RECONSTRUCTION OF RESTRICTIONS

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An r-expression embedded within an NP, when fronted to a sentence-initial position, cannot be coreferential with the matrix subject. Such disjoint reference, however, disappears or becomes considerably weakened when the antecedent of the r-expression is deeply embedded. We thus propose within the minimalist program that at LF an A'-chain of an argument must have a tripartite (operator-restriction-variable) structure and that the restriction containing an r-expression can be "reconstructed" into any position between the operator and the variable. Thus we can derive the weakening of disjoint reference, since the r-expression can escape from the c-command domain of deeply embedded arguments.*

1. Introduction

In this article I investigate reconstruction effects into embedded clauses, within Chomsky's minimalist program. Chomsky (1993) introduces the copy theory of movement in order to eliminate the operation of reconstruction that restores what has been once moved. Arguments for this theory come from his analysis of reconstruction effects on binding conditions. Chomsky (1995) further proposes full reconstruction. Those accounts, however, fail to derive some puzzling reconstruction phenomena. The main purpose of this article is to make explicit what assumptions are necessary to accommodate such phenomena. Our alternative approach in fact supports the copy theory of movement.

The paper is organized as follows. Section 2 presents an introduction to asymmetries observed in reconstruction phenomena. Section 3 shows that Chomsky's (1993; 1995) analyses are not adequate,

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given the data described in Section 2. Section 4 proposes a revision of the application of an operation akin to Quantifier Raising and LF-deletion of copies to derive a tripartite structure. Section 5 shows that evidence in favor of the analysis proposed in Section 4 comes from facts concerning Condition A and B as well. Section 6 outlines how the puzzling problems surrounding strong crossover and scope interpretations can be dealt with under our proposal. Section 7 concludes this article.

2. Preliminary Remarks

Let us consider first the following asymmetry reported in the literature:

(1) a. ?*Which pictures of Johni does hei like?
   (Speas (1991: 254))
b. Which pictures of Johni do you think hei said Mary likes?
   (Takano (1993: 4))
c. Which pictures of Johni did Mary say hei saw t?
   (Marantz (1995: 374))

The data in (1) show weakening of reconstruction effects: the effects of Binding Condition C (i.e. disjoint reference between the name and the pronoun) are weakened or even disappear if the pronoun is more deeply embedded. Thus, John in the wh-phrase cannot be coreferential with the matrix subject, as in (1a), but it can be coreferential with the embedded arguments, as in (1b–c). The same contrast is observed in the case of topicalization, as in (2a–b):

(2) a. *?Pictures of Johni, hei likes.
   (Speas (1991: 252))
b. Those pictures of Johni, I think hei said Mary likes.
   (Takano (1993: 4))

From the contrasts observed in (1)–(2) follows a generalization as in (3):

(3) A name within a fronted NP cannot be coreferential with the matrix subject, but it can be coreferential with embedded ones.

This generalization will be true if we put aside so-called anti-reconstruction effects: a name within a fronted adjunct or relative clause does not show Condition C effects, as shown in (4a–c):

(4) a. Which pictures near Johni does hei like most t?
   (Huang (1993: 106, fn. 4))
b. Which student that John taught did he say Mary criticized? (Takano (1993: 5))
c. The students that John taught, he said Mary criticized. (Ibid.: 5)

In (4a-c), the name in the A'-moved NP can be coreferential with the matrix subject. Such an anti-reconstruction effect is accounted for within the minimalist program, which we will review in the following sections.

Thus, the weakening effect of reconstruction is observed only if a name is embedded in an argument of A'-moved NPs. In the next section, we will argue that this weakening effect may not be accommodated under Chomsky’s (1993; 1995) proposals.¹

3. Minimalist Program and Reconstruction Effects

In this section we will argue that the weakening effect observed in the last section does not fall under Chomsky’s (1993; 1995) accounts.


Consider first the following contrast:

(5) a. Which claim [that John was asleep] was he willing to discuss
b. Which claim [that John made] was he willing to discuss (Chomsky (1993: 36))

Coreference between John and he is permissible in (5b) but not in (5a).

Chomsky introduces the copy theory of movement, as formulated in (6):

(6) A trace left by movement is a copy of the moved element, deleted by a principle of the PF component in the case of overt movement. (Ibid.: 35)

Given this theory, a structure as in (7) would be given to (5a):

(7) [CP [which claim [that John was asleep]] [he was willing to discuss [which claim [that John was asleep]]]]

¹ "The weakening effect" is a term introduced in Takano (1993).

In this article we will not discuss other reconstruction effects surrounding A-chains, A'-chains of adjuncts, and parasitic gaps. For these matters, see Barss (1986), Ike-uchi (1993), Takano (1993), Munn (1994), Guéron (1984), Speas (1991) among others.
Since the complement \textit{that John was asleep} must be inserted into the wh-phrase before wh-movement, its copy is left in its original position (as well as intermediate adjunction sites). In the LF component, an operation akin to Quantifier Raising (henceforth let us call it quasi-QR (cf. Tonoike and Oishi (1992))) applies to both the fronted wh-phrase and its copies, yielding (8):

\[
\text{(8)} \quad [\text{CP} [\text{which } x] [x \text{ claim } [\text{that John was asleep}]] [\text{he was willing to discuss } [[\text{which } x] [x \text{ claim } [\text{that John was asleep}]]]]]
\]

Derivations must converge at LF and hence the representation must consist of nothing but legitimate LF-objects (i.e. heads, arguments, adjuncts, and operator-variable constructions). In order to form an operator-variable structure, such a structure as (8) must undergo an operation of LF-deletion: every category except an operator must be deleted in the operator position and an operator must be deleted in the non-operator (i.e. trace) positions. Let us refer to such LF-deletion as "complementary deletion" (cf. Tonoike and Oishi (1992)). This converts (8) to the following two possible LF-structures (9a–b):

\[
\begin{align*}
\text{(9a)} & \quad [\text{CP} [\text{which } x] [\text{he was willing to discuss } [x \text{ claim } [\text{that John was asleep}]]]] \\
\text{(9b)} & \quad [\text{CP} [\text{which } x, x \text{ a claim } [\text{that John was asleep}]] [\text{he was willing to discuss } x]]
\end{align*}
\]

Then the computational system selects the derivation(s) satisfying derivational principles such as the Preference Principle, as formulated in (10):

\[
\text{(10) Preference Principle} \\
\text{Try to minimize the restriction in the operator position.} \\
\text{(Chomsky (1993: 41))}
\]

The computational system then singles out the derivation yielding (9a), in which the restriction \textit{x claim [that John was asleep]} is not in the operator position, satisfying the Preference Principle.

Binding Condition C, an interpretive condition applying to LF-outputs, is defined as in (11),

\[
\text{(11) If } \alpha \text{ is an r-expression, interpret it as disjoint from every c-commanding phrase,} \\
\text{where } \gamma \text{ c-commands } \beta \text{ iff } \gamma \text{ and } \beta \text{ do not dominate each other and every node that dominates } \gamma \text{ dominates } \beta.
\]

According to Condition C, the r-expression \textit{John} in (9a) must be disjoint from \textit{he}.

Let us turn to (5b). The relative clause, being an adjunct, is
allowed to adjoin to a wh-phrase raised into the matrix [Spec, CP] position, as in (12a) below. Consider the following LF-derivation:

(12)

a. \[\text{[CP [which claim [that John made]] [he was willing to discuss [which claim]]]}\]

b. \[\text{[CP [which x, x a claim [that John made]] [he was willing to discuss [[which claim] x]]]}\]

c. \[\text{[CP [which x, x a claim [that John made]] [he was willing to discuss x]]}\]

After the application of quasi-QR and complementary deletion, (12c) is yielded as the LF-representation. *John* is not c-commanded by, and hence can be coreferential with, *he*, according to Condition C. This is a brief outline of Chomsky’s (1993) account of the contrast between (5a) and (5b).

With this in mind, let us examine how the weakening effect observed in section 2 can be captured under Chomsky’s assumptions. The sentence (1a) contains an r-expression in the complement position of the fronted wh-phrase and thus will be excluded on a par with (5a). Let us now consider (1b–c). The LF-representations for (1b) and (1c) after the applications of quasi-QR and complementary deletion are as shown in (13a(i)–(ii)) and (13b(i)–(ii)), respectively:

(13)

a. i. \[\text{[which x] [you thought [he\textsubscript{i} said Mary likes [x pictures of John\textsubscript{i}]]]}\]

ii. \[\text{[which x, x a pictures of John\textsubscript{i}] [you thought [he\textsubscript{i} said Mary likes x]]}\]

b. i. \[\text{[which x] [Mary said he\textsubscript{i} saw [x pictures of John\textsubscript{i}]]}\]

ii. \[\text{[which x, x a pictures of John\textsubscript{i}] [Mary said he\textsubscript{i} saw x]}\]

(13a(i)) and (13b(i)) are chosen over (13a(ii)) and (13b(ii)), respectively, because of the Preference Principle, as discussed above (cf. (9a–b)). Then, Condition C would block coreference between *he* and *John* in (13a(i)) and (13b(i)), contrary to fact. Note that Condition C cannot override the Preference Principle: the computational system selects among derivations satisfying derivational principles (e.g. the Preference Principle) rather than interpretive conditions such as Binding Conditions. Thus, Chomsky’s (1993) analysis would fail to

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2 Adjunction is allowed as an exception to the general requirement of target-extension, which applies only in overt syntax. See Chomsky (1993; 1995) and Kitahara (1994), for this point.
derive the weakening effect in (1).

3.2. Chomsky (1995)

Chomsky (1995) excludes an adjunction structure as a violation of Full Interpretation (FI: every element must have some interpretation) at LF. Such a structure consists of at least two segments, one of which is assumed to receive no interpretation or no LF-role (e.g. θ-role). He argues that this would lead to a violation of FI, causing the derivation crash at LF. Therefore, when successive cyclic A'-movement adjoins an element α to maximal projections, α and its intermediate traces must be deleted; otherwise the derivation will crash. The operation of deletion is taken to be a last resort driven by FI to yield legitimate LF-objects (cf. Chomsky and Lasnik (1993: 547)). Consider (14a-b):

(14) a. meet John in England, he doesn’t expect that I will buy pictures of John, he doesn’t expect that I will buy

(Chomsky (1995: 410))

Here, the sentence-initial elements are assumed to be adjoined to some maximal projections. Chomsky proposes an operation “full reconstruction” which eliminates all the adjoined elements (including their intermediate traces) at LF. If this operation applies, (14a) and (14b) would be represented as (15a) and (15b), respectively:

(15) a. He doesn’t expect that I will meet John in England.
    b. He doesn’t expect that I will buy pictures of John.

Then, we could correctly predict disjoint reference between John and he in (14a-b), according to Condition C.

The full reconstruction analysis, however, cannot capture the contrast in (2a-b), repeated here:

(2) a. *?Pictures of John, he likes.
    b. Those pictures of John, I think he said Mary likes.

(Speas (1991: 252))

(Takano (1993: 4))

After full reconstruction, (2b), where the topic is adjoined to some maximal projection (possibly AgrSP), would have the LF-structure (16) below, on a par with (15):

(16) I think he said Mary likes those pictures of John.

This analysis would erroneously exclude (2b) as a Condition C violation. This is obviously undesirable.

We thus conclude that the full reconstruction analysis as well as Chomsky’s (1993) analysis would fail to derive the weakening effects of
reconstruction. In the next section we will propose a solution based on our interpretation of quasi-QR and LF-deletion.

4. Tripartite Structure and the Weakening Effect of Reconstruction

Consider first (17a)(=(1a)) and (18a)(=(1c)) and their corresponding LF-representations:

(17) a. ?*Which pictures of Johni does hei like? (=(1a))
    b. LF: [which x] [he$_i$ liked [x picture of John$_i$]]

(18) a. Which pictures of John$_i$ did Mary say he$_i$ saw t? (= (1c))
    b. LF: [which x] [Mary said he$_i$ saw [x pictures of John$_i$]]
       (= (13a))

Let us keep to the minimalist assumption that Binding Conditions are interpretive conditions applying to LF-outputs. As we saw in section 3.1, (18a) should not be mapped onto the LF-structure (18b), in which the restriction (i.e. [x pictures of John]) of the operator is “reconstructed” into the original trace position. Note that the weakening effect in (17)-(18) can be derived if at LF an r-expression (e.g. John) in a fronted NP is always included within the c-command domain of the matrix subject, but not necessarily within that of embedded arguments. In other words, the r-expression in (17)-(18) should be “reconstructed” into some position lower than the matrix subject and it could be higher than embedded arguments. But, how can such “reconstruction” be formulated in the minimalist program?

As a first approximation, let us posit iterative application of quasi-QR, an operation akin to QR. Consider (19), the structure given to a sentence which book did John read in the overt syntax. The (intermediate) traces of successive cyclic wh-movement are represented as copies.

(19) \[
\]

A’-movement in general is subject to the Minimal Link Condition requiring that the link of a chain be minimal. Let us adopt Ura’s (1994) claim that movement of \( \alpha \) can skip a potential landing site \( \beta \) if \( \alpha \) and \( \beta \) are in the same minimal domain.$^3$ Thus, a link of a chain is

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$^3$ The minimal domain is defined, as follows. Consider first (i):
minimal iff the two members consisting of the link are each contained in mutually adjacent minimal domains (cf. Manzini (1994)).

The structure (19) would then enter the LF component. Suppose that quasi-QR applies more than once: it first raises a whole wh-phrase leaving $x$, as in (20) and then adjoins the operator to the wh-phrase, as in (21). Quasi-QR applies to both the fronted wh-phrase and their copies at the same time.

\[
(20) \quad [\text{CP} \ [\text{which book} \ x] \ \text{did} \ [\text{AgrSP} \ John \ [\text{TP} \ [\text{which book} \ x] \ [\text{AgrOP} \ [\text{which book} \ x] \ \text{read} \ [\text{VP} \ [\text{which book} \ x] \ [\text{VP} \ \text{tV} \ t]]]]]]
\]

\[
(21) \quad [\text{CP} \ [\text{which } x \ [x \text{ book} \ x] \ [\text{AgrSP} \ John \ [\text{TP} \ [\text{which } x \ [x \text{ book} \ x] \ [\text{AgrOP} \ [\text{which } x \ [x \text{ book} \ x] \ \text{read} \ [\text{VP} \ [\text{which } x \ [x \text{ book} \ x] \ [\text{VP} \ \text{tV} \ t]]]]]]]
\]

In (20) the copy in the original trace position has been raised to [Spec, AgrOP] to have its Case-feature checked by AgrO.\footnote{A subject trace left within VP is omitted in this article, because of limitations of space. Furthermore, the actual adjunction structure of the wh-phrase in (21) will look like [[which $x$] [[$x$ book] $x$]], rather than the simplified version [[which $x$] [$x$ book] $x$]. We will adopt the latter in this article.}

An LF-representation satisfies FI if it consists entirely of legitimate objects. The legitimate LF-objects, assumed to form chains $\text{CH} = (\alpha_1, ..., \alpha_n)$, are defined in terms of the notion of L-relatedness (or distinction among A-, A'- and X⁰-positions) (see Chomsky (1993: 29)). Thus, we propose that legitimate LF-objects are heads, with $\alpha_i$ an X⁰; arguments, with $\alpha_i$ in an A-position; adjuncts, with $\alpha_i$ in an A'-position; and quantifier-variable constructions, to which we will turn shortly.

It should be noticed here that nothing would block iterative application of quasi-QR as in (20)-(21). This is because the operation of quasi-QR is not assumed to be driven by the morphological necessity; rather it is driven by FI, or to yield legitimate LF-objects.
Then, iterative quasi-QR is admissible if it is necessary to satisfy FI.\(^5\)

Then, one might wonder what kind of legitimate LF-objects would be derived thereby. We will claim that such LF-operations are driven to form quantifier-variable constructions.

Let us propose here that an A'-chain of an argument must form a quantifier-variable construction (cf. Huang (1982: chapter 4)), rather than an operator-variable construction as is assumed in Chomsky (1993: 29). Chomsky (1993) claims an operator-variable construction to be a legitimate LF-object, i.e. an A'-chain, with the operator in its head and the variable (often accompanied with the restriction) in its tail. Since the restriction is always located in the variable position in this framework (because of the Preference Principle), the weakening effect cannot be derived. By contrast, our quantifier-variable construction counts as a two-membered A'-chain, with the quantifier in its head and a variable in its tail. Following Clark’s (1992: 14) statement that a quantifier in our terms consists of an element bearing quantificational force (i.e. an operator) and a restriction on the quantification, let us propose that a quantifier that heads an A'-chain is composed of an operator and its restriction. Thus, the A'-chain of an argument has an internal structure as shown in (22). Let us call it a tripartite structure.

(22) \([\text{operator } x], ..., [x \text{ restriction}], ..., x (=\text{variable})\]

Thus, wh-phrases such as which book undergo iterative quasi-QR, yielding \([\text{which } x] [x \text{ book}] x\), as seen in (21). And [which x] will be an operator, since it both quantifies over a restricted set of books, represented as [x book] (i.e. the restriction), and binds its variable (in this case, x) that is established in the restriction (for details, see Heim (1982) and Diesing (1992)). If so, the sequence [which x] ... [x book] ... x would form a tripartite structure and we will have an A'-chain made up of a quantifier and its variable, in which [which x] and [x book] jointly form the quantifier and x is the variable. According to Clark (1992: 14), such wh-phrases as who contain its implicit restric-

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\(^5\) Movement in general is driven by the morphological necessity: an element is moved to have its features such as Case- or \(\phi\)-features checked by its checker. If an unchecked feature remains at interface levels, it counts an illegitimate object violating FI and the derivation crashes. In this sense, movement that is forced for convergence can be said to be driven by FI. Quasi-QR and subsequent LF-deletion are operations distinct from other movement in that they are not driven by the morphological necessity; since they are needed to yield legitimate LF-objects, i.e. quantifier-variable constructions, these LF-operations are also driven by FI.
tion (e.g. human). Then it would be plausible to say that who consists of \[\text{[which } x\text{]}\], \[x \text{ person}\], and \(x\) and, by the same token, what as in \text{what did you buy yesterday} consists of \[\text{[which } x\text{]}\], \[x \text{ thing}\], and \(x\) (see Huang (1982: 261) and Nishigauchi (1990: 10) for similar treatment). Moreover, this will be compatible with the translation of, say, who as “for which \(x\), \(x\) a person, \ldots, \(x\)” in logical representations (see Chomsky (1981: 89) and Nishigauchi (1990)).

The term restriction is equivalent to what is called “restrictive clause” or “restrictor” in the literature. It can be characterized as a portion restricting the domain of quantification of an operator bearing its quantificational force. (In Clark’s (1992: 12–13) terms, restrictive relative clauses constrain the set of individuals in the range a referring expression has and thus fix the referential properties of the expression. Restrictive relative clauses are thus taken as the restriction of an operator which they modify.)

It is in order here to ask whether or not an operator-variable construction, rather than a quantifier-variable construction, could be a legitimate LF-object.\(^6\) If an operator-variable construction were considered to be a legitimate LF-object, independently of its restriction portion, then the restriction, left alone without any interpretation, would be an illegitimate LF-object and this would violate FI. For an A’-chain to be legitimate, an operator-restriction-variable sequence as a whole should be associated with some adequate interpretation. For this reason, we claim that our tripartite structures (i.e. quantifier-variable constructions) rather than operator-variable constructions are legitimate LF-objects. Furthermore, note that if an A’-chain did not contain a restriction in the quantifier and were made up only of an operator and its variable, then any wh-phrases such as who or which book would be uniformly interpreted as \[\text{[which } x\text{]}, \(x\), lacking their nominal terms (such as person or book) which define a range that the operator quantifies over (in the sense of Lasnik and Stowell (1991: 704)). Without restrictions, adequate interpretations of quantifiers would be unavailable. This is why an A’-chain must have an internal tripartite structure as in (22).

Chomsky and Lasnik (1993: 546–547) and Chomsky (1995: 410) argue that a chain must satisfy the Uniformity Condition: a chain must be uniform with respect to \(L\)-relatedness (see Chomsky and Lasnik (1993:

\(^6\) I am indebted to an \(EL\) reviewer for raising this question.
and Chomsky (1993: 29), for details) and that a chain headed by an argument must be a uniform chain (X, Y), in which X is in an A’-position and Y in an A-position. The chain (quantifier, variable) satisfies this condition: even if an operator and its restriction are separate, they can jointly head the chain (quantifier, variable), whose head in an A’-position and the variable is in an A-position.

With this in mind, let us return to the derivation (20)-(21). In order to construct a tripartite structure, the application of deletion is necessary. Thus in (21), intermediate traces or copies must be deleted in order to form a uniform chain. Let us call this operation “trace-deletion”, distinguishing it from complementary deletion. We can either delete all the intermediate copies or leave any one of them undeleted (and delete others), since either option can lead to formation of tripartite structures, as we will see below. Thus we have three alternative deletion-patterns of (21) as in (23)-(25)7:

(23) \[ CP [(\text{which } x) [x \text{ book} ] x] [\text{AgrSP } \text{John } [TP [(\text{which } x) [x \text{ book} ] x] [TP [\text{AgrOP } [(\text{which } x) [x \text{ book} ] x] \text{ read } [\text{VP } tV t]]]]] ] \]

(24) \[ CP [(\text{which } x) [x \text{ book} ] x] [\text{AgrSP } \text{John } [TP [\text{AgrOP } [(\text{which } x) [x \text{ book} ] x] [\text{AgrOP } [(\text{which } x) [x \text{ book} ] x] \text{ read } [\text{VP } tV t]]]]] ] \]

(25) \[ CP [(\text{which } x) [x \text{ book} ] x] [\text{AgrSP } \text{John } [TP [\text{AgrOP } [(\text{which } x) [x \text{ book} ] x] \text{ read } [\text{VP } tV t]]]] ] \]

We can leave undeleted the TP-adjoined copy as in (23) or the AgrOP-adjoined one as in (24). Alternatively, we can delete all the intermediate copies, leaving the original copy in the [Spec, AgrOP] as in (25).

As the next step in yielding a tripartite structure, complementary deletion applies to (23)-(25), converting them to (26)-(28), respectively. This operation eliminates non-operator portions in an operator position and an operator in (intermediate) trace positions.

(26) \[ CP [(\text{which } x) [x \text{ book} ] x] [\text{AgrSP } \text{John } [TP [x \text{ book} ] x] [TP [\text{AgrOP } [[x \text{ book} ] x] \text{ read } [\text{VP } tV t]]]] ] \]

(27) \[ CP [(\text{which } x) [x \text{ book} ] x] [\text{AgrSP } \text{John } [TP [\text{AgrOP } [[x \text{ book} ] x] [\text{AgrOP } [[x \text{ book} ] x] \text{ read } [\text{VP } tV t]]]] ] \]

(28) \[ CP [(\text{which } x) [x \text{ book} ] x] [\text{AgrSP } \text{John } [TP [\text{AgrOP } [[x \text{ book} ] x] \text{ read } [\text{VP } tV t]]]] ] \]

7 The VP-adjoined copy in (21) must also be deleted in order to form a uniform chain; otherwise the chain would contain an A-bound copy in the A’-position after object-shift, violating the Uniformity Condition.
Unlike (28), (26) and (27) still do not include a tripartite structure. For the purpose of the formation of restriction-variable construction, the complementary deletion again applies to these structures, eliminating the non-restriction portion in the restriction position and the restriction in the variable position, i.e. \([\text{Spec, AgrOP}]\). This yields the following respective LF-representations of (26)-(27):

(29) \[
\begin{align*}
&\text{[CP [which } x]\ [\text{AgrSP John [TP [x book] [TP [AgrOP } x \text{ read [VP tV t]]]]]}
\end{align*}
\]

(30) \[
\begin{align*}
&\text{[CP [which } x]\ [\text{AgrSP John [TP [AgrOP [x book] [AgrOP } x \text{ read [VP tV t]]]]]}
\end{align*}
\]

(28), (29) and (30) contain the legitimate LF-objects: the tripartite structure ([which \(x\), [x book], \(x\)], which is assumed to be a uniform A'-chain (quantifier (= [which \(x\), [x book]], variable (= \(x\))).

Note that operations such as quasi-QR, trace-deletion, and complementary deletion are merely descriptive taxonomies proposed for expository purposes and are allowed to apply to derive legitimate LF-objects such as a uniform chain under FI. FI is the convergence condition: if it is violated, the derivation will crash.

In the following sections, we will examine how this tripartite structure analysis presented in this section fares with regard to the weakening effect of reconstruction.

### 4.1. The Weakening Effect of Reconstruction

Under our assumptions, the LF-derivations of (1a) and (1c) may be (31) and (32), respectively:

(31) ?*Which pictures of Johni does hei like? (= (1a))

a. \[
\begin{align*}
&\text{[CP [which pictures of Johni] does [hei [TP [which pictures of Johni] [TP [AgrOP [which pictures of Johni] [AgrOP [which pictures of Johni] like [VP tV t]]]]]]]
\end{align*}
\]

b. \[
\begin{align*}
&\text{[CP [[which x] [x pictures of Johni] x] does [hei [TP [[which x] [x pictures of Johni] x] [TP [AgrOP [[which x] [x pictures of Johni] x] [AgrOP [[which x] [x pictures of Johni] x] like [VP tV t]]]]]]]
\end{align*}
\]

c. \[
\begin{align*}
&\text{[CP [[which x] [x pictures of Johni] x] does [hei ... [[which x] [x pictures of Johni] x] [AgrOP [[which x] [x pictures of Johni] x] like [VP tV t]]]]]
\end{align*}
\]

d. \[
\begin{align*}
&\text{[CP [which x] does [hei [x pictures of Johni] [AgrOP x like [VP tV t]]]]}
\end{align*}
\]

(32) Which picture of Johni did Mary say hei saw t? (= (1c))
a. \[ \text{[CP [which pictures of Johni] did [Mary ... [which pictures of Johni] [AgrOP say [VP tv [CP [which pictures of Johni] [he_i [[which pictures of Johni] [AgrOP [which pictures of Johni] saw [VP tv t]]]]]]]]]}

b. \[ \text{[CP [[which x] [x pictures of Johni] x] did [Mary ... [[which x] [x pictures of Johni] x] [AgrOP say [VP tv [CP [[which x] [x pictures of Johni] x] [he_i [[which x] [x pictures of Johni] x] [AgrOP [[[which x] [x pictures of Johni] x] saw [VP tv t]]]]]]]]]

c. \[ \text{[CP [[which x] [x pictures of Johni] x] did [Mary ... [[which x] [x pictures of Johni] x] [AgrOP say [VP tv [CP [he_i [AgrOP [[[which x] [x pictures of Johni] x] saw [VP tv t]]]]]]]]]]

d. \[ \text{[CP [which x] did [Mary [x pictures of Johni] [AgrOP say [VP tv [CP [he_i [AgrOP x saw [VP tv t]]]]]]]]}

In the (a) sentences of (31)-(32), the copy in the original trace position has been raised to [Spec, AgrOP], for Case reasons. In (b), iterative quasi-QR has applied to (the copies of) the wh-phrase. Then, trace-deletion eliminates intermediate copies except one that is adjoined to either the matrix TP or AgrOP, converting (b) to (c). Note that any intermediate copy can be left undeleted, and thus we could have some alternatives to the (c) sentences, depending on which intermediate trace remains. But what counts is the fact that we may have at least one possible deletion-pattern as in (c) (see (23)-(25)).

Then, complementary deletion applies to (c), deriving the legitimate tripartite structure as in (d) (cf. (26)-(30)). In (31c) and (32c), complementary deletion eliminates non-operators in the operator position, elements except the restriction in the intermediate copy, and elements except the variable in the tail of the chain. Now, Condition

---

8 An EL reviewer claims that if the intermediate copies adjoined to the matrix AgrOP or TP in (31)-(32) are allowed to remain undeleted merely for the purpose of formation of a tripartite structure as in (22), then such an account would be regarded as somewhat stipulative. We hope that such a criticism will be circumvented, given the fact that a tripartite structure is a device widely accepted in the literature (see Heim (1982), Diesing (1991), and the references cited there). Thus, our treatment that leaves such undeleted intermediate copies will not be stipulative, since it is a consequence of this fairly general device. We will not discuss this matter any further, leaving it open in this article.
C allows for coreference between John and he in (32d), but not in (31d), since only in the latter John is c-commanded by he and thus we can correctly derive the weakening effect as seen in (1a-c).9,10

For the rest of this subsection, let us digress from our discussion on weakening effects, turning to tripartite structures of wh-in-situ. It is assumed within the minimalist framework that wh-in-situ may not undergo Move-α at LF. This assumption will correctly explain the fact that LF-movement does not affect the binding possibilities. Consider the following sentences:

(33) You said he liked [the pictures that John took]

(Chomsky (1993: 25))

9 (1b) will also fall under our account.

Furthermore, one might suggest that our analysis crucially hinges on the assumption that a wh-phrase does not adjoin to AgrSP. In other words, if its copy and hence the restriction of an operator could be left in the AgrSP-adjointed position, then we would have the following LF-representation (i) instead of (31d).

If so, Condition C would wrongly allow for coreference in question, since John would be no longer c-commanded by he:

(i) \[ CP \ [which x] does [AgrSP [x pictures of Johni] [AgrSP hei [AgrOP x like [VP tV t]]]]\]

We have three ways to circumvent this situation. First, as we have discussed at the beginning of this section, both the [Spec, CP] and AgrSP-adjointed positions are in the same minimal domain of the X0-chain (does, tAgrS). Therefore, the successive cyclic movement of the wh-phrase may not adjoin to AgrSP; otherwise such an adjunction counts as a superfluous step, which would be excluded by economy of derivation. Second, it is well-known that an AgrSP-adjointed position is an operator position open to operators raised by (quasi-)QR. Thus, once complementary deletion applies, non-operator portion, i.e. \[x pictures of John] x\], must be deleted from this operator position, i.e. the AgrSP-adjointed position, in accordance with the Preference Principle. Third, if the restriction could be somehow adjoined to AgrSP, we would then be forced to modify the definition of c-command in order for AgrSP-adjointed position to be c-commanded by the Spec of the AgrS. See also note 17.

An EL reviewer suggests that one could have the following representation alternative to (32d), by “reconstructing” the restriction into a position lower than the pronoun he:

(i) \[ CP \ [which x] did [Mary [AgrOP say [VP tv CP [hei ... [x pictures of Johni] ... [AgrOP x saw [VP tv t]]]]]]\]

If (i) were derived, coreference between he and John in (1c) would be erroneously barred under Condition C, since John is c-commanded by he. Note that in order for a sentence to satisfy a condition, at most one representation which satisfies the condition is sufficient. Further, since derivations yielding (32d) and (i) are (equally economical) competing derivations, neither excludes the other. It follows that since (32d) satisfies Condition C, although (i) would violate it, coreference in (1c) is correctly allowed.
In (33)–(34), *he* and *John* cannot be construed as coreferential. Chomsky (1993: 25–26) attempts to derive this fact by assuming that the whole wh-phrase *a* in situ may not undergo Move-*a* at LF and that the wh-operators *how many* and *who* are associated with by what he calls the syntactic basis for absorption. This operation yields a generalized quantifier at LF. Chomsky then suggests that this operation converts (34) to the following LF-representation:

(35) \[ ([\text{How many} \ \text{who}] \ [t \ \text{said he liked} \ [ ([t' \ \text{pictures}] \ \text{that John took}])] \]

(Ibid.: 25)

In (35), only the operator portion (i.e. *how many*) of the wh-phrase in (34) is associated with *who* by absorption. Since *John* is c-commanded by *he*, Condition C excludes coreference between them.

In order to incorporate this account into our tripartite structure analysis, the restriction of the wh-operator must not be raised via Move-*α* at LF. Note, however, that since the restriction must vacate its base-position in order to construct a tripartite structure, it must have been adjoined to the wh-phrase, before the operator undergoes absorption. The precise LF-derivation of (34) would be as follows:

(36) a. \[ \text{[CP} \ ([\text{which } x] \ [x \ \text{person}] \ x] \ [\text{AgrSP} \ ([\text{which } x] \ [x \ \text{person}] \ x) \ \text{said he} \ [\text{AgrOP} \ ([a \ \text{how many pictures that John took}] \ [y]) \ \text{liked} \ [\text{VP}\ tv\ t])]] \]

b. \[ \text{[CP} \ [\text{which } x] \ [\text{how many } y] \ [\text{AgrSP} \ ([x \ \text{person}] \ x) \ \text{said he} \ [\text{AgrOP} \ ([y \ \text{pictures that John took}] \ [y]) \ \text{liked} \ [\text{VP}\ tv\ t])]] \]

In (36a), covert object-shift has occurred. Then, the wh-phrase *a* is adjoined to itself, leaving a variable *y*. The wh-phrase *who* also undergoes iterative quasi-QR, forming a phrase \[[\text{which } x] \ [x \ \text{person}] \ x\]. Then, in (36b), complementary deletion has applied to this phrase, by which \[\text{which } x\] remains in the \[\text{Spec, CP}\] position, with the restriction and the variable left in \[\text{Spec, AgrSP}\]. Note that this restriction is adjoined to the variable and the chain of *who* in (34) forms a tripartite structure in (36b). Then, the syntactic basis for absorption associates the operators \[\text{how many } y\] and \[\text{which } x\], forming a generalized quantifier. The restriction of \text{how many} is adjoined to the variable *y* and left in the \[\text{Spec, AgrOP}\] position. Thus, the wh-in-situ also forms a tripartite structure at LF. It follows from this that the restriction of wh-in-situ does not undergo Move-*α* at LF, either. Rather, it is adjoined to the variable, via quasi-QR.
Thus, quasi-OR is an operation independently needed in order to form a tripartite structure at LF.

4.2. Topicalization

Let us return to the weakening effect in topicalization constructions as in (2a–b). Following Watanabe (1993), we assume that the landing site of topicalization is [Spec, CP], rather than an AgrSP-adjoined position. See Watanabe (1993), for detailed discussion.

Takano (1993) proposes that topic phrases such as [pictures of John] in (2a) actually contain a null operator inside, as illustrated in (37):

(37) [OP (those) pictures of John]

Here, OP may count as the topic counterpart of a wh-operator and the residue, as its restriction. Adopting Takano’s proposal, consider the following LF-derivations (38)–(39), given to (2a)–(2b), respectively. Here, some of intermediate copies are omitted because of limitations of space.

(38) ?*pictures of Johni, hei likes (= (2a))
   a. [CP [OP pictures of John] [AgrSP he ... [OP pictures of John] ... [AgrOP [OP pictures of John] like [VP tv t]]]]
   b. [CP [[OP x] [x pictures of John] x] [AgrSP he ... [[[OP x] [x pictures of John] x] ... [[[OP x] [x pictures of John] x] like [VP tv t]]]]
   c. [CP [[OP x] [x pictures of John] x] [AgrSP he [[[OP x] [x pictures of John] x] ... [[[OP x] [x pictures of John] x] like [VP tv t]]]]
   d. [CP [OP x] [AgrSP he [x pictures of John] [AgrOP x like [VP tv t]]]]

(39) Those pictures of Johni, I think hei said Mary likes (= (2b))
   a. [CP [OP those pictures of John] [AgrSP I ... [OP those pictures of John] think he [OP those pictures of John] Mary [OP those pictures of John] [AgrOP [OP those pictures of John] likes [VP tv t]]]]
   b. [CP [[OP x] [x those pictures of John] x] [AgrSP I ... [[[OP x] [x those pictures of John] x] think he [[[OP x] [x those pictures of John] x] ... [[[OP x] [x those pictures of John] x] Mary [[[OP x] [x those pictures of John] x] [AgrOP [[[OP x] [x those pictures of John] x] likes [VP tv t]]]]}],
RECONSTRUCTION OF RESTRICTIONS

1. c. \([\text{CP } [\text{OP } x] [x \text{ pictures of John}] x] [\text{AgrSP I } \ldots [\text{OP } x] [x \text{ pictures of John}] x] \text{ think he said Mary } [\text{AgrOP } [\text{OP } x] [x \text{ pictures of John}] x] \text{ likes } [\text{VP tv t}]]\]
   
d. \([\text{CP } \text{OP } x] [\text{AgrSP I } [x \text{ pictures of John}] \text{ think he said Mary } [\text{AgrOP } x] \text{ likes } [\text{VP tv t}]]\]

In the (a) sentences of (38)-(39), the copy in the original trace position has undergone object-shift. Iterative quasi-QR converts (a) to (b). And trace-deletion has occurred in (c), and then complementary deletion yields (d), which has a chain with a tripartite structure. According to Condition C, coreference between John and he is allowed in (39d), but not in (38d). Thus, the weakening effect observed in the contrast between (2a) and (2b) correctly falls under our analysis.

4.3. Anti-reconstruction

Let us ask how the anti-reconstruction effect as in (4b) is accommodated in our framework. Following Lebeaux-Chomsky accounts, adjunction of adjuncts to a fronted element is permitted after the fronting. Consider (4b) and its LF-derivation (40):

\[40\] [which student that John taught] did he say Mary criticized

\(\text{=(4b)}\)

a. \([\text{CP } [\text{which student [that John taught]] did [he ... [which student] say } [\text{CP } [\text{which student] [Mary ... [which student] [AgrOP [which student] criticized [VP tv t]]]]]]\]

b. \([\text{CP } [\text{which x} [x \text{ student [that John taught]} x] \text{ did [he ... [(which x) [x student] x] say } [\text{CP } [\text{which x} [x \text{ student} x] [\text{AgrOP [which x] [x student] x] [AgrOP [which x] [VP tv t]]]]]\]

c. \([\text{CP } [\text{which x} [x \text{ student [that John taught] x} \text{ did [he say [CP [Mary [AgrOP [which x] [x student] x] criticized [VP tv t]]]]]]\]

d. \([\text{CP } [\text{which x} [x \text{ student [that John taught]] did [he say [CP [Mary [AgrOP x criticized [VP tv t]]]]]]]\]

In (40a), object-shift has occurred in the deepest clause. Then, iterative quasi-QR yields (40b). In (40c), trace-deletion has eliminated all the intermediate copies of the wh-phrase. Recall that this deletion-pattern also yields a tripartite structure, as we saw in (28). Finally, complementary deletion eliminates the variable x in the Spec of the matrix CP in (40c) as well as the operator-restriction portion in the
Spec of the lowest AgrOP. This yields (40d). It should be noted that the restriction \([x \text{ student} [\text{that John taught}]\] may not be deleted in the matrix [Spec, CP] position because of recoverability of deletion: no copy of the relative clause is left during the course of derivation. In other words, since the relative clause in (40) is attached to the raised wh-phrase in [Spec, CP] and has not undergone movement, it does not have its own copy or trace in (40a) and hence cannot be “reconstructed” into the variable position at LF (cf. (12)). Since (40d) has no way of minimizing its operator position any more, the Preference Principle may not be violated. That is to say, there is no convergent LF-derivation competing with (40), which is singled out by the computational system. Condition C then allows for coreference in (40d). The same account would also hold of (4a), since adjuncts in general can adjoin to the fronted wh-phrase and are not forced to be “reconstructed” (see Chomsky (1993: 36) and Lebeaux (1988: 148ff.)). Thus, Lebeaux-Chomsky accounts of anti-reconstruction have come to be incorporated into our analysis.

In the next section, we will show that other reconstruction effects endorse our analysis.

5. Evidence from Other Reconstruction Phenomena

In this section we will extend the data to anaphors and pronouns which will lend further support to our analysis.

5.1. Condition A Effects

As is well-known, an anaphor embedded within an NP, when fronted, demonstrates “multiple binding domain effects” (cf. Barss (1986)), as in (41), where the reflexive takes either John or Bill as its antecedent:

\[
(41) \quad \text{John wondered [which picture of himself] [Bill took t] (Chomsky (1993: 38))}
\]

There is a further ambiguity in (41): the availability of idiomatic interpretation correlates with the choice of antecedent for himself: if the reflexive takes Bill as its antecedent, the phrase took ... picture can be interpreted either idiomatically (in the sense of “photograph”), or literally (in the sense of “pick up and walk away with”). And if the reflexive takes John as its antecedent, such idiomatic interpretation is barred (cf. Chomsky (1993: 38-39)). Chomsky claims that the phrase
took ... picture can be interpreted idiomatically only when it somehow presents as a unit at LF. Let us keep to this claim. Then, (41) will be given the LF-structure (42), as a result of the application of object-shift and iterative quasi-QR:

\[(42) \quad \text{[John AgrS [wondered [CP [which x] [x pictures of himself] x] [Bill AgrS [TP [which x] [x pictures of himself] x] [TP \text{[AgrOP [which x] [x pictures of himself] x] [AgrOP [which x] [x pictures of himself] x] took [VP tv t]}}}]]\]

Chomsky (1993) adopts a device of cliticization_{LF}, which adjoins an anaphor or part of it to some category by an operation similar to cliticization (p. 40). He assumes that the application of cliticization_{LF} must precede reconstruction. It must precede trace-deletion in our framework. Suppose that cliticization_{LF} adjoins an anaphor to an Agr-head. Then (42) will be converted to either (43) or (44), depending on which reflexive, represented as self, is adjoined to its nearest AgrS from within a copy:\textsuperscript{11}

\[(43) \quad \text{[John self-AgrS [wondered [CP [which x] [x pictures of tself] x] [Bill AgrS [TP [which x] [x pictures of himself] x] [TP \text{[AgrOP [which x] [x pictures of himself] x] [AgrOP [which x] [x pictures of himself] x] took [VP tv t]}}}]]\]

\[(44) \quad \text{[John AgrS [wondered [CP [which x] [x pictures of himself] x] [Bill self-AgrS [TP [which x] [x pictures of tself] x] [TP \text{[AgrOP [which x] [x pictures of himself] x] [AgrOP [which x] [x pictures of himself] x] took [VP tv t]}}}]]\]

In (43), the reflexive is adjoined to the matrix AgrS from within the copy in the embedded [Spec, CP] position. By contrast, in (44), the reflexive is adjoined to the embedded AgrS from within the copy adjoined to the embedded TP.

Then, trace-deletion converts (43) and (44) to (45) or (46), respectively:

\[(45) \quad \text{[John self-AgrS [wondered [CP [which x] [x pictures of tself] x] [Bill AgrS [TP \text{[AgrOP [which x] [x pictures of himself] x] took [VP tv t]}}}]]\]

\[(46) \quad \text{[John AgrS [wondered [CP [which x] [x pictures of himself] x] [Bill self-AgrS [TP \text{[AgrOP [which x] [x pictures of tself] x] took [VP tv t]}}}]]\]

\textsuperscript{11} Under the LF-cliticization approach, we only need to assume that cliticization_{LF} adjoins an anaphor to the nearest Agr (or possibly T) and that the anaphor takes its nearest c-commanding element as its antecedent. This assumption of course will need further elaboration, given more complex data. But that will be far beyond the scope of this article.
It should be noted here that, as Chomsky (1993: 41) argues, we cannot delete the copy containing the trace of the reflexive, i.e. $t_{\text{self}}$; otherwise the chain ($\text{self}$, $t_{\text{self}}$) would be broken and the cliticized reflexive could not receive a $\theta$-role at LF. This would cause a violation of FI.

Finally, complementary deletion converts (45)-(46) to (47)-(48), respectively:

\begin{align*}
(47) & \text{[John self-AgrS [wondered [CP [[which x] [x pictures of t_{\text{self}}] x] [Bill AgrS [TP [AgrOP x took [VP tv t]]]]]]]} \\
(48) & \text{[John AgrS [wondered [CP [which x] [Bill self-AgrS [TP [x pictures of t_{\text{self}}] [TP [AgrOP x took [VP tv t]]]]]]]} \\
\end{align*}

Consider first (47). Complementary deletion cannot eliminate the restriction containing $t_{\text{self}}$ in the embedded [Spec, CP] position, for the reason we just mentioned. Although the Preference Principle would not be satisfied in (47), this principle can be overridden for the sake of convergence, as discussed in (40d). Thus, the reflexive in (47) can take John as its antecedent. Furthermore, the phrase took ... picture may not present as a unit in (47), since picture and took are in the separate clauses. Thus, the idiomatic interpretation cannot be derived.

Consider (48) now. Complementary deletion cannot eliminate the restriction including $t_{\text{self}}$ in the embedded TP-adjoined position, in deriving (48) from (46). The reflexive thus takes Bill as its antecedent. And picture and took may somehow present as a unit, allowing for the idiomatic interpretation.\(^{12}\)

It follows from the above-discussion that we may have no difficulty in incorporating Chomsky’s (1993) LF-cliticization analysis into our account.

Consider (49) and its structure (50) given under Chomsky’s (1993) assumptions:

\begin{align*}
(49) & \text{[Which picture of himselfi/j] did Billi say [t’ that Johnj liked t best]} \\
(50) & \text{(Ike-uchi (1993: 25))}
\end{align*}

\(^{12}\text{The precise definition of a “unit” for the sake of idiomatic interpretation is not clear. If took is adjoined to T or AgrS by further LF head-movement, took and picture might form a “unit” within the same phrase, or under the Spec-head relation. I leave this issue open here.}\)
(50) [which] Billᵢ said [[\textit{TR1} t picture of himselfᵢ] [that Johnᵢ liked [[\textit{TR2} t picture of himselfᵢ₂] best]] (Ibid.: 25)

Ike-uchi (1993) suggests that even if copies of a wh-phrase are left in intermediate trace positions, as in (50), such copies must be entirely eliminated in the ultimate LF-representation, under Chomsky’s (1993) assumption that an argument chain must form an operator-variable construction at LF. However, those intermediate copies (e.g. \textit{TR₁} in (50)) must not be deleted, if we want to derive the multiple binding domain effect in (49). Thus, Chomsky’s (1993) operator-variable analysis may be caught in a dilemma. On the other hand, our tripartite structure analysis can evade it, since the restriction containing an anaphor can remain undeleted in any intermediate position at LF. This also lends further support to our analysis.

5.2. Condition B Effects

Consider first the following contrast:

(51) a. *Himi, Johnᵢ likes tᵢ.

b. Himᵢ, Johnᵢ thinks Mary likes tᵢ. (Barss (1986: 408))

This contrast shows that a topicaized pronoun can be coreferential with the matrix subject if the trace position of the pronoun is deeply embedded. This may be considered as another case of weakening effects of reconstruction.¹³

Let us examine how our proposal can accommodate this fact. The topicaized pronouns in (51a-b) are assumed to contain a null topic operator inside, as we discussed in section 4.3. Then, consider the following derivation of (51a):

(52) a. \([\text{OP him}] [\text{John} \ldots [\text{OP him}] \ldots [\text{AgrOP [OP him]} \text{likes} [\text{VP tV t}]]\]

b. \([[\text{OP x} [x \text{him} x] [\text{John} \ldots [[\text{OP x} [x \text{him} x] \ldots [\text{AgrOP \text{[OP x} [x \text{him} x] \text{likes} [\text{VP tV t}]]\]]\]

c. \([[\text{OP x} [x \text{him} x] [\text{John} [\text{AgrOP \text{[OP x} [x \text{him} x] \text{likes}}

¹³ The following contrast may not be considered to be cases of weakening effects:

(i) a. *How many pictures of himᵢ did Billᵢ take? (Huang (1993: 105))

b. Which story about herᵢ do you think that Maryᵢ remembers? (Johnson (1992: 268))

Note that whether a pronoun embedded in a fronted NP can be coreferential with the matrix subject or the embedded ones depends on the existence of an implicit subject within the NP, rather than the deepness of the antecedent of the pronoun. For this matter, see Chomsky (1993: 40-42).
The object NP has been raised to [Spec, AgrOP] for Case-checking in (52a). Then, quasi-QR applies to (52a), yielding (52b). Then, trace-deletion is allowed to eliminate the intermediate copies, leaving the original trace in [Spec, AgrOP], as in (52c). Complementary deletion converts (52c) to (52d). In (52d), the restriction, adjointed to the variable in [Spec, AgrOP], is “reconstructed” to the lowest position that it can occupy at LF. The pronoun, however, cannot be coreferential with John, according to Condition B, as defined in (53):

\[(53)\] If \(a\) is a pronominal, interpret it as disjoint from every c-commanding phrase in \(D\). \((\text{Chomsky (1993: 43)})\)

Let us tentatively assume that \(D\), a local domain, in (53) is a minimal clause or NP. Then, Condition B blocks coreference between he and John in (52d), since the pronoun is c-commanded by its antecedent in the same clause. Let us now consider the following LF-derivation of (51b):

\[(54)\]
\[
\begin{align*}
\text{a. } & \text{[OP him] [John ... [OP him] ... thinks ... [Mary ... [OP him] ... [AgrOP [OP him] likes [VP tv t]]]]} \\
\text{b. } & \text{[[OP x] [x him] x] [John ... [[OP x] [x him] x] ... thinks ... [Mary ... [[OP x] [x him] x] ... [AgrOP [[OP x] [x him] x] likes [VP tv t]]]]} \\
\text{c. } & \text{[[OP x] [x him] x] [John thinks [Mary [AgrOP [[OP x] [x him] x] likes [VP tv t]]]]} \\
\text{d. } & \text{[[OP x] [John thinks [Mary [AgrOP [[x him] x] likes [VP tv t]]]]} \\
\end{align*}
\]

In (54a), the object NP has undergone object-shift. And quasi-QR converts (54a) to (54b). Then, we can have at least one deletion-pattern as in (54c), in which trace-deletion eliminates all the intermediate copies, with the copy in the embedded [Spec, AgrOP] position left undeleted, so that the pronoun could be “reconstructed” deeply enough to satisfy Condition B. Then, complementary deletion converts (54c) to (54d). According to Condition B, the pronoun is allowed to take John as its antecedent, since John is not included in the local domain (i.e. the embedded clause) of the pronoun.\(^{14}\)

\(^{14}\) An EL reviewer suggests that one could have the following LF-representation instead of (54d):

\[(i)\] [[OP x] [John [x him] thinks [Mary [AgrOP x likes [VP tv t]]]]]
We hence conclude that the weakening effect on Condition B may also fall under our account.

5.3. Condition C Effects Revisited

In Section 4.1, we proposed the tripartite structure analysis, according to which the restriction of an operator is allowed to appear in any intermediate position between the operator and the variable. Thus, an r-expression embedded in the restriction can escape from the c-command domain of the embedded arguments but not from the matrix subject, and thus we derived the weakening effect on Condition C. We can now predict that such an r-expression will also escape from the c-command domain of the matrix object, even if the object raises to [Spec, AgrOP] for Case-checking. This prediction may be actually borne out. Consider the following contrast:

(55)  a. Which picture of John did he tell Mary that Bill liked?
     b. Which picture of John did Mary tell him that Bill liked?

Coreferential interpretation between John and the pronoun he/him seems fairly acceptable in (55b) but not in (55a), although the judgment is vague.15

The contrast between (55a) and (55b) can be by now straightforwardly accounted for. Consider their respective LF-representations (56) and (57), below:

(56)  [which x] did [he [TP [x picture of John] [TP [AgrOP Mary tell [VP tv tMary [that Bill [AgrOP x liked]]]])]]

(57)  [which x] did [Mary [TP [x picture of John] [TP [AgrOP him

In (i), the restriction [x him] is “reconstructed” into the matrix clause, and hence coreference between him and John would be excluded by Condition B. For the reason argued in note 10 above, (51b) can satisfy Condition B: at most one representation i.e. (54d) is sufficient for this condition to be satisfied.

Furthermore, one might wonder why the variable x c-commanded by John in (54d) may not violate Condition C. It is a troublesome problem discussed with relation to cases as in (i) below, in the literature.

( i ) Himselfi, Johni likes ti. (Barss (1986: 408))

Consider the following LF-representation given to (i) under our proposal:

(ii)  [OP x] [John self-AgrS [x tself] [AgrOP x likes [VP tv t]]]

In (ii), the variable x in [Spec, AgrOP] is c-commanded by John. One possible solution is that the variable x left as a result of “reconstruction” does not qualify as the trace of the pronoun or anaphor, but as the trace of the null topic operator OP. Thus, the pronoun/anaphor is merely the restriction of OP and does not leave its trace. We leave this matter open in this article. For discussion, see Barss (1986).

15 I am indebted to my informant for the judgment of the sentences (55a–b).
tell \[VP tV thim [that Bill [AgrOP x liked]]]]

*John* is c-commanded by the pronoun in (56), but not in (57). Condition C thus allows for coreference between them only in the latter, (55b).

The following sentences seem to display a similar subject/object asymmetry:

(58)  
b. *Johni's child, hei sent to camp. (Guéron (1984: 164))

(59)  
a. [Jack's1 wife]2 I told him1 that I had called t2.  
     (Postal (1993: 544))  
b. [Jerome1's sister]2 I informed him1 you were waiting for t2.  
     (Ibid.: 543)

The contrast between (58) and (59) will also fall under the above account.

It follows that the above data provide us with ample evidence in favor of the claim that the restriction of an operator is allowed to appear in any intermediate position between the operator position and the variable. In the next section, we will discuss some puzzling problems for the present analysis.

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16 The following examples indicate that stress functions a role in coreference:

(i) ?John's mother he never listens to e.  
(ii) *John's mother he never listens to e. (Guéron (1984: 164))

While mother is stressed in (i), John is stressed in (ii). Coreferential interpretation between John and he is considered to be improved in (i). We will leave this issue unsolved, relegating it to future research. For previous analyses, see Guéron (1984) and Speas (1991).

17 The example (i) from French will also endorse this claim. The translation of (i) is mine.

(i) *Aux amis de Pierre je l'ai vu parler souvent (Guéron (1979: 59))

To friends of Pierre I him have seen talk often

Coreference between Pierre and the clitic pronoun le is barred in (i). It has been argued in the literature that subject clitics like je and auxiliary verbs like ai are in an AgrS-head. Then, the pronominal clitic le may also appear in the AgrS-head (for some morphological reason (cf. Chomsky (1995: 417))). If this is tenable, then (i) would be represented as (ii) at LF under our assumptions:

(ii) \[AgrSP [OP x] [AgrSP [AgrSP je-le-ai] [TP [x aux amis de Pierre] [vu [tLe parler x]]]]

The topicalized PP aux amis de Pierre, being the restriction of the null topic operator [OP x], is “reconstructed” to the matrix TP-adjoined position in (ii). Since the r-expression Pierre cannot escape from the c-command domain of the clitic le, Condition C will be violated. If this solution is on the right track, our proposal that the restriction of an operator is forced to appear lower than the matrix TP will find strong support from French cliticization.
6. Further Speculations

So far, our hypothesis has explained otherwise insurmountable facts surrounding the weakening effect on reconstruction. Despite its feasibility, it will encounter some puzzling problems, to which we will turn in this section. We will argue that they do not undermine our proposal.

6.1. Strong Crossover

The first case to which we turn is the strong crossover (SCO) effect, as in (60). Compare it with the case of anti-reconstruction effects, i.e. (61) (cf. (40)):

(60) *[Which book that criticizes who]_i_j is he_i pissed off at t_j?  
    (Saito (1991: 476))

(61) [Which book that criticizes John]_i_j is he_i pissed off at t_j?  
    (Ibid.: 476)

In marked contrast to (61), (60) shows disjoint reference between he and who within the relative clause.

Recall that a relative clause, being an adjunct, can be attached to a wh-phrase after wh-movement, and hence coreferential interpretation between John and he in (61) (see (40) above) is allowed under Condition C. If so, (60) would never be excluded as a Condition C violation, as we will see below. The following LF-structure would be available for (60), on a par with (40d):

(62) [CP [[which x] [x book [that criticizes who]]] is [he_i pissed off at x]]

The computation further proceeds: operations of quasi-QR and absorption convert (62) to (63):

(63) [CP [[which x, y] [x book [that criticizes [[y person] y]]] is [he_i pissed off at x]]]

Here, which and who have undergone absorption, forming a generalized quantifier [which x, y] (cf. section 4.2 and Chomsky (1993: 26, 32, 48)). In (63), the pronoun he does not c-command which y, or y. Then, Condition C is irrelevant to the SCO effect in (60).

In order to resolve this problem, let us adopt the following condition on bound pronoun, proposed in Higginbotham (1983) and Lasnik and Stowell (1991: 690):

(64) A pronoun may serve as a bound variable with respect to an operator, if it is bound by the variable of the operator.
This is originally proposed to account for weak crossover effects, as shown in (65):

\[(65) \quad \begin{array}{ll}
\text{a.} & \text{*Which man}_i \text{ did you say his}_i \text{ boss dislikes?} \\
& \text{(Lasnik and Stowell (1991: 689))} \\
\text{b.} & \text{Which man}_i \text{ did you say dislikes his}_i \text{ boss?} \quad \text{(Ibid.: 687)}
\end{array} \]

Under our assumptions (65a–b) would be given the LF-representations (66a–b), respectively:

\[(66) \quad \begin{array}{ll}
\text{a.} & [\text{which } x] \text{ did you } [x \text{ man}] \text{ say } [\text{his}_i \text{ boss dislikes } x_i] \\
\text{b.} & [\text{which } x] \text{ did you } [x \text{ man}] \text{ say } [x_i \text{ dislikes his}_i \text{ boss}]
\end{array} \]

In (66a), the pronoun \textit{his} is not bound by the variable \(x\), and thus, it cannot be construed as a bound variable with respect to the operator. In (66b), the pronoun is bound by the variable in the embedded subject position and thus can be construed as a bound variable relative to the operator. Coreference between \textit{which man} and \textit{his} is thus allowed in (65b), but not in (65a).

Consider next the following SCO effect. (67a) would be given the LF-representation as in (67b):

\[(67) \quad \begin{array}{ll}
\text{a.} & \text{*Who}_i \text{ did hei see?} \quad \text{(Higginbotham (1983: 407))} \\
\text{b.} & [\text{which } y] \text{ did hei see } [[y \text{ person} ] y_i]
\end{array} \]

In (67b), the pronoun is not bound by the variable \(y\) and hence cannot be construed as a bound variable with respect to the operator. In this case, since the variable is c-commanded by the subject pronoun, Condition C is also violated. (One might claim that this would cause the redundancy between Condition C and (64). We will leave this matter unsolved here.)

Let us now turn to the LF-representation (63). In (63), the variable \(y\) does not c-command and hence does not bind the pronoun. Thus, the pronoun cannot be construed to be a bound variable relative to the operator [\textit{which } \(y\)]. (Note that the positions of restrictions such as [\textit{x man}] or [\textit{y person}] in (63), (66), and (67b) do not affect our account here.)

In any case, the above data of SCO effects will not undermine our proposal.

6.2. Proper Binding Condition (PBC)

The second puzzling problem comes from the following sentences cited from Saito (1989):

\[(68) \quad \text{Who}_i \ t_i \text{ knows [which picture of whom] } \text{ Bill bought } t_j. \quad \text{(Saito (1989: 187))} \]
The wh-phrase *whom* can take either matrix or embedded scope in (68), while it only takes matrix scope in (69). The marginal status of (69) is due to a wh-island effect.

Saito claims that since (69) has the LF-representation (70) below, the narrow scope interpretation of *whom* is excluded as a violation of the Proper Binding Condition (PBC). The PBC requires that traces be bound (cf. May (1977)).

\[(70) \ [S' \ [which\ picture\ of\ tkj] \ [S\ do\ you\ wonder\ [S' \ [whomk\ whoj] \ [s\ tj\ bought\ ti]]]] \] (Ibid.: 188)

Here, the trace *tk* left by the lowering of *whomk* to the embedded Comp is not bound, violating the PBC.

Regardless of whether the PBC can be maintained as an independent principle or reduced to FI, the requirement that traces be bound is an interface condition at LF under the minimalist assumption that no condition applies in overt syntax (see Kitahara (1994), for discussion).

Note that Tanaka (1994) argues that the sentence (69) counts as evidence against reconstruction at LF. If it applied to (69), the resultant LF-representation (71) below would not be excluded by the PBC:

\[(71) \ whichi\ do\ you\ wonder\ whomk\ whoj\ tj\ bought\ [ti\ picture\ of\ tk] \] (Tanaka (1994: 105))

Here, the phrase 
\[ [ti\ picture\ of\ tk] \] is "reconstructed" into the original trace, with *which* in the matrix [Spec, CP] and *whom* in the embedded [Spec, CP]. Since *tk* is bound by *whomk*, we cannot exclude this LF-representation by the PBC. Then the "reconstruction" would allow *whom* in (69) to take embedded scope, contrary to fact.

The same problem would arise with our account, given the following LF-derivation of (69):

\[(72) \ a. \ [CP \ [[which\ x]\ [x\ picture\ of\ whom]\ x]\ do\ [AgrSP\ you\ ...\ [which\ x]\ [x\ picture\ of\ whom]\ x]\ wonder\ [CP\ [which\ y]\ [AgrSP\ [[y\ person]\ y]\ [TP\ [[which\ x]\ [x\ picture\ of\ whom]\ x]\ [TP\ ...\ [AgrOP\ [[which\ x]\ [x\ picture\ of\ whom]\ x]\ bought\ [VP\ tv\ ti]]]]]]] \] \]

\[b. \ [CP\ [[which\ x]\ [x\ picture\ of\ whom]\ x]\ do\ [AgrSP\ you\ wonder\ [CP\ [which\ y]\ [AgrSP\ [[y\ person]\ y]\ [TP\ [[which\ x]\ [x\ picture\ of\ whom]\ x]\ [TP\ ...\ [AgrOP\ [[which\ x]\ [x\ picture\ of\ whom]\ x]\ bought\ [VP\ tv\ ti]]]]]]] \] \]
In (72a), quasi-QR has applied to (the copies of) which picture and who, but not to whom. The application of trace-deletion yields (72b) and complementary deletion yields (72c). Then, LF-absorption applies to whom and [which y] in the embedded [Spec, CP] position in (72c), forming a generalized quantifier [which y, z], as in (72d). If this derivation were allowed, nothing could actually prevent whom in (69) (i.e. which z in (72d)) from taking embedded scope, since the trace of whom (i.e. the variable z, bound by its operator) satisfies the PBC in (72d).

On the contrary, we can correctly exclude the LF-derivation (72) in terms of considerations of the nature of complementary deletion. Recall that this deletion has a property to eliminate non-operators in an operator position and operators in non-operator positions. However, during the course of derivation from (72b) to (72c), the operator whom in the matrix [Spec, CP] position (an operator position) is deleted, which is actually incompatible with the nature of complementary deletion. From this follows a corollary: complementary deletion can apply only after the operator vacate its position within the wh-phrase.18

Thus, consider the following alternative derivation:19

\[(73)\]

\[
\text{a. } [\text{CP } [[\text{which } x, z] \text{ [x picture of } [[\text{z person} z]] x]] \text{ do } [\text{AgrSP you } [[\text{which } x, z] \text{ [x picture of } [[\text{z person} z]] x]] \text{ wonder}}
\]

18 An EL reviewer claims that this corollary would be crucial to our account: if complementary deletion would precede quasi-QR, it would wrongly delete the operator in the operator position, which is against the property of complementary deletion. Such an account could be an alternative to our account in the text. Still, it would be desirable to avoid assuming such rule-ordering, which might seem rather stipulative. For this reason we resort to considerations of the property of complementary deletion, in resolving the problem in question.

19 Quasi-QR converts which picture of whom in (69) to [[which x, z] [x picture of [[z person] z]] x] in (73a), in the following manner:

\[
\text{(i) } \\
\text{a. } [[\text{which } x] \text{ [x picture of whom} x]] \\
\text{b. } [[\text{which } x] \text{ [x picture of } [[\text{which person} z]] x]] \\
\text{c. } [[\text{which } x] \text{ [which } z] \text{ [x picture of } [[\text{z person} z]] x]]
[CP [which y] [AgrSP [[y person] y] [AgrOP [[which x, z] [x picture of [[z person] z]] x] bought [VP tv t]]]]

As in (73a), the operator [which z] is raised from within the wh-phrase whom in (72a) via quasi-QR and undergoes absorption with [which x] to form a generalized quantifier [which x, z]. After trace-deletion, complementary deletion can eliminate the non-operator portions [x picture of [[z person] z]] x in the matrix operator position, as in (73b). This is compatible with the nature of complementary deletion. Since whom in (69) has formed a generalized quantifier with [which x], it obligatorily takes matrix scope. In other words, whom cannot take embedded scope, since complementary deletion cannot eliminate operators in operator positions as in (72).

It follows that the absence of embedded scope of whom in (69) is derived from considerations of the defining property of complementary deletion and may not count as evidence against our proposal.  

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20 The ambiguity of (68) is also straightforwardly accommodated. Whom can undergo absorption either with who (hence it takes matrix scope) or which picture (hence embedded scope).

21 We have another puzzling problem concerned with scope of the restriction of an operator with respect to other operators. Consider first the following sentence:

(i) Which philosophers would you be annoyed if we invited?

(Higginbotham (1993: 200))

According to Higginbotham (1993), the restriction (i.e. philosophers) of the wh-phrase in (i) may never be interpreted as if it would be “reconstructed” within the scope of the modal would. Thus, (i) may not be associated with a meaning like that of (ii):

(ii) For which things x would you be annoyed if x was a philosopher and we invited x?

(Ibid.: 200)

Since scope of an element is considered to be its c-command domain, one might argue that the restriction in (i) must not be c-commanded by the modal at the point of interpretation; otherwise we would erroneously have the interpretation (ii). Under our assumptions, (i) may be given the following LF-representation, where we omitted irrelevant details:

(iii) [which x] would you be annoyed if we invited [[x philosophers] x]

Since the restriction must not stay in the operator position under the Preference Principle, it is forced to occupy some lower position, as in (iii). Then, it appears that the restriction could never fail to be c-commanded by the modal, as it stands. If so, the interpretation (ii) would be wrongly allowed.
7. Conclusion

We have proposed in this article that an A’-chain of an argument forms a tripartite structure consisting of an operator, its restriction, and its variable, rather than an operator-variable structure and that only such a tripartite structure qualifies as a legitimate LF-object. Operations such as quasi-QR, trace-deletion and complementary deletion apply to derive such a legitimate LF-object. In other words, the driving force of these operations is the convergence condition FI (Chomsky (1993: 26)). This proposal allows the restriction of an operator to be “reconstructed” into any intermediate position between the operator position and the variable. This is a desirable result, since Condition C effects do not require the restriction to be “reconstructed” too deeply, while effects of Condition A and B do, in some cases. This correctly derives the weakening effect of reconstruction. Thus, assuming the tripartite structure analysis, we actually support the copy theory of movement and can find a way to evade the dilemma pointed out in Ike-uchi (1993).

Still, we would like to suggest one possible way to resolve this problem. Enç (1991) observes the fact that a specific NP, unlike a nonspecific one, has wide scope over modals (and other operators). An NP is specific if its referent is a subset of a referent which is already in the domain of discourse. Consider:

(iv) Helen must beat an athlete from UCLA who is trained by the Dogar brothers.  
(Enç (1991: 1))

The indefinite NP in (iv) is taken to be specific when interpreted to have scope over must.

As Beghelli (1993) argues, a specific NP does not necessarily move out of scope of other operators in the same sentence, but can be somehow assigned wide scope. Then, it is not implausible to adopt Pesetsky’s (1987) proposal that these specific NPs (corresponding to d(iscourse-linked NPs in his term) are (unselectively) bound by a covert operator taking wide scope. Recall that an NP is specific if its referent is a subset of a referent which is already in the domain of discourse. If such (unselective) binding is generally available for specific (i.e. D-linked) NPs, it is not necessary to assume that the restriction of an operator as in (iii) is always in a position which c-commands other operators such as modals. Pesetsky argues that such a wh-phrase as [which N] is D-linked and unselectively bound by a covert operator at LF. Then, it is not implausible to assume that the restriction [x philosophers] in (iii) can be assigned wide scope over the modal via binding by such a covert operator or possibly by its operator [which x]. For a similar proposal made for bare numeral quantifier phrases, see Beghelli (1993). Of course, we need further elaborations of this sketchy account in future research. However, if this move is on the right track, the scope relation in (iii) will not suffice to undermine our proposal.
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