "operator" and "variable" are notions relevant only at LF and, as such, invisible at PF, this part of the PBC should be attributed to an LF interface condition, and it can be identified as a well-known "ban on vacuous quantification." Then, why do we have this condition at LF? Here I simply assume that representations containing vacuous quantification are not legible for systems of thought.

Next, let us consider Case II, where the offending trace results from non-operator movement. Under a copy theory, there is no way of sorting out the "trace" of a non-operator-variable chain at LF: it is just one of the copies at that level. The copy that corresponds to a "trace" is nothing but an unpronounced copy. Thus, in Case II, the PBC can be interpreted as saying that unpronounced copies must be bound. Because the notion of "pronounced/unpronounced" is only available at PF, this part of the PBC should be attributed to a PF-related condition. The question we have to ask next is why we have such a condition. At PF, chains are interpreted or pronounced, and in most cases, the highest copy of a chain at the stage of the derivation to which Spell-Out applies is pronounced. From this it follows that in order to determine which copy is pronounced, relative height among copies must be determined. Suppose that "height" is determined in terms of c-command (i.e. when X c-commands Y, X is higher than Y), in order to determine the relative height among copies, a c-command relation must hold between any two of them. If a copy of a phrase is not

c-commanded by or does not c-command any other copy of the phrase, the PF representation will not be legible from external systems, because it fails to provide information about which copy is pronounced. Thus, we have a PF legibility condition requiring that when Spell-Out applies, a c-command relation must hold between any two copies of a phrase.[3] The effect of the PBC in Case II results from this condition.

To sum up the discussion so far, the effects of the PBC can be captured by the following two interface-related conditions:

(8) a. the LF condition which bans vacuous quantification
b. the condition on Spell-Out which requires that a c-command relation hold between any two copies of a phrase when Spell-Out applies

Now an apparent problem arises with this line of approach to the PBC. Consider the following paradigms:

(9) a. *[How likely $t_i$ to be a riot]$_j$ did you say there$_i$ was $t_j$?
b. *Who said there$_i$ was [how likely $t_i$ to be a riot]? (Boeckx's (in press) (17))
(10) a. *[How likely $t_i$ to be taken of John]$_j$ did you say that advantage$_i$ was $t_j$?
b. *Who said that advantage$_i$ was [how likely $t_i$ to be taken of John]? (Boeckx's (18))

Since the "traces" in (9b) and (10b) are not the ones left by operator movement, the LF condition (8a) has no effect on them. Moreover, because they are bound in the surface representation, they seem to satisfy the condition on Spell-Out (8b) as well. Thus, it appears

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[3] This line of argument for the PBC as a PF-related condition is also found in Kuno (2000) and Takahashi (2001). Two brief comments on the difference between their proposals and the one being made here are in order. First, they assume that the relevant condition is a PF condition on the linearization process. Although I agree that the motivation for the condition comes from the linearization considerations, I claim that it should be formulated as a condition on Spell-Out, rather than a condition operative in the PF component, hence (8b). For the reason why I adopt the latter formulation, see fn.7.

Second, Kuno and Takahashi, unlike me, seem to argue that the PBC is entirely reducible to the PF condition. If this is the case, however, the deviance of examples like the following would be a problem:

(i) *John asked who [~~who~~ Mary left]

This example is identical with (5) except that the upper, not the lower, copy of *who* is pronounced. Because the upper copy c-commands the lower copy and the former is pronounced, the PF condition in question is perfectly satisfied, so that (i) should be acceptable under the "PF PBC theory." Although the deviance of (i) would be independently explained on the assumption that a probe/attractor (or [+Q] on the embedded C, in this case) can search for its goal/attractee (or the corresponding feature of *who*) only in its c-command domain, it will be clear below that this assumption is not adopted in the present paper. The following example illustrates the same point:

(ii) *John asked Bill [~~when~~ Mary left] when

The ungrammaticality of (i) and (ii) can be explained in the theory being proposed here in the same way as that of (5): the copy of *who/when* in [Spec,CP] (i.e. operator) does not c-command the other copy (i.e. variable), violating the ban on vacuous quantification at LF.

to be impossible to attribute the ungrammaticality of the *b* examples in (9) and (10) to the (reinterpreted) PBC. Actually, on the basis of the same data, Boeckx (in press) concludes that the PBC approach to the above paradigms should be abandoned.[4] In what follows, I argue that this conclusion is not tenable and that (9b) and (10b) can be ruled out by the condition (8b) if we make our analysis within the current development of the theory.[5]

My claim is that the ill-formedness of (9b) and (10b) is explained by the condition (8b) under the theory proposed by Chomsky (2001b), which adopts multiple Spell-Out and covert phrasal movement. In this theory, it is assumed that Spell-Out applies at each phase level (*v*P or CP) and that the only difference between overt movement and covert movement is the timing of Spell-Out with respect to Move:

> *"By definition, the operation TRANSFER applies at the phase level. At this level, internal Merge can apply either before or after TRANSFER, hence before or after Spell-Out S-O. The former case yields overt movement, the latter case covert movement, with the displaced element spelled out in-situ"* (Chomsky 2001b: 9)

It may be worth briefly mentioning the difference between this theory of covert movement and the one proposed by Chomsky (1995) or the one proposed by Chomsky (2000, 2001a). In Chomsky's (1995) system, covert movement is treated as movement of formal features rather than movement of categories. In Chomsky's (2000, 2001a) system, nothing moves covertly and the effects of covert movement are captured by the operation Agree, through which features at a distance enter into a checking relation. Unlike these, in Chomsky's (2001b) theory, it is assumed that covert movement does occur and what move are not features but categories (see also Pesetsky (2000)).

Let us see how the last system works in some detail. First, in overt movement, Move applies before Spell-Out. Consider the following portion of a derivation:

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[4] Boeckx gives a Relativized Minimality account of the problematic paradigms. It may be an issue whether this RM approach is also applicable to examples like (6), because, as argued by Saito and Fukui (1998), scrambling does not exhibit RM effects.

[5] Akira Watanabe (p.c.) pointed out the possibility that (9b) is ruled out by Beck's (1996) Minimal Quantified Structure Constraint (MQSC), which prohibits covert movement from crossing a scope-bearing element, in combination with William's (1984) hypothesis that *there* is a scope-marker. As Pesetsky (2000) argues, however, the MQSC is not empirically correct. Consider the following example, which is acceptable although the covert movement of *whom* crosses the scope-bearing element *not*:

(i) What$_i$ did who not give $t_i$ to whom? (Pesetsky's (118a))

Although he does not directly discuss the paradigm in (9), Pesetsky proposes an alternative to the MQSC, according to which (9b), as well as (i), does not give rise to any problem (p. 67). Thus, the deviance of (9b) cannot be reduced to the "intervention effect" by a scope-bearing element. See Pesetsky (2000) for the details of his proposal.

(11) Stage 1: XP
(movement to the edge of the phase)
Stage 2: XP XP
(Spell-Out)
Stage 3: XP ~~XP~~

First, we have a phrase XP within a given phase (Stage 1). Next, Move applies to XP and places its copy at the edge of the phase (Stage 2). Then, Spell-Out applies to the phase and removes the phonological features of the lower copy of XP (Stage 3).[6] These phonological features will not be interpreted or pronounced at PF, hence the overt movement of XP. On the other hand, Spell-Out precedes Move in covert movement. Consider the following partial derivation:

(12) Stage 1: XP
(Spell-Out)
Stage 2: ~~XP~~
(movement to the edge of the phase)
Stage 3: ~~XP~~ ~~XP~~

Stage 1 is the same as in (11). This time, however, Spell-Out applies to XP first and removes its phonological features (Stage 2). Then, Move applies to XP, which has lost its phonological features, and places it at the edge of the phase (Stage 3). The spelled-out phonological features of the lower copy of XP will be pronounced at PF, resulting in covert movement.

Although Spell-Out removes the phonological features of the lower copy in both overt movement and covert movement, they are pronounced in the latter and they are not in the former. From this, it follows that there is a PF condition like "if the spelled-out copy of X is the highest of all the copies of X in the structure, pronounce it." Here, again, to determine whether the spelled-out copy is pronounced or not, a c-command relation must hold between it and any other copy when Spell-Out applies, so that we still have the above PF legibility condition or condition on Spell-Out (8b).

It should be noted that in the theory being considered, a moved phrase is spelled-out (at least) twice: in its base position and in its displaced position. For example, consider the following example:

[6] The upper copy is not spelled out at the same time as the lower copy, since the edge of a phase is assumed to be spelled out at the next higher phase. See Chomsky (2000, 2001a, 2001b).

(13) John wonders why Bill bought what.

*What* is first spelled out in its surface position, where its phonological features are removed and sent to the phonological component. Because the spelled-out copy of *what* is the highest copy of the phrase at that stage, its spelled-out phonological features are pronounced. Next, after *what* moves to its scope position, that is the embedded [Spec, CP], it is spelled out again, when its checked WH feature is removed.

Returning back to (9b) and (10b), the bracketed *wh*-phrase is also spelled out both in its surface position and in its scope position (i.e. in the matrix [Spec, CP]). When it is spelled out in its surface position, the "trace" of *there/advantage* is bound, so that no problem arises with the condition on Spell-Out (8b). However, when the bracketed *wh*-phrase is spelled out in the matrix [Sepc, CP], no c-command relation holds between the copy (or "trace") of *there/advantage* contained by the moved *wh*-phrase and the one located in the embedded subject position. See the following representations:

(14) a. *~~[how likely $t_i$ to be a riot]~~ who said there$_i$ was [how likely $t_i$ to be a riot]?

b. *~~[how likely $t_i$ to be taken of John]~~ who said that advantage$_i$ was [how likely $t_i$ to be taken of John]?

Thus, these examples can be ruled out by the condition (8b).[7]

Notice that this account crucially relies on multiple Spell-Out and covert phrasal movement. If it were not for multiple Spell-Out, the condition (8b) should be evaluated only once when the bracketed *wh*-phrase was spelled out in its surface position and it would be satisfied. If covert movement were movement of features or replaced with Agree, the offending "trace" of *there/advantage* would not occur under the matrix [Spec, CP] and the condition would be satisfied again. In this sense, to the extent that this account is on the right track, it gives some support to Chomsky's (2001b) theory, as well as the PBC approach to the paradigms in (9) and (10).

## 3. A Consequence

In the last section, I have proposed to decompose the PBC into an LF interface condition and a condition on Spell-Out. If this reinterpretation of the PBC is on the right track, one of its implications is that lowering is permitted rather freely. Actually, under the

[7] If the PBC is reduced to a condition on linearization which is operative in the PF component, as assumed by Kuno (2000) and Takahashi (2001), the ungrammaticality of the examples in (14) cannot be explained, because the copy of *there/advantage* under the matrix [Spec,CP] carries no phonological features, so that it is invisible in the PF component, giving rise to no problem with respect to

theory being considered, the following two types of lowering are allowed *as long as the higher copy is pronounced*:

(15) a. lowering of an operator base-generated in [Spec, CP]
b. lowering of a non-operator

In what follows, I discuss a consequence of (15b).[8] It will be seen that allowing this type of lowering enables us to resolve some of the problems with Bošković and Takahashi's (1998) theory of scrambling and continue to have it as one of the possible and interesting views of the phenomenon.

### *3. 1. Bošković and Takahashi (1998)*

First, I briefly review the theory of scrambling proposed by Bošković and Takahashi (1998) (henceforth, B&T).

Under the "standard" analysis of scrambling, a sentence like (16b) is derived from (16a) through a movement operation:

(16) a. John-ga [Mary-ga sono hon-o katta to] omotteiru.
John-NOM Mary-NOM that book-ACC bought that think
'John thinks that Mary bought the book.'
b. Sono hon-o John-ga [Mary-ga *t* katta to] omotteiru.

Because of the optionality it exhibits, scrambling is considered to be troublesome within a current minimalist theory of grammar, which argues that movement takes place as a "last resort." Various proposals have been made to accommodate so-called optional operations such as scrambling, and B&T's theory is one of them.[9]

They claim that the sentences in (16) are not related transformationally. They argue that the scrambled phrase *sono hon-o* 'the book' in (16b) is base-generated in the surface position and that it undergoes LF (covert) movement to the position where it can receive a θ-role. Thus, the derivation of sentences like (16b) under this theory can be represented in the following way:

(17) Sono hon-o John-ga [Mary-ga katta to] omotteiru.

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linearization. See fn.3 above.
[8] See Lasnik and Saito (1992: ch.2) for a possible case of (15a).
[9] See also Saito and Fukui (1998) and Miyagawa (1997), among many others.

They view θ-roles as formal features to be checked at some point of the derivation. In this sense, the LF movement of a scrambled phrase to its θ-position is an obligatory operation driven by the need of feature checking. Thus, the optionality of scrambling is eliminated.

One problem that immediately arises with this theory of scrambling concerns the PBC:

(18) Traces must be bound.

Since the LF movement of the scrambled phrase in (16) is lowering, the "trace" left by this operation is not bound by the head of the chain. B&T follow Lasnik and Saito (1992) in assuming that movement does not have to leave a "trace," when no principle requires it. It is claimed that the LF movement in (16) is not required to, and hence does not, leave a trace, so that the violation of the PBC is circumvented.

Where does the difference between scrambling languages such as Japanese and non-scrambling languages such as English lie? One of the possibilities B&T suggest is the feature strength of θ-roles. In scrambling languages, θ-roles are weak features, and as such, they do not have to be checked off in the overt syntax, being allowed to be base-generated in a non-θ-position. In contrast, θ-roles in non-scrambling languages are strong features, so that they have to be checked off before Spell-Out applies and cannot be base-generated in a non-θ-position.[10]

So far, we have concentrated on B&T's analysis of A'- (or long-distance) scrambling. As has been argued in the literature, however, scrambling exhibits properties of A-movement in some cases. Specifically, clause-internal scrambling can be A-movement (cf. Mahajan (1990), Saito (1992), Tada (1993)). For example, consider the following sentence:

(19) [Mary-to Bill]$_i$-ni [otagai$_i$-no hahaoya]-ga $t_i$ atta
Mary-and Bill-DAT each other-GEN mother-NOM met
'Mary and Bill, each other's mothers met.'

Here, the scrambled NP precedes the anaphor and the grammaticality of this sentence indicates that the landing site of the scrambled phrase is A-position: otherwise the Condition A would not be satisfied. Because the A-scrambled phrase is obviously interpreted in its surface position in (19), it would have to leave a "trace" there if it lowered to its θ-position, as

[10] The other possibility B&T suggest is that IP-adjoined positions may be base-generated in scrambling languages, while they are not in non-scrambling languages (cf. Saito (1989)). As they point out, the possibility I introduce in the text is "more in line with current assumption concerning crosslinguistic variation" (p.352). However, it is not free from problems. For example, unless independent (e.g. morphological) evidence is given, the assumption that θ-role features are strong in some languages and weak in others may be *ad hoc*. Also, if the current line of research is on the right track, the notion of feature strength should be removed from a theory. I will come back to this issue in my future work.

in A'-scrambling. If so, however, the "trace" would induce a violation of the PBC. In order to circumvent this problem, B&T assume that an A-scrambled phrase does not undergo LF movement to check its θ-feature and remain in its surface position (i.e. in the IP-adjoined position) at LF. It is hypothesized that a verb moves to I and may θ-check the A-scrambled phrase in the IP-adjoined position, allowing it to stay there.

### *3. 2. Problems*

Although, as argued by them, B&T's theory of scrambling has some clear advantages over other theories (see also Sugisaki (2000)), it also has some problems. In the following, I point out several empirical problems with their treatment of A-scrambling.

First, consider the following example:

(20) *[$_{IP}$ [John$_i$-no hahaoya]-o [$_{IP}$ kare$_i$-ga semeta]].
John-GEN mother-ACC he-NOM blamed
'John's mother, he blamed." (B&T's (26))

Here the object *John-no hahaoya-o* 'John's mother' has been scrambled to the sentence-initial position. Usually, this example is ruled out as the Condition C-type reconstruction effect: the scrambled object is reconstructed into its base position, where *John* is bound by *kare* 'he' in violation of the Condition C (cf. Saito (1985, 1992)). Under B&T's analysis, however, this explanation for the ungrammaticality of the example in (20) cannot be maintained, since it is assumed that the "clause-internally scrambled" object is base-generated in its surface position and does not have to lower into its θ-position. Instead, B&T assume on the basis of the segment theory of adjunction that the subject in [Spec, IP] c-commands the object in the IP-adjoined position (p. 361). As a consequence, *kare* c-commands *John* in (20), the Condition C being violated. However, this assumption does not seem to be tenable. Consider the following examples:

(21) a. Nobody can do it under any circumstances.
b. *Under any circumstances nobody can do it.
(22) a. Nobody can do it any way.
b. *Any way nobody can do it.

These examples show that the subject in [Spec, IP] does not c-command the topicalized NPI in the sentence-initial position. Suppose following Lasnik and Saito (1992) that possible landing sites of matrix topicalization are [Spec, CP] and an-IP adjoined position, the above examples indicate that neither of them is c-commanded by the subject in [Spec, IP]. This is

incompatible with B&T's assumption.

Next, consider the following examples:

(23) a. ???[John-to Mary]-$o_i$ otagai$_i$-ga $t_i$ mita.
John-and Mary-ACC each other-NOM saw
'John and Mary, each other saw.' (Miyagawa's (1997) (11))

b. [John-to Mary]-$o_i$ otagai$_i$-no sensei-ga $t_i$ mita.
John-and Mary-ACC each other-GEN teacher-NOM saw
'John and Mary, each other's teachers saw.' (Miyagawa's (12))

Miyagawa (1997) argues that the problem in (23a) is that the reciprocal anaphor locally c-commands the "trace" of its antecedent, thereby violating Rizzi's (1986) Chain Condition. It is obvious that this explanation presupposes that a copy of the scrambled object appears in its θ-position. However, under B&T's theory, this presupposition cannot be obtained, because it is assumed that the "clause-internally scrambled" phrase is base-generated in the IP-adjoined position and does not have to lower to its θ-position.[11] Therefore, Miyagawa's explanation on the basis of the Chain Condition cannot be maintained under B&T's theory. Although B&T would take (23a) to violate the Condition C on the above assumption that the subject in [Spec, IP] c-commands the object in the IP-adjoined position, the unacceptability of (24a) below will remain unexplained, even if we turn a blind eye to the problem of the assumption:[12]

(24) a. *[musume-to musuko]-$o_i$ John-ga otagai$_i$-ni $t_i$ hihans-are-ta.
daughter-and son-ACC John-NOM each other-DAT criticize-PASS-PAST
'John was affected by daughter and son, each other criticizing.'

b. [musume-to musuko]-$o_i$ John-ga otagai$_i$-no sensei-ni $t_i$
daughter-and son-ACC John-NOM each other-GEN teacher-DAT
hihans-are-ta.
criticize-PASS-PAST
'John was affected by daughter and son, each other's teachers criticizing.'

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[11] Actually, under B&T's theory, the lowering of the object NP *cannot* occur in (23), because the scrambling involved there must be A-scrambling; otherwise, the anaphor would violate the Binding Condition A.

[12] I adapted these examples from Miyagawa's (1997) following ones:

(i) a. *John-ga [musume-to musuko]-$o_i$ otagai$_i$-ni $t_i$ hihans-are-ta.
John-NOM daughter-and son-ACC each other-DAT criticize-PASS-PAST
'John was affected by daughter and son, each other criticizing.' (Miyagawa's (14))

b. John-ga [musume-to musuko]-$o_i$ otagai$_i$-no sensei-ni $t_i$ hihans-are-ta.
John-NOM daughter-and son-ACC each other-GEN teacher-DAT criticize-PASS-PAST
'John was affected by daughter and son, each other's teachers criticizing.' (Miyagawa's (15))

In these examples, where biclausal adversity passive is involved, B&T's assumption is irrelevant because the reciprocal does not occur under [Spec, IP].

Lastly, consider the following paradigm (cf. Hoji (1985), Takano (1996)):

(25) a. Mary-ga subete-no gakusei$_i$-ni soitu$_i$-no sensei-o syookaisita.
Mary-NOM all-GEN student-DAT he-GEN teacher-ACC introduced
'Mary introduced his teacher to every student.'

b. *Mary-ga soitu$_i$-no sensei-ni subete-no gakusei$_i$-o syookaisita.
Mary-NOM he-GEN teacher-DAT all-GEN student-ACC introduced
'Mary introduced every student to his teacher.'

c. Mary-ga [subete-no gakusei]$_i$-o soitu$_i$-no sensei-ni $t_i$ syookaisita.
Mary-NOM all-GEN student-ACC he-GEN teacher-DAT introduced

d. ?Mary-ga [soitu$_i$-no sensei-o]$_j$ subete-no gakusei$_i$-ni $t_j$ syookaisita.
Mary-NOM he-GEN teacher-ACC all-GEN student-DAT introduced
(Takano's (1996: ch.4) (35))

In the intended interpretation of these examples, the bound pronoun *soitu-no* 'his' is bound by the quantificational nominal which contains *subete-no* 'every.' The problem here is the acceptability of (25d): in the surface representation, the bound pronoun in the accusative phrase does not seem to be bound by the quantificational dative phrase, because the former appears on the left of the latter; however, the intended interpretation is possible. Compare this example with the one in (25b), where the dative phrase which contains the bound pronoun appears on the left of the accusative phrase and the bound variable interpretation cannot be obtained, as expected. On the basis of this contrast, Hoji (1985) argues that in the Japanese ditransitive construction, the base order of the two internal arguments is dative-accusative and that the pronoun in (25d) is bound by the quantificational nominal through Connectivity:

(26) α is bound by β through Connectivity iff a trace of α, but not α itself, is bound by β
(Takano (1996: 153); cf. Higgins (1973), Barss (1986))

Because the dative phrase and the accusative phrase are base-generated in this order, the accusative-dative order in (25d) is derived through the short-distance scrambling of the accusative phrase.[13] The trace of the bound pronoun is c-commanded by the quantificational nominal, so that the intended interpretation is possible through Connectivity. In contrast, the pronominal variable binding is ruled out in (25b) since there is no trace of the dative phrase c-commanded by the accusative phrase. Notice at this point that Hoji's explanation relies

[13] Short-distance scrambling solely exhibits A-properties (cf. Saito (1992), Tada (1993)).

crucially on the assumption that the trace (or copy, under the copy theory) of the accusative phrase exists in its θ-position in (25d). Under B&T's theory, however, this assumption cannot hold: because the scrambled accusative phrase is assumed to be base-generated in its surface position and not to have to lower to its θ-position, no copy of the accusative phrase appears in the latter position. Therefore, Hoji's explanation cannot be maintained within B&T's theory. They might try to overcome this problem by extending their assumption about the c-command domain of a subject in [Spec, IP] in such a way that a phrase in the Spec position of an XP can c-command a phrase in an adjoined position of the XP: assuming that the dative phrase in (25d) is in [Spec, VP] in a Larsonian shell structure and that the accusative phrase is in a VP-adjoined position, the former could c-command the latter. This line of analysis, however, would wrongly predict that examples like (27a) below are acceptable:

(27) a. *John-ga soitu$_i$-no heya-de subete-no gakusei$_i$-ni Mary-o syookaisita.
John-NOM he-GEN room-in all-GEN student-DAT Mary-ACC introduced
'John introduced Mary to every student in his room.' (Takano's (1998) (35))
b. John-ga subete-no gakusei$_i$-ni soitu$_i$-no heya-de Mary-o syookaisita.
John-NOM all-GEN student-DAT he-GEN room-in Mary-ACC introduced

Suppose the locative phrase containing the bound pronoun appears in a VP-adjoined position and the dative phrase appears in [Spec, VP], the variable binding would be predicted to be possible. However, this prediction is incompatible with the fact.[14]

### *3. 3. The Problems Resolved*

It should be noted that all of the problems with B&T's treatment of A-scrambling we discussed in the previous subsection disappear if we can assume that lowering of scrambled phrases takes place in A-scrambling.[15] First, the unacceptability of (20), repeated here as (28), can be attributed to a violation of the Condition C, if the scrambled object lowers into its θ-position and the lower copy is interpreted with respect to Binding at LF:

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[14] The example in (27a) gives rise to no problem in the Connectivity analysis, because adjuncts cannot undergo scrambling (cf. Miyara (1982), Saito (1985)), so that no copy of the locative phrase can appear in a position c-commanded by the dative phrase.

[15] Another problem with their analysis is that it makes a wrong prediction. As mentioned above, under their theory, the strength of θ-features is a parameter distinguishing between scrambling languages and non-scrambling languages. However, it is wrongly predicted that, whether θ-features are strong or not in a given language, if it has overt V-to-I movement, it exhibits clause-internal scrambling, because the strong θ-features are checked in their surface position before Spell-Out through the overt V-to-I movement. It is obvious that this prediction is wrong (consider, for example, French).

(28) *[$_{IP}$ [John$_i$-no hahaoya]-o [$_{IP}$ kare$_i$-ga semeta]].
John-GEN mother-ACC he-NOM blamed
'John's mother, he blamed."

Second, the unacceptability of (23a), repeated below as (29), can be attributed to Rizzi's Chain Condition, if the scrambled object lowers and the anaphor c-commands the lower copy:

(29) ???[John-to Mary]-o$_i$ otagai$_i$-ga $t_i$ mita.
John-and Mary-ACC each other-NOM saw
'John and Mary, each other saw.'

Third, the possibility of the variable binding in (25d), repeated here as (30), can be explained on the basis of Connectivity, if the scrambled accusative phrase, which contains the bound pronoun, lowers and the quantificational dative phrase c-commands the lower copy:

(30) ?Mary-ga [soitu$_i$-no sensei-o]$_j$ subete-no gakusei$_i$-ni $t_j$ syookaisita.
Mary-NOM he-GEN teacher-ACC all-GEN student-DAT introduced
'Mary introduced his teacher to every student.'

Recall now the reason why B&T cannot assume that lowering occurs in A-scrambling. That is because if it occurs, the copy left induces a violation of the PBC. In A'-scrambling, lowering of a scrambled phrase is assumed not to leave a trace/copy, because it does not have to. However, because at least in some cases of A-scrambling, scrambled phrases are obviously interpreted in their surface position, lowering of an A-scrambled phrase must leave a trace/copy. Thus, we have a dilemma: in empirical terms, we want to assume that lowering occurs in A-scrambling, as well as in A'-scrambling, whereas in conceptual terms, we cannot do so.

The reinterpretation of the PBC proposed in the last section comes into the picture here. As mentioned at the beginning of this section, one of its implications is that the following two types of lowering are allowed as long as the higher or c-commanding copy is pronounced:

(31) a. lowering of an operator base-generated in [Spec, CP]
b. lowering of a non-operator

Here only (31b) is relevant, because scrambling is not an operation creating an operator-variable chain (Saito 1989). Under the theory which allows (31b), it is possible to assume that lowering takes place in A-scrambling, as well as in A'-scrambling. First, let us adopt the single cycle model proposed by Chomsky (2000, 2001a, 2001b), in which there is

no independent LF cycle. It follows that it is impossible to maintain B&T's original claim that a scrambled phrase lowers to its θ-position in the LF component. Instead, I claim that the scrambled phrase, whether it is A-scrambled or A'-scrambled, lowers to check its θ-feature as soon as it is introduced into the derivation. Notice that adopting the single cycle model is a good move in conceptual terms because it makes our theory simpler or more desirable than B&T's original one. When the scrambled phrase lowers, it leaves a copy in its surface position. Since this copy c-commands the copy in the θ-position, as long as the former is pronounced, no problem arises with respect to the two conditions being argued to replace the PBC, which B&T are worried about. Because an A-scrambled phrase can lower to its θ-position and, at the same time, leave a copy in its surface position, the problems discussed above are resolved.[16,17]

## 4. Summary

In this paper, I have proposed to decompose the PBC into two separate conditions that may be considered to come from legibility requirements at the interface levels: one is an LF condition which bans vacuous quantification and the other is a condition on Spell-Out which requires that a c-command relation hold between any two copies of a phrase when Spell-Out applies. It has been seen that an apparent problem with this proposal can be resolved if Chomsky's (2001b) theory, where multiple Spell-Out and covert phrasal movement are assumed, is on the right track. Because the problem cannot be resolved under the "feature movement" theory nor "long-distance agreement" theory of covert movement, the present work may be taken to support Chomsky's (2001b) move. A consequence of the above proposal has also been discussed, and it has been argued that some of the problems that

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[16] A departure of the theory being proposed here from B&T's original one is that cases where a scrambled phrase surfaces lower than its theta position are not permitted. Consider the following examples, where *Bill-ni* is a matrix argument:

(i) a. *John-ga [Peter-ga [riyuu-mo naku Bill-ni Mary-ga nakidasita to] omotta
John-NOM Peter-NOM reason-even without Bill-DAT Mary-NOM began to cry COMP thought
to] itta (koto).
COMP said (fact)
'John told Bill that Peter thought that Mary began to cry without any reason.' (B&T's (17))

b. ?John-ga [riyuu-mo naku Bill-ni Mary-ga nakidasita to] itta.
John-NOM reason-even without Bill-DAT Mary-NOM began to cry COMP said
'John told Bill that Mary began to cry without any reason.' (B&T's (16b))

The example in (ia) seems to support our position, while the example in (ib) seems to indicate the opposite. I leave this issue open here, but I would like to point out that I judge the example in (ib) to be at best "??."

[17] One might point out that, because we adopt a system with multiple Spell-Out, lowering of a scrambled object to its θ-position may be blocked by the Phase Impenetrability Condition (Chomsky 2000, 2001a, 2001b). Here I assume following Fukui and Sakai (2003) that obligatoriness of application of multiple Spell-Out is parameterized and that multiple Spell-Out applies optionally in scrambling languages. Several other issues also arise when we try to implement the lowering analysis of scrambling in the single cycle model, but I leave them for future research.

Bošković and Takahashi's (1998) analysis of A-scrambling faces can be resolved under the theory proposed in this paper.

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