A RECONSTRUCTION APPROACH TO PROPER BINDING CONDITION EFFECTS ON REMNANT MOVEMENT

HIROSHI TERADA

Osaka Kyoiku University

This study is primarily concerned with the question of how a certain type of remnant movement satisfies the Proper Binding Condition (PBC), the requirement that a trace be bound. Remnant movement is generally delineated as [... [β ... tα ...] ... α ... [ ... tβ ...] ...], in which remnant category β contains a trace of α, and yet is not overtly bound by α. Several studies on this topic have attempted to reduce the PBC to locality conditions such as the Minimal Link Condition, Phase Impenetrability Condition, and so on. The purpose of this study is to argue that a version of the PBC must be preserved independently and that PBC-effects on remnant movement are accommodated, according to the types of reconstruction applied to remnant categories.*

Keywords: Proper Binding Condition, reconstruction, remnant movement

1. Introduction

Dislocation is a property characteristic of human language. One of the topics of current interest in linguistics has been the investigation of the locality of movement. The Proper Binding Condition (PBC) is one of the most fundamental locality conditions:

(1) Proper Binding Condition (PBC)
    Traces must be bound.


This condition is introduced to rule out such ill-formed sentences as (2),

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which contains unbound traces created by downward movement:

(2) *John asked \[t_1 [\text{CP} \, \text{who}_1 \, [\text{Mary saw Bill}]]\]

Here, who\(_1\) is lowered to the embedded Spec-CP position, with \(t_1\) unbound. Similarly, so-called remnant movement gives rise to a PBC violation. Thus, consider the following example from Saito (1989: 187):

(3) *[DP Which picture of \(t_1\)_2 do you wonder who\(_1\) John likes \(t_2\)]

Remnant movement is an operation that moves a category containing a trace created by a preceding movement operation. Movement that creates a remnant category is referred to as *internal movement* (Grewendorf (2003)). In (3), internal movement extracts who\(_1\) from DP\(_2\) located in the embedded verb phrase to the embedded Spec-CP position, followed by movement of the remnant DP\(_2\) to the matrix Spec-CP position. This leads to an ungrammatical sentence. If the PBC must be checked at the very stage where a movement operation is applied (cf. Fiengo (1977)), then these sentences are correctly excluded.

Given that the predicate-internal subject hypothesis is correct, the grammaticality of sentences including predicate fronting, as in (4), creates a new problem with such a PBC account.

(4) *[AP \(t_1\) how proud of Bill]_2 is John\(_1\) \(t_2\) ? (Takano (1995: 332))

Here, internal A-movement of John is followed by A'-movement of remnant predicate AP\(_2\). If the PBC were checked at the stage where the predicate is fronted, \(t_1\) would violate this condition.

In recent years, several ways of deriving PBC-effects have emerged. Müller (1998), for example, proposes a condition, according to which internal movement cannot be of the same type as the subsequent remnant movement. Kitahara (1997) attempts to reduce this condition to a more general principle, i.e. the Minimal Link Condition. Grewendorf (2003) hypothesizes that a particular type of internal movement does not feed the application of a particular type of remnant movement, while Takahashi (2001) and Saito (2003) postulate that a particular type of trace is invisible to the PBC. Cecchetto (2001) and Hiraiwa (2002) suggest that the PBC is reduced to a condition on structure building, i.e. the Phase Impenetrability Condition, proposed by Chomsky (2000, 2001a, 2001b).

The purpose of this study is to show that there is no reason for eliminating the PBC from the theory of grammar and to argue that the contrast between (3) and (4) and other related phenomena fall under some version of the PBC (cf. Takahashi (2001) for a similar claim). The
hypothesis I will pursue is that dislocated remnant categories undergo reconstruction in the LF-component, and that a particular type of remnant movement is susceptible to a particular type of reconstruction, from which different PBC-effects arise.

This paper is organized as follows: In section 2, I will suggest problems associated with some of the recent treatments of PBC effects. In section 3, I will propose an alternative analysis on the basis of typology of reconstruction, showing that the PBC effect on remnant movement is a consequence of reconstruction properties. In section 4, I will discuss the status of the PBC. Section 5 forms the conclusion to this paper.

2. Problems Associated with Previous Analyses

2.1. Minimal Link Condition Approach

Müller (1998) has introduced the following condition, according to which internal movement and the subsequent remnant movement cannot be of the same type:

(5) Unambiguous Domination (UD)

In a structure ... [A ... B ...] ..., A and B may not undergo the same kind of movement. (Müller (1998: 271))

According to this theory, the contrast between (3) and (4) is explained as follows. In (3), the UD requirement is violated, since both internal movement and the subsequent remnant movement are A'-movement. In (4), however, the UD requirement is satisfied, since internal movement is A-movement and the subsequent remnant movement is A'-movement.

A problem that arises with this theory is that UD is a description that should be deduced from a more general principle. Kitahara (1997) suggests that it is possible to derive this requirement from Chomsky's (1995: 311) Minimal Link Condition (MLC):

(6) K attracts α only if there is no β, β closer to K than α, such that K attracts β.

This theory holds that an ungrammatical example such as (3) involves more than one illegitimate application of Move during the course of derivation (7a, b):

(7) a. [CP who1 [John likes [DP which picture of t1]]]
   b. [CP [DP Which picture of t1] do you wonder [CP who1 [John likes t2]]]

At stage (7a), the movement of who across which violates the MLC. At stage (7b), the movement of DP2 across who also violates the MLC.
These accumulated MLC-violations yield a severe deviance. On the other hand, the well-formed example (4) involves no illegitimate application of Move at any stage of its derivation:

(8) a. [TP John₁ is [AP ₁ how proud of Bill]₂]
   b. [CP [AP ₁ how proud of Bill]₂ is [TP John₁ ₂₁]]

The movement of *John* in (8a) as well as the subsequent remnant movement of AP observes the MLC, since there is no intervener for each movement. Therefore, the MLC correctly captures the contrast between (3) and (4). This is a brief outline of Kitahara’s theory.

Although it is desirable to reduce UD to such independently motivated principles as the MLC, a problem arises from examples such as (9), in which *wh*-movement is followed by remnant topicalization:

(9) ??[Give ₁ to Mary]₂ I really don’t know [CP [DP which book]₁ he did ₂]

According to Müller (1998), this example does not involve a severe PBC-violation, but only a *wh*-island violation, which is an MLC-effect under Kitahara’s theory. This implies that a feature attracting a topic phrase and a feature attracting a *wh*-phrase interact with each other with respect to the MLC. In such a case, (9) would have two instances of illegitimate application of Move during its derivation, i.e. (10):

(10) a. [CP C he did [O give [DP which book]₁ to Mary]₂]
   b. H [I really don’t know [CP [DP which book]₁ he did [O give ₁ to Mary]₂]]

1 An anonymous *EL* reviewer suggests that sentences such as (i) are ungrammatical (cf. Cecchetto (2001)). Müller (p. 247) also suggests that (i) is less acceptable than (9).

(i) *[Ready to marry ₁]₂ I wonder [who₁ [John is ₂]]

There are reasons to believe that (9) and (i) are not PBC-violations, however. My informants find both (9) and (i) equally marginal. Note that such considerable variation in acceptability judgments of examples is characteristic of *wh*-island violations, while PBC-violations uniformly end up with a severe deviance. According to my informants, the sentences in (ii), involving topicalization of a non-remnant predicate across a *wh*-island, are just as unacceptable as (9) and (i):

(ii) a. ??[Ready to marry Mary], I wonder when John is. (cf. (i))
   b. ??[Give this book to Mary], I really don’t know when he did. (cf. (9))

The same is the case with corresponding German examples (Müller (1998: 246–247)). Topicalization of a remnant predicate across a *wh*-island in this language gives rise to only a *wh*-island violation (cf. (60b) below). For these reasons, it is fairly safe to say that (9) and (i) do not involve PBC-violations.
Let us suppose that a topic phrase has a topic operator, i.e. O, and is attracted by a certain head, i.e. H. At stage (10a), the feature of O is closer to C than the wh-feature of DP₁, so wh-movement across O violates the MLC. At stage (10b), the wh-feature of DP₁ is closer to H than the feature of O, so topicalization across the wh-phrase violates the MLC again. The accumulated MLC-violations would yield as severe a deviance as that of (3), contrary to fact. It is safe to conclude that a PBC-violation, as observed in (3), should not be treated as an accumulated MLC-violation. This casts doubt on the MLC-approach to PBC-effects.²

2.2. Phase Approach

In this section, I will examine what I shall call the Phase Approach to PBC-effects, which has been adumbrated by Cecchetto (2001) and Hiraiwa (2002). In Chomsky’s (2000, 2001a, 2001b) theory, access to the lexicon is restricted to a single access to a lexical array (LA). An LA is divided into subarrays, and each subarray must be exhausted by the derivation in such a way that it forms a certain syntactic object called a phase. CP and light verb phrase vP (but crucially not TP) qualify as phases. Each phase is closed off and sent to the LF/PF-component by Transfer (or, Spell-Out), prior to the next highest phase. Elements that are in the edge (or, the specifier and adjoined positions) of a phase can be accessed by operations outside the phase. In this way, phase theory delimits derivational cycles and reduces computational complexity. The notion of cyclicity is captured in terms of the

² As a modification of UD, Grewendorf (2003: 67) proposes a condition called Improper Remnant Movement (IRM) to the effect that remnant movement is prohibited unless it is of a higher type than internal movement. Types of movement are hierarchically ordered in (i):

( i ) \( A' \) -movement >> Adjunction movement >> A-movement

Thus, if the internal movement of X is adjunction movement, then the remnant movement of Y containing the unbound trace of X can be \( A' \)-movement, but never adjunction or A-movement. Just like the MLC-approach, IRM suffers from an empirical problem: in (9), wh-movement can be followed by movement of a lower type, i.e. topicalization. Moreover, its construction-specific character is also problematic.
Phase Impenetrability Condition (PIC):

(11) In phase P with head H, the domain of H is not accessible to operations outside P; only H and its edge are accessible to such operations.


Cecchetto and Hiraiwa both argue that the PBC should be rejected in favor of the PIC and that illicit remnant movement yields a PIC-violation. Let us first see how grammatical examples like (4) fall under their theory. The derivation of this example has the following steps:

(12) a. [TP John [vP is [AP t1 how proud of Bill]]]
    b. [CP [AP t1 how proud of Bill] is [TP John [vP t_v t2]]]

At each step, the PIC is observed. Neither TP nor non-transitive vP can be relevant phrases for the PIC.

Let us now consider the contrast between (13a) and (13b) (= (3)):

(13) a. ??Who does you wonder [which picture of t1] John likes t2?
    b. *[Which pictures of t1] do you wonder who John likes t2? (=(3)) (Saito (1989: 187))

To see how (13b) is ruled out by the PIC, let us first consider the following derivation of this example:

(14) a. [CP who [TP John [vP t1 tSubj likes [which picture of t1]]]]
    b. [vP [DP which picture of t1] [v you wonder [CP who [John [vP likes t2]]]]]
    c. [CP [DP which picture of t1] do [you [vP wonder [CP who [John [vP likes t2]]]]]]

At stage (14a), who1 has moved to the edge of vP and then to the edge of CP, in accordance with the PIC. In order for remnant DP2 to be moved to the matrix clause at a later stage (i.e. (14c)), it has to be moved to the edge of the matrix vP at stage (14b). However, remnant DP2 has already been rendered inaccessible to Move at the CP-level in (14a), since the complement of v has been sent to the LF/PF-component by Transfer. The putative derivation of (14) is at variance with the PIC.

Let us now consider the following legitimate derivation of (13a):

(15) a. [CP [DP which picture of who] [TP John [vP t2 likes t2]]]
    b. [CP who do you [vP t1 wonder [DP which picture of t1] John likes t2]]

DP2 is moved to the edge of vP and then to the edge of CP, as in (15a). Who1 is moved out of DP2 to the edge of the matrix vP and
then to the edge of the matrix CP, as in (15b). At each stage, the PIC
is satisfied. This is the gist of the Phase Approach.

This novel approach to PBC-effects, however, is problematic, both
theoretically and empirically. The first argument against it comes from
predicate fronting across a wh-island in examples such as (9) above. If
(13b) were excluded by the PIC, examples like (9) would also be
wrongly excluded (cf. Cecchetto (2001: 108)).

The second argument comes from a wh-island violation:

(16) ??What₁ do you wonder [how₂ John could fix t₁ t₂]?
(Sabel (2002: 264))

Extraction of an argument from a wh-island is marginally acceptable, as
seen in (16). The relevant condition is the Defective Intervention
Constraint (DIC) (Chomsky (2000: 128, 2001a: 4)):³

(17) If probe P matches inactive K that is closer to P than
matching M, the Agree relation between P and M is
blocked.

To see how this works, suppose that a derivation of (16) reaches (18):

(18) [vP John [v fix] [VP [vP t₁ v what₁ how₂]]]

Each wh-phrase has to be moved to the edge of the vP-phase before
moving on. The derivation proceeds up to the moment in which
embedded C is merged:

(19) [CP how₂ [C' what₁ [John T [vP t₂ [v t₁ v [VP [vP V t₁] t₂]]]]]]

Suppose that both CP and vP have multiple specifiers and that how₂ is
located in the outer Spec, while what is moved to its inner Spec via
tucking in (Chomsky (2001b: 7)). This means that a C/v-head optionally
bears more than one EPP-feature (Chomsky (2000: 102)). Other-
wise, the derivation yielding (16) would be blocked by the PIC.
The derivation proceeds further until it reaches (20):

(20) [vP you wonder [CP how₂ [C' what₁ [John ...]]]]

Since how is closer to the matrix v-head than what, if what is moved
across how to the vP, the DIC is violated. If this is on the right track,
then the edge of v/C optionally hosts more than one wh-phrase and the
marginal sentence (16) violates the DIC, but not the PIC.

³ The notion of closeness is defined as (i):

(i) A matching feature G(=goal) is closest to P(=probe) if there is no G' in
     D(P) matching P such that G is in D(G'), where D(X) is the c-command
domain of X. (cf. Chomsky (2000: 122))
However, Hiraiwa hypothesizes that a projection (except for a v-projection) has one and only one specifier. Cecchetto also hypothesizes that a wh-phrase (except for a which-NP) cannot use an extra escape hatch of CP if the CP is already occupied by another wh-phrase. Under these hypotheses, what cannot be moved to the CP-edge at stage (19). Then, marginally acceptable sentences such as (16) would be wrongly predicted to be completely unacceptable, since it would violate not only the DIC but also the PIC, an unwanted result.

Given that a v/C-head optionally bears more than one EPP-feature, ill-formed sentences such as (13b), just like marginal sentences such as (16), violate the DIC, but not the PIC. The contrast between these sentences would not be accommodated within the Phase Approach. It follows that the PBC cannot be rejected in favor of the PIC, and that the Cecchetto-Hiraiwa analysis does not endorse phase theory. For these reasons, their approach could not be maintained.

2.3. An Argument for A-Traces

As we have seen in (4), movement of a remnant category containing a trace of A-movement yields no PBC-effect. (21) is a parallel case:

(21) [How likely [t₁ to win the race]]₂ is John₁ t₂.

To ensure that such sentences are well-formed, Takahashi (2001) and Saito (2003) assume, following Lasnik (1999), that A-movement leaves no copy/trace. Since there is no unbound trace left within the remnant category, the PBC is satisfied vacuously in (4) and (21).

Although this is a possible solution to PBC puzzles, there are reasons to believe that A-movement leaves copies/traces. Let us consider the following example:

(22) Every picture of his₁ dog seemed to someone₁ to be out of focus. (Hornstein (1995: 159))

Here, the indefinite experiencer takes wide scope with respect to the A-moved universal quantifier. (23) is a similar case in point:

(23) Every student mustn’t get an A. At most a third of them can get one. (must>not>every) (Sauerland (2003: 309))

Here, negation not takes scope below modal auxiliary must and, at the same time, the universal quantifier is able to take scope below the negation, given an appropriate intonation and continuation pattern.

These facts are accommodated if an A-moved DP can be interpreted in one of its copy positions, as shown in the following schema:

(24) ... seemed/must ... [...] someone/not ... [...] every ...
In (22), for example, the raised subject is moved back to the embedded subject positions, so the genitive pronoun is correctly A-bound by the indefinite experiencer, within which the universal quantifier takes scope. A similar remark applies to (23). I would therefore suggest that the following property holds true of A-movement:

(25) An A-moved phrase can be reconstructed to one of its copies.

(25) is based on the fact that an A-moved phrase, whether or not it is a universal quantifier, can be interpreted in a position in which it can satisfy a certain binding requirement or receive a certain scope interpretation.

If, as Lasnik argues, A-movement did not leave any trace/copy, then such an LF-configuration as (24) would not be possible for (22)–(23). (See Boeckx (2001) for the claim that Lasnik’s (1999) arguments against A-traces are dubious.) Accordingly, unlike the theories proposed by Takahashi (2001) and Saito (2003), a promising approach to PBC-effects should not rest on the claim that A-movement leaves no copy.

In this section, I have explored possible problems with some previous approaches. In the next section, I will provide support for a reconstruction-based alternative.

3. On the Reconstruction Approach to Proper Binding Condition Effects

In this section, I will show that PBC-effects correlate with reconstruction types of remnant categories.

3.1. On the Typology of Reconstruction

Let us begin with the typology of reconstruction. We have at least three types of reconstruction, as follows:

(26) a. Obligatory Partial Reconstruction (for A’-moved arguments)

b. Obligatory Total Reconstruction (for A’-moved non-arguments)

c. Optional Total Reconstruction (for A-moved elements)

(26a) is an operation by which a fronted category or its restrictive part is obligatorily interpreted in an intermediate position between its surface and original positions. This type of reconstruction is referred to in
Lechner (1998) as shallow reconstruction. (26b) is an operation by which a fronted constituent or its non-operator part is obligatorily interpreted in its original position. (26c) is an operation by which a fronted category is optionally interpreted in its (original) trace position.

Let us first consider (26a). A'-movement of an argument headed by an operator shows obligatory partial reconstruction effects:4

(27)  
    a. *Which pictures of John1 did he1 like?  
    b. Which pictures of John1 did Mary say he1 saw?  


As is clear from (27b), it is characteristic of this reconstruction type that Condition C effects are weakened if the pronominal DP is deeply embedded. A similar contrast is observed in the case of topicalization:

(28)  
    a. *?Pictures of John1, he1 likes.  
    b. ?Those pictures of John1, I think that he1 said Mary likes.  

    (Takano (1995: 331))

c. *Ben1's problems, he1 won't talk about.  

d. Ben1's problems, you can't talk to him1 about.  

    (Reinhart (1981: 609))

This implies that a fronted phrase is obligatorily reconstructed to a position lower than the matrix subject, yielding a Condition C violation in (27a) and (28a, c). Furthermore, such a fronted phrase is only partially reconstructed to a position between the matrix subject and the verb, thereby attenuating Condition C violations in (27b) and (28b, d). A similar effect is observed in pronominal binding cases (Culicover (1992: 659)):

(29)  
    a. His1 paycheck, everyone1 should give me t.  
    b. *His1 partner, I managed to introduce no one1 to t on time.  

Pronouns interpreted as variables bound by quantifiers have to be c-commanded by their variables at LF. Let us call this requirement the Bound Pronoun Principle (BPP). In (29a), the BPP is satisfied, since topicalized DP is reconstructed to some position (e.g. vP-adjoined position) c-commanded by the variable of everyone. In (29b), in contrast, topicalized DP should not be reconstructed to t; otherwise, the pronoun

4 We leave open the question of what makes the difference between less acceptable sentences, such as (28b), and acceptable ones, such as (27b).
his could be bound by the variable of no one. Similar cases in point are the following:

(30)  

a. You should give everyone₁ his₁ paycheck.

b. *His₁ paycheck, you should give everyone₁ t.

c. *A picture of him₁ shaving, you should show no one₁ t.

d. *The person that wrote it₁, I agreed to give every book₁ back to t at no charge. (ibid.)

(31)  

a. [Which criticism [because of his₁ scandal]] does every congressman₁ remember t? (Ishii (1998: 44))

b. *Which picture of her₁ do you regret that every woman₁ admires?

c. *Which of her₁ stories do you think that every woman₁ remembers? (Johnson (1992: 268))

Let us suppose that (32) holds true of A'-moved arguments:

(32) Obligatory partial reconstruction applies to an A'-moved argument, whereby the restrictive part of the operator is interpreted only in some position between the subject closest to the operator and its verb.

In Chomsky’s (1995: Ch. 3) theory, copies created by A'-movement are subject to operations akin to Quantifier Raising (hereafter, quasi-QR) and complementary deletion in order to constitute a legitimate LF-object, i.e. a tripartite structure consisting of an operator, a restrictive part and a variable. Thus, a sentence like Who did we see? has the following derivation in the LF-component:

(33)  

a. [O person] did we [O person] see [O person]

b. [O person][x] we [O person][x] saw [O person][x]

c. [O₁][x person][x] we [O₁][x person][x] saw [O₁][x person][x]

Suppose that successive cyclic movement leaves an intermediate copy, as in (33a). Who is analyzed as which person(s) (cf. Heim (1987)), and operator O corresponds to which. By iterative applications of quasi-QR, [O person] adjoins to itself in (33b) and O adjoins to itself in (33c). (33c) has the following potential structures after the application of complementary deletion:

5 Conditions A and B have different characteristics from Condition C and the BPP. We will return to this issue in note 7.
(34)  a. \([O_x] [x \text{ person}] \ \text{we saw} \ [x]\)
b. \([O_x] \ \text{we} \ [x \text{ person}] \ \text{saw} \ [x]\)
c. \([O_x] \ \text{we saw} \ [x \text{ person}] \ [x]\)

Such a tripartite structure, consisting of operator \(O_x\), restriction \([x \text{ person}]\) and variable \([x]\), serves as a legitimate LF-object. If (32) is a correct observation, (34b) is the only possible deletion pattern for \(A'\)-moved arguments.

After the application of obligatory partial reconstruction, (27a, b), for example, are mapped onto (35a, b), respectively:

(35)  a. \([O_x] \ \text{he}_1 \ [x \text{ pictures of John}_1] \ \text{likes} \ [x]\)
b. \([O_x] \ \text{Mary} \ [x \text{ pictures of John}_1] \ \text{said he}_1 \ \text{saw} \ [x]\)

In (35a), the restrictive part is located between the subject and verb, yielding a Condition C violation. In (35b), by contrast, the restriction is located somewhere higher than \(he\), so a Condition C effect is attenuated. Similar remarks apply to (28)–(31).6 7

6 An EL reviewer suggests that such a reconstruction effect would follow if it is assumed that both TP and CP are projections of a clause in a broad sense and that the subject of TP always c-commands Spec-CP. Such a solution is problematic, however, since it would wrongly exclude antireconstruction cases, as we will see in note 8.

7 The question arises here as to why anaphors behave as if they are reconstructed to deeply embedded positions. Consider (i):

(i) Which picture of herself did John say that Jo heard that Joe likes?

One cannot resort to covert anaphor movement (Chomsky (1995: Ch. 3)). Suppose that an anaphor covertly moves to be licensed by its antecedent, leaving a trace in the restriction. Since the restriction is only partially reconstructed, the trace would not be bound at LF in sentences like (i), violating the PBC.

For this reason, it is reasonable to assume that Condition A is not an LF interpretive rule, but an anywhere condition, as suggested by Sabel (2002) and Saito (2003), among others:

(ii) Condition A can be fulfilled at any stage of the derivation.

Let us turn to Condition B, which also shows weakening effects.

(iii)  a. *\(\text{Him}_1, \ \text{John}_1 \ \text{likes} \ t_1\).
     b. \(\ \text{Him}_1, \ \text{John}_1 \ \text{thinks} \ \text{Mary} \ \text{likes} \ t_1\). \ \text{(Barss (1986: 408))}

Suppose that the restrictive part of \([O \text{ him}]\) undergoes obligatory partial reconstruction. An EL reviewer notes that if Condition B were an LF interpretive rule, the contrast between (iii) and (iiib) would remain a mystery. Let us suppose that Condition B is also an anywhere condition that needs to be satisfied only once:

(iv) Condition B can be fulfilled at any stage of the derivation.

In (iiib), Condition B is fulfilled before \(\text{him}\) moves out of the embedded clause. In (iiiia), by contrast, copies of \(\text{him}\) are locally bound by \(\text{John}\) prior to reconstruction, and the restriction containing \(\text{him}\) is c-commanded by the local binder after obligatory partial reconstruction.
Let us turn to (26b). Obligatory total reconstruction is a property demonstrated by predicate fronting. Thus, consider (36):

(36)  
a. (??)*Criticize John₁, he₁ said I will not.
b. *Criticize John₁, I think he₁ said Mary did.
c. (??)*How proud of John₁ does he₁ think I should be?
d. *How proud of John₁ do you think he₁ said Mary is?

(Takano (1995: 329, 331))

In (36b, d), Condition C effects are not attenuated, though pronominals are deeply embedded. The following examples from Speas (1991a: 51) show a similar pattern (see Guéron (1984), for parallel cases):

(37)  
a. *How near Dan₁ did he₁ find a snake?
b. *How near Dan₁ did Mary say he₁ found a snake?

Let us suppose that (38) holds true of A'-moved non-arguments (cf. Takano (1995: 332)):

(38) Obligatory total reconstruction applies to an A'-moved non-argument, whereby its non-operator part is interpreted only in the original position.

Let us assume with Takano (1995) that (36a, b) are given operator-variable structures like (39a, b), respectively:

(39) a. \[\text{Ox} \text{ he₁ said I will not } [x t\text{Subj} \text{criticize John₁}]\]
b. \[\text{Ox} \text{ I think he₁ said Mary did } [x t\text{Subj} \text{criticize John₁}]\]

In this manner, Condition C violations are yielded in (36) and (37).³

³ NPs within an adjunct which is adjoined to a fronted phrase can evade Condition C (an antireconstruction effect), as in (ia, b).

(i)  
a. Which story that John₁ wrote does he₁ like?
b. Which pictures near John₁ did he₁ destroy?

(Speas (1991b: 241))

Adjuncts can be post-cyclically merged with a wh-phrase in the derived position (Chomsky (1995: Ch. 3)). (ib), for example, has the following structure:

(ii) \[\text{O pictures [near John]} \text{ he [O pictures] destroyed [O pictures]}\]

Since no copy of the adjunct is created during the course of the derivation, the restrictive part, i.e. \([x \text{pictures near John}]\), may not be deleted in the matrix Spec-CP position, due to a recoverability principle. (ii) is mapped onto the reconstructed structure (iii).

(iii) \[\text{O₁} [x \text{pictures near John} \text{ he destroyed } [x]]\]

Non-cyclically merged adjuncts are therefore exempt from obligatory partial reconstruction.

Let us suppose that obligatory total reconstruction involves an operation akin to quantifier lowering (quasi-QL) and the deletion of copies created by this operation.
As for optional total reconstruction (26c), we have seen in section 2.3 that this is a property shown by A-moved elements. They can be reconstructed to their trace position (cf. (25)).

With this in mind, I will show in the next section that PBC-effects on remnant movement follow from the above-mentioned reconstruction properties.

3.2. Alternative Analysis

Let us begin with PBC-effects on A'-moved arguments. We repeat here examples (13a, b):

(13) a. ??who₁ do you wonder [which picture of t₁]₂ John likes t₂
b. *[which pictures of t₁]₂ do you wonder who₁ John likes t₂
(=3) (Saito (1989: 187))

Given the discussion in the last section, a PBC-effect in (13b) is a consequence of obligatory partial reconstruction. After the application of reconstruction, this sentence has the following LF-structure:

(40) [Oₓ] you [x pictures of y] wonder [whoy] [John likes x]

Here, restriction [x pictures of y] is located somewhere between you and wonder. Then, variable y embedded within the restriction is not bound by operator who, violating the PBC (for the ease of exposition, I ignore the fact that whoy is further decomposed into Oy and [y person]). No

Thus, consider (iv) below. A predicate Pr is overtly A'-moved to a sentence-initial position, creating a copy Pr', as in (iva). By the application of quasi-QL, a lower copy Pr" is created in the complement to T, as in (ivb), followed by the deletion of the older copies (i.e. Pr and Pr'), as in (ivc):

(iv) a. Pr' [TP ... T Pr] (predicate-fronting)
b. Pr' [TP ... T [Pr [Pr"]]] (quasi-QL)
c. [TP ... T Pr"] (copy-deletion)

If this is correct, we can accommodate an argument/non-argument asymmetry with respect to antireconstruction. Unlike A'-moved arguments, A'-moved predicates do not show attenuated Condition C effects. Compare (i) with sentence (v) from Takano (1995: 332):

(v) *Criticize a student that John₁ taught, he₁ said Mary did.

Even if the adjunct is postcyclically merged with vP in the matrix Spec-CP, (the non-operator part of) the whole predicate is copied onto the complement to T by quasi-QL. Condition C is therefore violated. While obligatory partial reconstruction involves iterative quasi-QR (rather than quasi-QL) and complementary deletion, obligatory total reconstruction involves quasi-QL and copy-deletion. I will return to the reason why these two types of reconstruction involve different operations in section 5.
PBC-violation is involved in (13a), since the restriction of *which* remains in the embedded clause.

One might wonder why *whoy* (or *Oy*) in (40) could not be reconstructed to variable *y*. If this were allowed, (40) might satisfy the PBC, since unbound trace *y* would be bound by its operator. However, if such an operation were allowed, LF-operations could alter the overtly determined scope relations, which is barred by economy considerations. It is uneconomical to reassign scope to *wh*-phrases in English. The scope of *who* has been overtly fixed in the subordinate interrogative Spec-CP position. Moreover, it does not make sense to delete an operator in operator positions.

Consider the following parallel examples from Saito (1989: 187):

(41) *who*$_1$ $t_1$ knows [which picture of whom]$_2$ Bill bought $t_2$.
(42) ??[Which picture of whom]$_1$ do you wonder who$_2$ $t_2$ bought $t_1$.
(41) is ambiguous: whom takes either matrix or embedded scope. (42), by contrast, is unambiguous: whom takes only matrix scope. Under the embedded scope interpretation of whom in (42), both the operator of whom and the restriction of which picture of whom would have to be interpreted in the embedded clause, which is not possible under obligatory partial reconstruction (32). For this reason, the scope of whom is restricted to the matrix clause.

The contrast between (43a) and (43b) is a parallel case:

(43) a. ??*who*$_1$ $t_1$ said that [the man that bought what]$_2$, John knows whether Mary liked $t_2$?
    b. *Mary thinks that [the man that bought what]$_2$, John knows who$_1$ $t_1$ likes $t_2$. (Saito (1989: 188))
(43a) is marginal, due to an island effect. In this sentence, what has to take matrix scope. This is because the operator and restriction of what cannot be reconstructed to the deepest clause, by definition. (43b) is ungrammatical, not only because it involves an island violation, but also because, although what could be licensed only in the interrogative Spec-CP position, the reconstruction of DP$_2$ into the deepest clause is not possible under (32).

So far, we have seen that the PBC-effect on A'-movement of remnant arguments is a consequence of obligatory partial reconstruction. Let us turn to the absence of PBC-effects on A'-movement of remnant predicates. Consider first the following sentence:

(44) [Fired $t_1$ by the company]$_2$ John$_1$ indeed was $t_2$.  
    (Cecchetto (2001: 101))
If (38) is correct, the well-formedness of such examples is straightforwardly accommodated. A fronted predicate is totally reconstructed to its original position. Therefore, the LF-structure assigned to (44) looks like:

(45) \([O_y] \text{John}_1 \text{indeed was [y fired t}_1 \text{by the company]}_2.\)

Here, O_y is a topic operator, whose non-operator part has been reconstructed to the original position. Trace t_1 is properly bound by John, satisfying the PBC.

Let us return to example (9), repeated here as (46a). (46b) is a parallel case with a wh-phrase in-situ instead of a proper noun:9

(46) a. ?[Give t_1 to Mary]_2 I really don’t know which book_1 he did t_2.
    b. ?[Give t_1 to whom]_2 I really don’t know which book_1 he did t_2.

Each sentence involves only a wh-island violation. Our approach can ensure that the PBC is satisfied in (46a, b), whose respective LF-structures would look like (47a, b):

(47) a. \([O_y] \text{I really don’t know [O}_x \text{he [x book] [y gave x to Mary]}\]
    b. \([O_y] \text{I really don’t know [O}_x \text{[whom}_z \text{he [x book] [y gave x to z]}\]

In (47a), the fronted predicate is reconstructed to the embedded verb phrase, whereby variable x can be bound by O_x in accordance with the PBC. The same remark applies to (47b). Although whom takes only embedded scope, the predicate containing the variables x and z is totally reconstructed and the PBC is observed.10

We have seen that in sentences such as (48a), no PBC-violation is

9 I am indebted to an EL reviewer for bringing this example to my attention.
10 An EL reviewer has pointed out that if predicates are obligatorily reconstructed to their original positions, then movement of a remnant predicate as in (i) should be allowed. However, (i) is ungrammatical, although the remnant vP avoids a PBC-violation.

(i) *[Say that Bill would t}_1\text{]}_2, John thinks that [win the race]_1, Mary did t_2.

The ungrammaticality of such examples is due to the fact that a topicalized phrase counts as a strong island (Müller (1998: 239)):

(ii) *[This book]_2 Mary thinks that [to John]_1 Bill gave t_2 t_1.

A violation of the topic island condition gives rise to a severe deviance. Therefore, (i) does not count as an argument against the present approach. See also note 1.
yielded, since they are given an LF-structure such as (48b):

(48)  a. [How likely t to win] is John?
     b. [O,x] John₁ is [x likely t₁ to win]

A question arises here as to how the following paradigm can be accommodated:

(49)  a. Advantage is likely to be taken of John.
     b. There is likely to be a riot.

(Lasnik and Saito (1992: 141))

(50)  a. *[How likely t₁ to be taken of John]₂ is advantage₁ t₂?
     b. *[How likely t₁ to be a riot]₂ is there₁ t₂? (ibid.)

As shown in (50), idiom chunks and existential there do not tolerate remnant predicate fronting. These ungrammatical sentences are assigned the following LF-configurations after the application of obligatory total reconstruction:

(51)  a. [O,x] advantage₁ is [x likely t₁ to be taken of John]
     b. [O,x] there₁ is [x likely t₁ to be a riot]

In (51a, b), t₁ can be bound by its antecedent, so (50a, b) are not excluded by the PBC. This does not necessarily mean that the property (38) of A'-moved non-arguments is incorrect. As suggested by Boeckx (2002) and Abels (2002), the ill-formedness of (50a, b) can be attributed to the fact that idiom chunks and existential there cannot move past interrogative how, but arguments can:

(52)  a. Who said that John was how likely to win?
     b. *Who said that there is how likely to be a riot?
     c. *Who said that advantage was how likely to be taken of John? (Abels (2002: 10))

If the ill-formedness of (50) is accommodated by whatever explanation is offered to rule out (52b, c), then we can safely conclude that (50) does not cast doubt on the viability of the PBC and (38).\(^{11}\)

3.3. Remnant Movement in German

In the previous section, I have shown that PBC-effects on remnant movement are correlated with the properties of reconstruction operations applied to fronted remnants. It is tempting to see whether such corre-

\(^{11}\) We will not discuss PBC-effects on remnant A-movement, because there are not sufficient data available. See also note 12.
lation also holds true of German remnant movement.

Let us start with the correlation between short scrambling and PBC-effects. Short scrambling is an operation which raises XP to a postsubject position. (53b) is derived from (53a) by this operation:

\[(53)\]
\[
\begin{align*}
(53a) & \quad \text{weil die Maria [jedem}_1 \text{ [sein}_1 \text{ Geschenk]}_2 \text{ überreicht} \\
& \quad \text{since the Mary everyone his parent gave}
\end{align*}
\]
\[
\begin{align*}
& \text{habe]} \\
& \quad \text{has}
\end{align*}
\]
\[
\begin{align*}
(53b) & \quad \text{*weil die Maria [sein}_1 \text{ Geschenk]}_2 \text{ [jedem}_1 \text{ t}_2 \text{ überreicht} \\
& \quad \text{since the Mary his parent everyone gave}
\end{align*}
\]
\[
\begin{align*}
& \text{habe]} \\
& \quad \text{has}
\end{align*}
\]
\[(\text{Lechner (1998: 297))}\]

In (53b), DP$_2$ is scrambled across DP$_1$, but not across the subject. Pronoun sein cannot be interpreted as a variable bound by VP-internal quantifier jedem. To accommodate this fact, Lechner (1998) claims that short scrambling cannot be reconstructed to its original position. The same is the case with the following pair of examples:

\[(54)\]
\[
\begin{align*}
(54a) & \quad \text{*daß der Jörg ihn}_1 \text{ [die Bilder vom Hans}_1]_2 \text{ gezeigt} \\
& \quad \text{that John him the pictures of Hans shown}
\end{align*}
\]
\[
\begin{align*}
& \text{hat.} \\
& \quad \text{have}
\end{align*}
\]
\[
\begin{align*}
& \quad \text{‘that John has shown him}_1 \text{ the pictures of Hans}_1,\]
\end{align*}
\]
\[
\begin{align*}
(54b) & \quad \text{daß der Jörg [die Bilder vom Hans}_1]_2 \text{ ihm}_1 \text{ t}_2 \text{ gezeigt} \\
& \quad \text{that John the pictures of Hans him shown}
\end{align*}
\]
\[
\begin{align*}
& \text{hat.} \\
& \quad \text{have} \\
& \quad \text{(Frank, Lee and Rambow (1995: 14))}
\end{align*}
\]

If short scrambling of DP$_2$ were obligatorily reconstructed to t$_2$, (54b) would be excluded by Condition C on a par with (54a). This also bolsters the claim that short scrambling cannot be reconstructed.

Let us suppose that this claim is correct. In that case, the present theory predicts that short scrambling of a category containing a trace would give rise to a PBC-violation. This prediction is borne out. Consider the following example:

\[(55)\]
\[
\begin{align*}
(55a) & \quad \text{Gestern habe ich [PRO das Fahrrand}_1 \text{ zu reparieren]}_2 \text{ reparieren]_2} \\
& \quad \text{yesterday have I the bicycle to repair}
\end{align*}
\]
\[
\begin{align*}
& \text{der Helga t}_2 \text{ versprochen.} \\
& \quad \text{Helga promised}
\end{align*}
\]
\[
\begin{align*}
& \quad \text{‘I promised Helga to repair the bicycle.’}\]
\]
b. *Gestern habe ich [PRO $t_1$ zu reparieren]$_2$ das Fahrrad$_1$
    yesterday have I to repair the bicycle
    der Helga $t_2$ versprochen.
    Helga promised (ibid.: 24)

In (55a), the complement to *promise is dislocated by short scrambling.
The grammaticality of this sentence demonstrates the fact that there is
nothing wrong with short scrambling of the complement. In the
derivation of (55b), internal scrambling of *das Fahrrad is followed by
remnant scrambling of [PRO $t_1$ zu reparieren]. Since this remnant
phrase cannot be reconstructed to $t_2$, $t_1$ remains unbound, violating the
PBC.

Let us now consider the correlation between scrambling across a sub-
ject and PBC-effects. Compare the following example with (53a)
above:

(56) *weil [sein$_1$ Geschenk]$_2$ die Maria [jedem$_1$ $t_2$ überreicht habe]
    since his parent the Mary everyone gave has
    (Lechner (1998: 297))

(56) is parallel with (29)-(31), above. Scrambling of DP$_2$ shows an
obligatory partial reconstruction pattern. Condition C effects in the fol-
lowing examples illustrate this point:

(57) a. *daß er$_1$ [die Bilder vom Hans$_1$]$_2$ gekauft hat.
    that he1 the pictures of Hans bought has
    (Frank, Lee and Rambow (1995: 14))
    ‘that he1 has bought the pictures of Hans$_1$’

b. *daß [die Bilder vom Hans$_1$]$_2$ er$_1$ $t_2$ gekauft hat.
    that the pictures of Hans he bought has

(56)-(57) indicate that scrambling across a subject is obligatorily recon-
structed to a position lower than the matrix subject and higher than the
verb phrase.

The present theory predicts that scrambling of a remnant category
containing a trace gives rise to a PBC-violation, if its antecedent is
located below the matrix subject. This prediction is borne out. Con-
sider (58a, b), which illustrates this point:

(58) a. weil [TP PRO $t_1$ zu küssen]$_2$ der Student$_1$ von Maria
    since to kiss the student by Mary
    [*CP $t_2$ ] versucht wurde.
    tried was (Grewendorf (2003: 82))

b. *daß [TP PRO $t_1$ zu lesen]$_2$ keiner [*VP [*CP [*DP das Buch]]$_1$
    that to read no-one the book
t2] versucht] hat
tried has (Müller (1998: 227))

In (58a), embedded object *der Student* is passivized to the subject position before embedded infinitival TP2 is scrambled across the subject. In the LF-component, TP2 is reconstructed to a position lower than the derived subject, so *t1* can be properly bound by its antecedent. In (58b), by contrast, DP1 has undergone scrambling within embedded CP (cf. Grewendrof and Sabel (1994: 290, 291)) before TP2 is scrambled across subject *keiner*. TP2 is reconstructed to some position lower than subject *keiner* and higher than the verb phrase headed by *versucht*, so *t1* cannot be bound by DP1, violating the PBC.

On the other hand, predicate topicalization in this language shows an optional total reconstruction pattern, as shown in (59):

(59) a. [zugeben, daß [der Kerl dort drüben]1 krank ist], würde
er1 kaum
‘admit that the guy over there is ill, he hardly would.’

b. [sein1 Lieblingsbuch stehlen] darf man keinen1,
his favorite book steal may one-Nom nobody-Dat
‘One must not rob anybody of his favorite book.’


Subject pronoun *er* in (59a) can be coreferential with DP1 embedded within the fronted verb phrase. If the fronted predicate were obligatorily reconstructed, this sentence would be excluded as a Condition C violation. Pronoun *sein* in (59b) can be bound by *keinem*. If the fronted predicate were not reconstructed at all, such a bound pronoun interpretation would not be available. This indicates that a fronted verb phrase can be optionally reconstructed to its original trace. In such a case, we can straightforwardly accommodate the absence of PBC-effects on topicalization of a remnant verb phrase in such examples as (60):

(60) a. [t1 Gelesen]2 hat das Buch1 keiner t2.
read has the book no-one (Müller (1998: 215))

b. ??[t1 Geküßt]2 weiß ich nicht [wen1, sie t2 hat].
kissed know I not whom she has (ibid.: 178)

Although (60b) is marginal because of a *wh*-island violation, there is no PBC-effect involved here. In each sentence, the topicalized verb phrase can be reconstructed to *t2*, so *t1* is properly bound by its antecedent.

If this treatment is tenable, we can safely conclude that reconstruction types and PBC-effects on remnant movement are correlated and that the present reconstruction approach is given further support from German
remnant movement.

4. On the Status of the Proper Binding Condition

So far, I have argued that PBC-effects on remnant movement can be explained if we look at the post-reconstruction structure. The next question that arises here is whether or not the PBC can be maintained as it stands. Chomsky (1995: 228) has introduced the Inclusiveness Condition, which states that no new objects are added in the course of computation, apart from rearrangements of lexical properties. Under this condition, Move creates a copy of the original category, rather than a trace, and traces have only a taxonomical status. If we take this assumption seriously, the original version of the PBC in (1) can no longer be viable and must then be restated in terms of copy theory.

Takano (1995) proposes that one such candidate is the Chain Condition in (61):

\[(61) \text{ } C = (\alpha_1, \alpha_2, \ldots, \alpha_n), \text{ where } \alpha_1 \text{ is its head and } \alpha_n \text{ its tail, is a legitimate chain at LF only if for each } i, 1 < i < n-1, \alpha_i \text{ c-commands } \alpha_{i+1}.\]  

(Takano (1995: 336))

We should recall that A'-moved arguments and non-arguments are given such LF-structures as (34b) and (48b), repeated here:

(34) b. [Ox] we [x person] saw [x]
(48) b. [Ox] John1 is [x likely t1 to win]

In (34b), who has a tripartite structure consisting of operator Ox, restriction [x person] and variable [x]. In (48b), the fronted predicate has a structure consisting of operator Ox and non-operator part [x likely t1 to win]. Given that the application of reconstruction operations gives rise to such a modified structure rather than a chain, \( \alpha_1, \alpha_i, \text{ and } \alpha_n \) in (61) should be understood to correspond to an operator, a restriction and a variable, respectively.\(^{12}\)

\(^{12}\) A-reconstruction can apparently create a complication for the Chain Condition. Let us recall that A-movement can be optionally reconstructed to its copy under (25). Suppose then that there is a sentence in which a remnant category contains an unbound A-trace. If this trace is left unbound at LF, a PBC-effect would be yielded. If, however, the head of an A-chain can be reconstructed to such an unbound trace, the A-chain ends up with a single-membered chain, i.e. \( C=(\alpha) \), after reconstruction. Accordingly, the chain can vacuously satisfy the Chain Condition, and such sentences are predicted to be grammatical. Because of the lack of data, we leave open the question of whether this prediction is borne out.
Takano (1995) claims that reconstruction is triggered in order to satisfy the Chain Condition. Such a theory is consistent with obligatory reconstruction of fronted non-arguments (e.g. (4)), but not with PBC-violations in (3) and attenuated Condition C effects, as in (27b). We assume, contrary to Takano, that the Chain Condition is an LF interpretive rule, on a par with Binding Condition C and the BPP (cf. (29)). As an LF interpretive rule, the Chain Condition does not trigger operations; rather, it is applied to the output of, say, quasi-QR, complementary deletion, or other reconstruction operations. Accordingly, derivations yielding unbound copies could converge, but they would yield deviant interpretations (cf. Chomsky (2001b: 10)).

This move provides support for the necessity of representational conditions, which has recently been recognized in the literature (Aoun and Li (2003)). If this is tenable, the copy-theory version of the PBC can be the Chain Condition, although we will leave a further refinement of this analysis to future research.

5. Conclusion

In this paper, I have pointed out problems associated with some of the current approaches to PBC-effects on remnant movement. The alternative approach that I have adopted has shown that such effects are accommodated, according to the types of reconstruction (i.e. (32), (38) and (25), repeated here) applied to a remnant category:

(62) a. Obligatory partial reconstruction applies to an A'-moved argument, whereby the restrictive part of the operator is interpreted only in some position between the subject closest to the operator and its verb. (=32))

b. Obligatory total reconstruction applies to an A'-moved non-argument, whereby its non-operator part is interpreted only in the original position. (=38))

c. Optional total reconstruction: An A-moved phrase can be reconstructed to one of its copies. (=25))

I have suggested that one part of the PBC can be taken over by the Chain Condition.

The remaining task is to derive (62a–c) from general principles (cf. note 8). Chomsky (1995) hypothesizes that whenever possible, an operator must be minimized (the Preference Principle) and a restriction deleted in the operator position by complementary deletion. Based on
this principle, Terada (1995) has proposed that a restriction can be reconstructed to any position between the operator and the variable. Recently, Fox (2000) has introduced the principle of Operator-Variable Economy (hereafter, OVE). OVE bars the deletion of material from the tail of an A’-chain, whenever such deletion is not necessary (p. 178). Since the restriction is forced to move back to the tail of its chain by OVE, such sentences as (27b) above would be wrongly excluded by Condition C (Terada (2002)). We repeat (27a, b) here:

(27) a. Which pictures of John1 did he1 like?
    b. Which pictures of John1 did Mary say he1 saw?


These previous proposals do not provide any answer to the question of why the restrictive part of an operator has to be located between the subject closest to the operator and its verb (=62a)). A potential answer to this question might lie in Diesing’s (1992) Mapping Hypothesis. According to this hypothesis, the syntactic representation of a sentence is mapped onto the semantic representation consisting of an operator (or, a CP-level subtree), a restrictive clause (or, an TP-level subtree) and a nuclear scope (or, a vP-level subtree). It is natural to suppose then that whenever possible, a restriction is located in the restrictive clause. In such a case, the restriction [x pictures of John], as in (27), is reconstructed into some position within the TP-level subtree, resulting in obligatory partial reconstruction. It might be the case that obligatory total reconstruction (62b) is also triggered by this hypothesis. Suppose that the whole predicate is reconstructed to its original position, simply because vP must be mapped onto a nuclear scope. Although a further inquiry into this possibility is necessary, that is beyond the scope of this paper. We will therefore leave this issue to future research.

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Department of English Education
Osaka Kyoiku University
4-698-1 Asahigaoka, Kashiwara-shi
Osaka 582-8582
e-mail: terakan@cc.osaka-kyoiku.ac.jp