

# Total Reconstruction, PF Movement, and Derivational Order

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Theories of total reconstruction have generally supposed that movement can be followed by an undoing operation like LF lowering (May 1977, 1985) or deletion of higher copies (Chomsky 1993). We argue that reconstruction effects can be derived only if the original movement is purely phonological. There are no undoing operations. We present three distinct arguments, based on an interaction between raising and *wh*-movement in English, facts from agreement with group terms in British English, and multiple scrambling in Japanese. The arguments imply that the T-model is correct in supposing that movement that affects both LF and PF must precede movement that affects only PF.

*Keywords:* scope, raising, T-model, scrambling, agreement, derivations versus representations

## 1 Introduction

Movement usually brings about semantic effects, such as new scope and binding possibilities. But there are also some cases where movement can or even must be invisible to interpretation. The terms *scope reconstruction* (May 1977), *radical reconstruction* (Saito 1989), and *total reconstruction* (Aoun and Benmamoun 1998) have been used for these phenomena—we will use *total reconstruction* here. While most analyses of these facts assume that movement is followed by an undoing operation, an alternative analysis is that total reconstruction is due to purely phonological movement (Aoun and Benmamoun 1998). In this article we argue that total reconstruction phenomena can only be derived by purely phonological movement.

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A typical example of total reconstruction is (1).<sup>1</sup> The subject *an Austrian* can take scope below *likely* in (1), since the sentence can be felicitous in a situation where no Austrian participant has the property of being likely to win, just so long as it's likely that the winner will be from Austria—for example, if the Austrians who qualified for the competition outnumber the athletes from other nations who qualified.

- (1) [An Austrian]<sub>i</sub> is likely to *t<sub>i</sub>* win the gold medal.

We will shortly describe the explanations that have been given for this phenomenon, but first it is important to recognize that total reconstruction in (1) is distinct from the phenomenon called *binding reconstruction*, *connectivity*, or *partial reconstruction* found with *wh*-movement in English. A typical example of binding reconstruction is (2), where the pronoun *hers* is bound by the quantifier *every student*.

- (2) [Which relative of hers]<sub>j</sub> did every student<sub>j</sub> invite *t<sub>i</sub>*?

As Saito (1989) discusses in more detail, the process applying to the *wh*-phrase in (2) must differ from that applying to the indefinite in (1). This is because the scope of moved *wh*-phrases in English is fixed by their surface position: (3) does not have an interpretation corresponding to the paraphrase *Did Mary ask which relative to invite?* In (1), however, the scope of the moved phrase is narrower than its surface position.

- (3) [Which relative]<sub>j</sub> did Mary ask whether to invite *t<sub>i</sub>*?

We follow the literature (Chomsky 1993, Fox 1999, Sauerland 1998) in assuming that the mechanism accounting for (2) is the copy theory. In (2) only parts of the moved phrase occupy a position at LF that is lower than the pronounced material, as shown in (4) (Engdahl 1980, Fox 1999, Sauerland 1998).

- (4) which<sub>i</sub> did every student<sub>j</sub> invite [relative of hers]<sub>j</sub>  
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In total reconstruction, however, the entire moved phrase occupies a position at LF that is lower than its pronounced position (Fox 1999, May 1977, Romero 1997). (3) and further evidence in Saito 1992 and Aoun and Benmamoun 1998 argue that total reconstruction is not available with *wh*-movement.

Total reconstruction has sometimes been viewed as that case of partial reconstruction where all of the moved material is affected (Hornstein 1995). However, we argue below that total reconstruction must be derived by a very different mechanism from the one responsible for partial

<sup>1</sup> In raising constructions, total reconstruction of universal QPs, like the one in (i), is impossible. Our discussion relies only on examples where existentials raise.

(i) Every coin is 3% likely to land heads. (Lasnik 1998)

It is beyond the scope of this article to investigate the reason for this difference between universal and existential QPs.

reconstruction. One reason why total deletion of the higher copy in a movement chain may not be possible is that movement might create more than just a copy at the top position of a chain.<sup>2</sup> Heim and Kratzer (1998), Nissenbaum (1998), and Sauerland (1998) argue that movement also creates a  $\lambda$ -operator that initiates an operator-variable chain. This means that we expect partial reconstruction to be possible via the deletion of parts of the top copy of the movement chain at LF, assuming structures like (5a) (following Engdahl (1980)). But deletion of the entire top copy of the movement chain would yield the structure (5b), which plausibly is ill formed because it is not of the right semantic type—it is a predicate rather than a question—and the  $\lambda$ -operator does not bind anything.

- (5) a. which  $\lambda f$  did every student<sub>j</sub> invite [ $f$ (relative of hers<sub>j</sub>)]  
 b.  $\ast \lambda f$  did every student<sub>j</sub> invite [which relative of hers<sub>j</sub>]

Total reconstruction, then, is distinct from partial reconstruction. At least four different analyses have been proposed for it.<sup>3</sup> May (1977) advances the *LF lowering* analysis (see also, e.g., May 1985, Barss 1986, Fox 1995, Chomsky 1995b). He proposes that the raised quantifier undergoes downward movement in the LF branch of the derivation as sketched in (6).

- (6) a. [An Austrian] is likely to  $t$  win.  
           ↑  
 b. is likely [an Austrian]<sub>i</sub> to  $t_i$  win  
           ↑

Chomsky (1993), Hornstein (1995), and Bobaljik (1995) advance an explanation based on the *copy theory* of movement. They propose that movement must leave a copy of the moved material in the trace position, but that at the LF and PF interfaces one of the two copies must be deleted. However, even when the higher copy is pronounced and the lower copy deleted at PF, the lower copy can be the one that is interpreted. This is sketched in (7).<sup>4</sup>

<sup>2</sup> Chomsky (1995b:326–327) also proposes that partial reconstruction of the type available in  $\bar{A}$ -chains can never give rise to the effect of total reconstruction, though for different reasons.

<sup>3</sup> Here we consider only analyses roughly based on the framework of the Extended Standard Theory, where overt movement can affect interpretation. McCawley (1999), by contrast, assumes that PF structures are derived by application of transformations to LF structures. On this perspective, all movement is, in a sense, PF movement. Since our proposal relies on the existence of both stem and PF movement, it is incompatible with McCawley's view.

<sup>4</sup> One difference between the LF lowering view and all other proposals is that only on the former is the LF position of the reconstructed quantifier higher than its trace position. Chomsky (1995b:327) argues for the LF lowering view on the basis of the contrast in (i).

- (i) a. (It seems that) everyone isn't here yet.  
 b. Everyone seems not to be here yet.

In (ia) negation can take scope above *everyone*, but not in (ib). This contrast is expected, Chomsky argues, if LF lowering in (ib) must target a position above negation. Chomsky's argument carries no force, however, if universal QPs can never totally reconstruct in raising constructions (see footnote 1)—then the contrast in (i) is expected on any account of total reconstruction.

- (7) a. [An Austrian] is likely to [an Austrian] win.



- b. ⟨[an Austrian]⟩ is likely to [an Austrian] win

Von Stechow (1991) notices a possible analysis of total reconstruction that Cresti (1995), Rullmann (1995), and Chierchia (1995) develop as *semantic reconstruction*. They propose that the semantic type of the trace can be that of a quantifier, as in (8b), rather than that of an individual. As the application of  $\lambda$ -conversion shows, (8b) is equivalent to a representation where *an Austrian* occupies its trace position.

- (8) a. [An Austrian] is likely to  $t$  win.



- b. [An Austrian]  $\lambda x^{(et,t)}$  is likely to  $x^{(et,t)}$  win.

All three proposals so far—LF lowering, the copy theory, and semantic reconstruction—assume that total reconstruction involves movement that is visible to interpretation followed by an optional undoing operation. The analysis of the narrow scope interpretation of (1) we argue for is that *an Austrian* undergoes movement from the trace position  $t$ , but that this movement operation is purely phonological and therefore does not affect interpretation.

- (9) a. [An Austrian] is likely to  $t$  win.



PF

- b. is likely to [an Austrian] win

We call this *PF movement*. If there is PF movement, it is expected to have no effect on interpretation, just like other phonological processes (e.g., final obstruent devoicing, vowel epenthesis). Aoun and Benmamoun (1998) suggest that some cases of reconstruction of clitic left-dislocation in Lebanese Arabic should be analyzed as PF movement. Our proposal is consistent with theirs, but much stronger: all cases of total reconstruction must be analyzed as PF movement.<sup>5</sup> Note that our proposal entails that movement that takes place to satisfy a condition of the LF interface cannot totally reconstruct. Therefore, we assume that the two cases of totally reconstructing movement we discuss—movement to the subject position in English (the EPP) and scrambling in Japanese—serve to satisfy a PF interface condition.

Total reconstruction in (1) was detected by the narrow scope of the subject. In addition to narrow scope, we will be concerned with two other diagnostics of total reconstruction: licensing of negative polarity items (NPIs) and licensing of binominal *each*. In the examples in (10), the NPI *any* must be in the scope of negation at LF (Linebarger 1980, 1987). This is only possible

<sup>5</sup> Bouchard (1983) also proposes that narrow scope in English raising constructions is a consequence of PF movement, but for different reasons. We thank Anna Szabolcsi (personal communication) for pointing out Bouchard's work to us.

in (10a) if the raised subject totally reconstructs.<sup>6</sup> As predicted, *a doctor with any reputation* must take scope below *likely* and *not* in (10a). In the control (10b), the base position of the subject is above negation. Therefore, total reconstruction to a position below negation is not possible and *any* is not licensed in (10b).

- (10) a. [A doctor with any reputation]<sub>i</sub> is likely not to be  $t_i$  available.  
 b. \*[A doctor with any reputation]<sub>i</sub> is  $t_i$  anxious for John not to be available.

Binominal *each* is only licensed in the scope of a distributive noun phrase at LF (Burzio 1986). In (11b) *each* is licensed by the plural DP *the athletes*, which must receive a distributive interpretation.<sup>7</sup> On the other hand, *each* is not licensed in (11c) because the subject cannot take scope below the plural *the athletes*. *Each* in (11a) is licensed only by total reconstruction of the subject to the indicated trace position, where it can be in the scope of the plural *the athletes*.

- (11) a. [One translator each]<sub>i</sub> is likely to  $t'_i$  be assigned  $t_i$  to the athletes.  
 b. The Olympic Committee assigned one translator each to the athletes.  
 c. \*[One translator each]<sub>i</sub> is likely to  $t_i$  give a speech to the athletes.

These diagnostics will be used in later sections.

The evidence in this article has direct implications for the structure of the grammar. The claim that there is PF movement obviously presupposes that the application of operations can either affect both LF and PF representations or affect the PF representation only. Furthermore, we show that intricate predictions arise from the assumption that the two types of movement we are concerned with are inherently ordered—namely, that PF movement must follow movement that affects both LF and PF. For the exposition we adopt the terminology of the *T-model* as sketched in (12). To distinguish between overt movement that affects interpretation and overt movement that does not affect interpretation, we use the terms *stem movement* for movement affecting both LF and PF and *PF movement* for movement affecting only PF.<sup>8</sup>

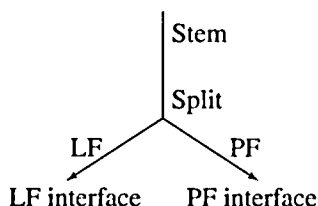
<sup>6</sup> Licensing of the NPI requires a lowered interpretation. Therefore, partial reconstruction cannot be sufficient for NPI-licensing, if it is available in raising constructions at all. Since the interpretation of partial reconstruction when there is no variable binding is very similar to that of an unreconstructed LF structure, this result argues for a theory of NPI-licensing that makes reference to properties of semantic interpretation (Ladusaw 1979).

<sup>7</sup> For many speakers examples like (11a) and (11b) are slightly marked as compared to (i), where *each* is in the scope of a distributive plural that precedes it.

(i) The athletes were assigned one translator each.

See Safir and Stowell 1987 and Pesetsky 1995 for further discussion of binominal *each*, especially of how *each* might be in the scope of the plural in (11b). We thank Richard Kayne (personal communication) for drawing our attention to binominal *each*.

<sup>8</sup> Within the T-model, PF movement raises similar issues for the cycle as the existence of LF movement does. When they do not target the root node, neither LF movement nor PF movement can be subject to the cycle condition that forces Merge and Move operations in the stem to build the syntactic representation in a bottom-up fashion (Chomsky 1995a). We assume that a separate, subsequent cycle exists for PF movement, as has also been proposed for LF movement (Bures 1992). In section 5.2 we show how our analysis can be incorporated into a system with a single cycle.

(12) *T-model* (Chomsky and Lasnik 1977)

The article consists of three independent arguments for the PF movement analysis of total reconstruction. The first two arguments, in sections 2 and 3, concentrate on unexpected restrictions on the meanings of English raising constructions: the first concerns plural agreement with nouns denoting groups in British English; the second examines a correlation, in all dialects of English, between the ability of a phrase to reconstruct and its c-commanding the reconstruction site in the overt form. The third argument, in section 4, concerns another well-studied case of total reconstruction, namely, Japanese scrambling. We show that restrictions on total reconstruction in multiple scrambling constructions follow from the PF movement view. In section 5 we summarize the pieces of evidence that argue for a derivational view of syntax, and those that argue for a structure of the grammar in which PF movement must follow movement that affects both interfaces. Furthermore, we show that models that give up this ordering requirement are only compatible with our result if they incorporate a form of look-ahead to determine what phrases will undergo movement in a later step of the derivation.

## 2 British English Plural Agreement

In this section we argue that support for the PF movement theory of total reconstruction can be derived from a curious fact about verbal agreement in British English.<sup>9</sup> It is well known that in British English certain nouns that denote groups can take either singular or plural verbal agreement. Thus, the two sentences in (13) are equally grammatical.

- (13) a. The Government is ruining this country.  
 b. The Government are ruining this country.

As far as we know, however, it has not previously been noted that this special plural agreement has systematic effects on quantifier scope. In particular, while (14a), with singular agreement, is ambiguous in the normal way, (14b), with the peculiar British English plural agreement, can only have wide scope for the subject with respect to the lower scope-bearing element.

- (14) a. A northern team is likely to be in the final. ( $\exists > \text{likely}$ ,  $\text{likely} > \exists$ )  
 b. A northern team are likely to be in the final. ( $\exists > \text{likely}$ ,  $*\text{likely} > \exists$ )

<sup>9</sup> David Pesetsky deserves special thanks for his role as midwife to this section.

We will show that the PF movement theory predicts the data in (14), while the other three theories of total reconstruction incorrectly predict that both readings should be available in (14b).

## 2.1 Number and Mereology

We will start with a brief descriptive account of British English plural agreement. Apparently, little previous generative work has been done on it. A few of the facts set out here are mentioned in Pollard and Sag 1994 and Munn 1998.

The basic fact is that in British English certain singular nouns that are names of groups can behave as if they were plural. They behave this way by a variety of diagnostics. For example, they can be used with *each*, as in (15).

- (15) The committee each received a pay-rise.

They can license plural anaphors, as in (16).

- (16) a. I want the battalion to get themselves under cover.  
b. The Labour Party scare each other.

They can bind plural pronouns, as shown by (17), which is ambiguous between strict and sloppy readings. Following Partee (1970) and many other researchers, we take a sloppy reading of a sentence with VP-ellipsis to be indicative of variable binding.

- (17) The rugby team like their coach and the football team do too.

And, of course, they can be used with plural verb agreement, as shown in (16b), (17), and (18).

- (18) {3,5,7,9} This set are all odd.

An incomplete list of nouns that behave like this is given in (19).

- (19) cabinet, committee, platoon, (political) party, pride, hive, team, regiment, battalion, bank, government, group, family, faculty, Senate, House (of Lords, Commons, Representatives), set, squad

At the same time that they behave as if they were plural, however, these nouns also display signs of being morphologically and semantically singular. They are morphologically singular in terms of overt morphology: *committee*, not *committees*, and so on. They are semantically singular in that it is still clear, in sentences like (15)–(18), that only one committee, battalion, or set is being referred to. There is a reflex of this fact, presumably, in the singular demonstrative *this* in (18), where *these* would be ungrammatical. Furthermore, as well as being able to bind plural pronouns, as shown in (17), these nouns can bind singular pronouns when used with plural verbal agreement, as shown in (20).

- (20) All the rugby team are carrying its mascots and all the football team are too.

(20) is ambiguous between strict and sloppy readings. Again, the sloppy reading signals that the pronoun is bound.

It seems, then, that any adequate account of the behavior of these nouns will have to find some way of portraying them as simultaneously singular and plural. We propose to do this by suggesting that the category of a feature and the value it takes figure separately in its representation, a device suggested for independent reasons by Chomsky (2000). By *category* we mean things like person, number, gender, Case; by *value* we mean things like "1st," "2nd," and "3rd" in the case of person, and "singular" and "plural" in the case of number. We propose, then, that features should be represented as in (21).

- (21) [Number: singular]  
       [Person: 1]  
       [Case: accusative]

In fact, such representations make sense for any language in any version of syntax in which there is a principle analogous to "Mismatch of features cancels the derivation" (Chomsky 1995b). For example, we want to rule out a derivation in which the direct object, bearing accusative Case, is merged in Spec,VP and then raises to Spec,TP, in the checking domain of the [nominative] feature of T. This is done, of course, by the principle that mismatch of features cancels the derivation. There is mismatch between the [nominative] feature of T and the [accusative] feature of the DP. But how is the derivation to know that this is a case in which nonidentity equates with mismatch? After all, there is no mismatch between, say, a [nominative] feature and a [plural] feature, even though they are not identical. The answer is obviously that mismatch is caused when the values of features of the *same category* fail to match. But then the most straightforward way to build this into the derivational system is to have features wearing their category on their sleeve. The alternative would presumably be to posit the existence of lists of features of the same category to which the computational system would refer every time a checking configuration arose in the course of a derivation, with the proviso that the derivation be canceled if any two nonidentical members of the same list occurred together in such a configuration. Such an alternative is conspicuously less economical than the present proposal, which requires examination only of the features present in the checking configuration.

Such a conception of features is useful in the present case because it opens up the possibility that the same set of values may be the values of more than one category. As illustrated above, we need to say that the *committee*-type nouns in British English are somehow simultaneously singular and plural. This is especially obvious in cases like (18), where the noun takes a singular determiner but a plural verb, and (20), where the noun takes a plural verb but binds a singular pronoun. Now we cannot simply say that there are undifferentiated [singular] and [plural] features simultaneously present on these nouns. This is because it is not the case that these nouns can do everything that normal plural nouns can do. For example, as mentioned above, they cannot take plural determiners, even when they are used with plural verbs. Thus, to repeat the example, we have the contrast in (22).

- (22) a. This set are all odd.  
       b. \*These set are all odd.

This fact could not be captured if we said that there was simply a [singular] and a [plural] feature on these nouns, and processes sensitive to number could refer to either. Then we would predict that (22b) would be good. Instead, we need to say that certain processes, such as verbal agreement, can refer to either feature, while others, such as determiner concord, can refer only to a particular one.

We suggest that in British English there are two feature categories that have as values [singular] and [plural]. One is the conventional Number feature, which for any nominal predicate indicates how many such things are being referred to. So in (22a) *set* is [Number: singular], since only one set is being referred to. The other feature we will call *Mereology*. It indicates whether or not the entity under discussion is being conceived of as consisting of more than one member. So in (22a) *set* is [Mereology: plural]. We are now in a position to offer at least a preliminary account of the phenomena we have outlined so far: certain processes, like verbal agreement and the licensing of singular and plural anaphors and pronouns, can refer to either the Number feature or the Mereology feature; but determiner concord refers only to the Number feature. It remains to be seen, of course, whether any deeper account can be offered of this discrepancy; our purpose here is only to motivate the assumption of the Mereology feature.

## 2.2 Subject-Verb Agreement

This leaves the question of the mechanism of subject-verb agreement. We will follow recent work in minimalist syntax (Chomsky 1995b, 2000) and assume that the operation crucially involves the  $\phi$ -features of the subject checking uninterpretable  $\phi$ -features on T. We suppose, then, that in the British English cases we have been looking at there are uninterpretable Person, Number, and Mereology features on T that are checked by the  $\phi$ -features of the subject. The morphological operation that copies  $\phi$ -features from T and manifests them in overt verb endings copies the Person feature and one of the Number and Mereology features.

Beyond the common assumption that subject-verb agreement involves checking features on T, recent theories differ significantly in this area. In the theory developed in Chomsky 1995b, the  $\phi$ -features on T in (23a) would be checked when the subject moves by whole-category movement to Spec,TP; so the features of an XP in the specifier of a head can check those of the head. By contrast, the  $\phi$ -features on T in (23b) would be checked by the formal features of the associate raising and adjoining to T in the LF branch.<sup>10</sup>

- (23) a. An unpopular candidate T-was elected *t*.  
 b. There T-was elected an unpopular candidate.

By contrast, more recently Chomsky has proposed abolishing the specifier-head relationship (see Chomsky 2000). The idea is that the  $\phi$ -features on T in (23a) and (23b) would be checked in exactly the same manner, when the derivation reaches the stage in (24).

<sup>10</sup> Chomsky (1995b) uses the T-model of the grammar, as we do here. He further argues that movement only of formal features, as opposed to whole-category movement, can take place only after Spell-Out, in the LF branch.

## (24) T be elected an unpopular candidate

At this point the  $\phi$ -features on T seek deletion by matching with some lower set of identical  $\phi$ -features. After this takes place, the EPP-feature of T is satisfied either by Merge of *there*, if this appears in the numeration, or by movement of *an unpopular candidate*. Thus, in the Chomsky 2000 theory the same mechanism of subject-verb agreement is used in *there*-expletive sentences and the corresponding raising sentences.

A significant problem for the Chomsky 2000 theory is that there are asymmetries in agreement between these two types of sentences. For example, let us take subjects consisting of two conjoined singular NPs (Sobin 1997). As (25) illustrates, plural agreement is entirely acceptable when such a subject appears in Spec,TP, but distinctly awkward (for many speakers) when the same subject appears as the associate of an expletive.

- (25) a. A cat and a dog are in the yard.  
b. \*There are a cat and a dog in the yard.

Another troublesome example, and one that will be important for other reasons later, concerns mereological plurality in British English. It is impossible to have plural agreement with a *committee*-type noun when such a noun is the associate of an expletive, as shown in (26) and (27).

- (26) a. A committee was holding a meeting in here.  
b. There was a committee holding a meeting in here.  
c. A committee were holding a meeting in here.  
d. \*There were a committee holding a meeting in here.
- (27) a. Was there a team drinking each other under the table?  
b. \*Were there a team drinking each other under the table?

According to the Chomsky 2000 theory, subject-verb agreement takes place in exactly the same way in each of the sentences in (25), (26), and (27). These data are clear counterexamples to this theory.

On the other hand, the theory of agreement in Chomsky 1995b suggests an analysis of the data in (25)–(27). We can say that the [Mereology: plural] feature reaches Spec,TP in (26c) by whole-category movement in the stem, which carries along all features of a lexical item, even phonological ones. On the other hand, we can say that the Mereology feature is not able to raise in covert feature movement. This produces the ungrammaticality in (26d), since then the uninterpretable Mereology feature on T will not be checked and will cause the derivation to crash at the LF interface.<sup>11</sup> It is beyond the scope of this article to investigate why the Mereology feature should be unable to raise in covert feature movement. We note only that this is not an isolated example. To judge by the following sentences (with list readings), it seems that English first and second person features also cannot raise covertly:

<sup>11</sup> The Mereology feature must be added optionally to T, since if it were obligatory we would expect (26b) to be ungrammatical for exactly the same reason as (26d).

- (28) a. There's me.  
       b. \*There am I/me.
- (29) a. There's you.  
       b. \*There are you.

In sum, the Chomsky 1995b system can offer a preliminary explanation of asymmetries in verbal agreement between *there*-expletives and raising sentences, since different mechanisms are used for verbal agreement in these two cases. We therefore adopt it here in preference to the Chomsky 2000 theory of verbal agreement.

### 2.3 Mereology and Scope

We are now in a position to consider what conclusions about the nature of total reconstruction can be drawn from the scope data in (14b). The full relevant paradigm is given in (30). The missing pieces of data were the *there*-expletive sentences related to the raising sentences. As expected given the examples in the previous section, (30d), with a plural verb and a *committee*-type associate, is ungrammatical.

- (30) a. A northern team is likely to be in the final. ( $\exists > \text{likely}$ ,  $\text{likely} > \exists$ )  
       b. A northern team are likely to be in the final. ( $\exists > \text{likely}$ ,  $*\text{likely} > \exists$ )  
       c. There is likely to be a northern team in the final.  
       d. \*There are likely to be a northern team in the final.

Let us consider how well the rival theories of total reconstruction described in section 1 can deal with the data in (30). In particular, we will want to know if any sense can be made of the correlation between the ungrammatical *there*-expletive sentence (30d) and the ungrammatical raising sentence with reconstruction (30b).

The LF lowering theory, the copy theory of movement, and the theory of semantic reconstruction have one thing in common: namely, that the subject of a raising sentence like (30a) always moves to Spec,TP in the normal way, and then the movement can be reversed somehow to obtain inverse scope. Under these theories, then, it is hard to see how the contrast between the two readings in (30b) can be obtained at all: the uninterpretable [Mereology: plural] feature on T will be checked in the normal way when the subject moves to Spec,TP, and the subsequent reversal of the movement cannot alter this fact. In other words, these three theories state that subject-verb agreement in raising sentences takes place the same way regardless of whether the subject has wide or narrow scope with respect to a lower scope-bearing element. This is clearly falsified by the data in (30b). If there are any differences at all in this area, the *there*-expletive sentence is predicted to pattern differently from either reading of the raising sentence, since the mechanism for subject-verb agreement it uses is different from that used by the raising sentence. Again, the data in (30) disconfirm this prediction.

Now consider the PF movement theory. It is an interesting corollary of the PF movement theory of total reconstruction that subject-verb agreement in a raising sentence like (30a) is predicted to take place differently according to the scope of the subject. If the subject takes scope

over a lower scope-bearing element, it is predicted to move to Spec,TP in the stem and check the relevant features on T in the specifier-head relationship. If, however, the subject takes scope below a raising predicate like *likely*, the claim is that it stays in its base position permanently in the stem and in the LF branch, and that movement involves only phonological features in the PF branch. Thus, subject-verb agreement will be accomplished by feature raising in the LF branch: the formal features of the subject raise to T, checking the uninterpretable  $\phi$ -features there. Now note that this is exactly the same mechanism by which subject-verb agreement is accomplished in *there*-expletive sentences. We predict, therefore, that if any process interferes with subject-verb agreement in a *there*-expletive sentence, the corresponding raising sentence will be ungrammatical in the reading with the subject taking scope below the raising predicate; but it will not necessarily be ungrammatical on the reading with wide scope for the subject. This prediction is exactly the opposite of that made by the other three theories of total reconstruction—and it is confirmed by the data in (30).

Further confirmatory data arise in the area of NPI-licensing. As is well known, NPIs typically have to be c-commanded by negation or some other member of a limited class of operators. As mentioned in section 1, Linebarger (1980, 1987) has shown that NPIs can be licensed by reconstruction, in sentences where they are not overtly c-commanded by any relevant operator, as illustrated in (10). For present purposes it is interesting to note that this type of NPI-licensing is also blocked by British English mereological plurality. (31) shows the *committee*-type noun *people* in the sense in which it is used in (32); note the grammaticality of the plural in (31b) and (32d).

- (31) a. A Germanic people is trying to settle in this land.  
       b. A Germanic people are trying to settle in this land.
- (32) a. [A people with any tradition of trepanning]<sub>i</sub> has never been discovered  $t_i$ .  
       b. \*[A people with any tradition of trepanning]<sub>i</sub> have never been discovered  $t_i$ .  
       c. [A people with a tradition of trepanning]<sub>i</sub> has been discovered  $t_i$ .  
       d. [A people with a tradition of trepanning]<sub>i</sub> have been discovered  $t_i$ .

In (32a) the NPI is licensed by reconstruction and nothing else goes wrong, but in (32b), with mereological plural, the sentence is not grammatical.

It is difficult to see how this contrast can be accounted for by anything other than the theory of PF movement combined with the observation that the Mereology feature cannot raise in covert feature movement. On this view the necessity of licensing the NPI forces raising of the subject only at PF in (32b), leaving it in its base position below negation at LF; but then the [Mereology: plural] feature that has to be present on T to produce the plural verb agreement in (32b) must be checked by covert feature movement, and previous examples make it clear that this cannot happen. Hence the ungrammaticality. Consider now what the consequences are of trying to account for these data by LF lowering, semantic reconstruction, or the copy theory of movement: the subject raises to Spec,TP in the stem by whole-category movement and checks the  $\phi$ -features on T, and the movement is later reversed in some manner, leaving the features checked. These theories of

reconstruction in A-movement predict, then, that there should be no difference in grammaticality between (32a) and (32b).

Although we will not attempt any in-depth treatment of them in this article, it seems likely that English and other languages contain phenomena similar to the British English *committee* facts that could be used to confirm or refute our theory. One quick example: we have already mentioned that many English speakers do not accept a *there*-sentence in which the associate consists of two conjoined singular NPs and the verb is plural (see (25)). This suggests the experiment whose results are set out in (33).

- (33) a. Some New Yorker is likely to be on that bus. ( $\exists > \text{likely}$ ,  $\text{likely} > \exists$ )  
 b. Some New Yorker and some Vermonter are likely to be on that bus. ( $\exists > \text{likely}$ ,  $*\text{likely} > \exists$ )  
 c. There is likely to be some New Yorker on that bus.  
 d. \*There are likely to be some New Yorker and some Vermonter on that bus.

The expletive sentence (33d) is ungrammatical, and, as we predict, the corresponding raising sentence (33b) is ungrammatical on the reading where the subject has narrow scope, but not on the reading where the subject has wide scope. Note the parallel with (30).<sup>12</sup>

A possible objection to this whole line of argument goes as follows. Perhaps the British English mereological plural is not licensed by wide scope after all, but by something that often correlates with wide scope, namely, specificity on some definition. It is certainly true that, for example, (31b) is most naturally interpreted as being about some particular Germanic people that the speaker has in mind. But then this might be argued to take the phenomenon out of the realm of scope and feature checking and into a different one. But as it happens there are examples in which there is mereological plurality but no specificity. For instance, (34a), with free-choice *any*, is completely acceptable, and many speakers find no difficulty with the generic (34b) and the donkey-sentence (34c).<sup>13</sup>

<sup>12</sup> Judgments on (33) are virtually unanimous and quite sharp. A messier picture emerges if we replace *some* in (33) with *a*, as in (i).

- (i) a. A New Yorker and a Vermonter are likely to be on that bus.  
 b. There are likely to be a New Yorker and a Vermonter on that bus.

We have so far tested the examples in (i) on 12 native speakers. Of these, only 6 found (ib) ungrammatical. Of these 6, 3 could indeed obtain only the ' $\exists > \text{likely}$ ' reading for (ia), as we would predict. The other 3 found (ia) ambiguous, however. At the moment we are uncertain how to explain the judgments of the latter 3 speakers; but given the facts in (33), we suspect that some kind of pseudo-scope is at work. We leave this issue for further research.

<sup>13</sup> These sentences also provide a refutation of the only other theoretical account of the British English *committee*-type data of which we are aware. Den Dikken (1999) proposes that these data involve an apposition structure like that in (i).

- (i) [<sub>DP</sub> pro<sub>i</sub> + plural] [<sub>DP</sub> the committee<sub>i</sub> - plural]]

There is no plural feature on *committee* itself, as in the present approach; rather, the plural feature is always carried by a pro adjoined to the DP in question. A sentence like (34a), then, would have to have the structure in (ii).

- (ii) [<sub>DP</sub> pro<sub>i</sub> + plural] [<sub>DP</sub> any committee<sub>i</sub> - plural]]

But here it is impossible to justify the presence of pro: it cannot be referential, because we are dealing with free-choice *any*; and it cannot be bound or E-type, since there is no binder or antecedent.

- (34) a. Any committee worth their salt are going to have looked into that.  
 b. A rugby team are likely to break up the furniture.  
 c. If a team have a good coach, they do what he says.

In none of these examples is the subject specific, and yet the plural agreement is grammatical. What these examples do have in common with those we have looked at previously is a subject that moves to Spec,TP in the stem by whole-category movement. It seems likely, then, that this is the critical factor in allowing mereological plurality. But then the PF movement analysis gains support from the evidence presented in this section.

### 3 Reconstruction and C-Command

In this section we argue that further support for the PF movement theory can be derived from a generalization about total reconstruction and c-command that we call Barss's Generalization.

#### 3.1 Barss's Generalization

Barss (1986:418–427) observes that in (35a) only a scopal construal where *some* takes scope over *likely* and *every* is available. Unlike (35b), (35a) allows no interpretation where *some* takes scope below either *likely* or *every*. Barss concludes that total reconstruction is impossible in (35a).

- (35) a. [How likely to  $t_i$  address every rally] $_j$  is [some politician] $_i$   $t_j$ ? (some > likely/  
 every, \*likely/every > some)  
 b. [Some politician] $_i$  is likely to  $t_i$  address every rally. (some > likely/every, likely/  
 every > some)

One of the ways (35a) differs from examples like (1) is that the QP *some politician* does not c-command any potential reconstruction position below *likely* in the overt form of (35a).<sup>14</sup> Barss's discussion of (35a) indicates that he believes that this is indeed the factor blocking total reconstruction and that the generalization in (36) holds, which we therefore call *Barss's Generalization*.<sup>15</sup>

- (36) Total reconstruction of an A-moved QP to a position X is blocked when the QP does not c-command X in the overt form.

<sup>14</sup> We use the term *overt form* rather than *Spell-Out* since *Spell-Out* is usually identified with the splitting point of the derivation; if we are correct, the representations at the two points can differ substantially.

<sup>15</sup> A stronger generalization that (36) could be subsumed under is that overtly moved phrases are scopally frozen for both total reconstruction and quantifier raising. However, this generalization, which we pursued in earlier work, and which also was suggested to us by Kyle Johnson, Susi Wurmbrand (personal communications), and one reviewer, faces empirical problems. For example, (ia) allows an interpretation where *every city* takes scope above *how many photographs*. Also (ib), due to Kyle Johnson, allows *many* to take scope over negation when *many* is focused for the five speakers we found who accept (ib) as grammatical.

- (i) a. Tell me how many photographs of every city Bill bought.  
 b. ... and talk to many students Mary can't.

In support of generalization (36), Barss presents only one example where total reconstruction is blocked, namely, (35a). But we now show that his generalization turns out to be correct for a variety of other cases. Consider first (37), which is structurally similar to (35a). Considering the kind of scenario discussed for (1) shows that (37) does not allow *likely* to take scope above *an Austrian*. This corroborates generalization (36), since in (37) the trace position of *an Austrian* below *likely* is not c-commanded by it in the overt form.<sup>16</sup>

- (37) [How likely to  $t_i$  win]<sub>j</sub> is [an Austrian]<sub>i</sub>  $t_j$ ? (an Austrian > likely, \*likely > an Austrian)

Since both (35a) and (37) involve an A-moved quantifier that is stranded by subsequent movement of the constituent to its right, one might hypothesize that the stranded quantifier in such a construction is generally unable to take narrow scope. But the examples in (38) show that the stranded A-moved phrase is capable of taking scope below a c-commanding quantificational element. In (38a) *some politician* can take scope below *every journalist*. (38b) shows that the stranded phrase can also take scope below a c-commanding *likely*.

- (38) a. Every journalist asked [how likely to  $t_i$  address every rally]<sub>j</sub> [some politician]<sub>i</sub> is  $t_j$ . (every journalist > some politician, some politician > every journalist)  
 b. John is likely<sub>1</sub> to find out [how likely<sub>2</sub> to  $t_i$  address every rally]<sub>j</sub> [some politician]<sub>i</sub> is  $t_j$ . (likely<sub>1</sub> >  $\exists$ ,  $\exists$  > likely<sub>1</sub>)

This shows that the lack of narrow scope of the stranded phrase in (35a) cannot be due to any general inability of stranded phrases to take narrow scope, but is specific to the relationship between the A-moved quantifier and quantificational elements that are part of the subsequently moved constituent.

Barss's example (35a) also contrasts with the examples in (39), which both allow the raised subject to take scope below *likely*. This corroborates generalization (36) since the overt position of the raised phrase c-commands its trace position in both (39a) and (39b). This shows that even when the degree of likelihood is in question, total reconstruction to a position below *likely* is possible.<sup>17</sup>

- (39) a. [How likely]<sub>j</sub> is [some politician]<sub>i</sub>  $t_j$  to  $t_i$  address every rally? (some > likely, likely > some)  
 b. Who claimed that [some politician]<sub>i</sub> is how likely to  $t_i$  address every rally? (some > likely, likely > some)

<sup>16</sup> In addition to the episodic readings considered, (37) can be understood generically. Then again, only an interpretation where *an Austrian* takes scope above *likely* is available. A paraphrase of this reading is 'Generally when an Austrian enters a competition, what are the Austrian's chances of winning?'

<sup>17</sup> The precise structure of (39a) is not important for the argument here, as long as  $t_i$  is c-commanded by *some politician*. However, the judgment on (39a) was shared by only roughly half of our informants. This might indicate that in fact for many of our informants the infinitive is extraposed from the fronted *wh*-phrase after *wh*-movement has taken place.

In Barss's example (35a) the relevant judgment concerned the absence of a particular scopal construal. The contrast in (40) involving *each*-licensing confirms Barss's Generalization. Here the judgment concerns the grammaticality of the example. As shown by (11), *each* can only occur in the scope of a distributive noun phrase, and in (40a) total reconstruction of *one translator each* is required for the plural *the athletes* to take scope above it. The ungrammaticality of (40b) then indicates that total reconstruction is not possible, as predicted by Barss's Generalization.

- (40) a. [One translator each]<sub>i</sub> is likely to be assigned  $t_i$  to the athletes.  
 b. \*[How likely to be assigned  $t_i$  to the athletes]<sub>j</sub> is [one translator each]<sub>i</sub>  $t_j$ ?

The contrasts in (41) and (42) show that Barss's Generalization is also observed in cases where the movement destroying the c-command relationship between an A-moved phrase and its trace is VP-fronting or *though*-raising, rather than *wh*-movement.<sup>18</sup> The ungrammaticality of (41a) and (42a) again seems to be due to the presence of *each*, since when *each* is omitted in (41b) and (42b) the examples become acceptable. In fact, Barss's Generalization predicts that total reconstruction should be impossible in (41) and (42) and therefore that *each* should not be licensed in (41a) and (42a).

- (41) a. \*... and [likely to be assigned  $t_i$  to the athletes]<sub>j</sub> [one translator each]<sub>i</sub> is  $t_j$ .  
 b. ... and [likely to be assigned  $t_i$  to the athletes]<sub>j</sub> [one translator]<sub>i</sub> is  $t_j$ .  
 (42) a. \*[Likely to be assigned  $t_i$  to the athletes]<sub>j</sub> though [one translator each]<sub>i</sub> is  $t_j$ , there were still complaints.  
 b. [Likely to be assigned  $t_i$  to the athletes]<sub>j</sub> though [one translator]<sub>i</sub> is  $t_j$ , there were still complaints.

While NPIs are often independently licensed in questions, VP-fronting and *though*-raising do not license NPIs. Hence, we can use licensing of *any* as a further test of Barss's Generalization. As shown by (10),<sup>1</sup> licensing of *any* situated in the raised DP requires total reconstruction, if the only potential licenser is a negation c-commanding a trace of the raised DP but not its surface position. As the data in (43) and (44) show, the result from NPI-licensing confirms the *each*-licensing data.

- (43) a. \*... and [certain not to be  $t_i$  available]<sub>j</sub> [a doctor with any reputation]<sub>i</sub> was  $t_j$ .  
 b. ... and [certain not to be  $t_i$  available]<sub>j</sub> [a doctor from cardiology]<sub>i</sub> was  $t_j$ .  
 (44) a. \*Certain not to be  $t_i$  available]<sub>j</sub> though [a doctor with any reputation]<sub>i</sub> is  $t_j$ , patients were waiting.  
 b. [Certain not to be  $t_i$  available]<sub>j</sub> though [a doctor from cardiology]<sub>i</sub> is  $t_j$ , patients were waiting.

As we have shown, then, Barss's Generalization is corroborated by data from *each*-licensing and *any*-licensing in structurally different examples.

<sup>18</sup> VP-fronting in English requires that the fronted VP have an explicit antecedent in the preceding discourse (Ward 1990). We indicate this by prefixing (41) and other examples below with ellipsis dots.

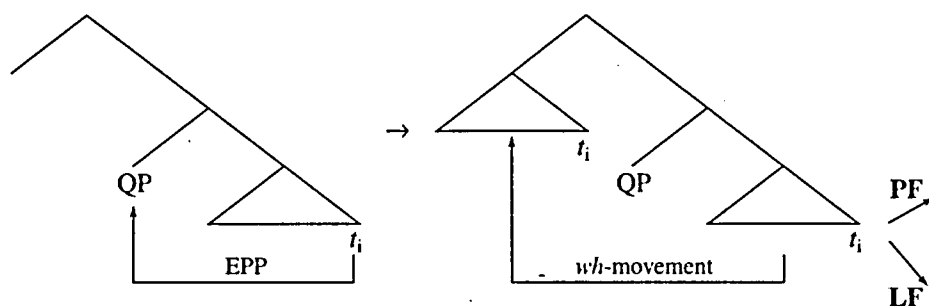
### 3.2 An Account of Barss's Generalization

Barss's Generalization is a direct consequence of the PF movement analysis of total reconstruction combined with two very standard assumptions: the c-command requirement on movement and the assumption that PF processes must follow movement that affects both LF and PF. For the demonstration, consider again example (37), repeated in (45). Recall from above that (45) is grammatical, but only allows an interpretation where *an Austrian* takes scope above *likely*.

(45) [How likely to  $t_i$  win] $_j$  is [an Austrian] $_i$   $t_j$ ?

Consider first the derivation of the available wide scope interpretation of (45), which is sketched in (46).

(46) *Derivation for wide scope*



In this derivation, first the subject, *an Austrian*, raises from the embedded subject position to the matrix subject position. This movement satisfies the Extended Projection Principle (EPP), which requires that the subject position of English clauses be filled. Subsequently, the embedded clause undergoes *wh*-movement to sentence-initial position, to satisfy the requirement that the specifier of a constituent question be filled by a *wh*-phrase. Both of these movements take place in the stem of the derivation and are therefore visible to both the PF and LF interfaces.

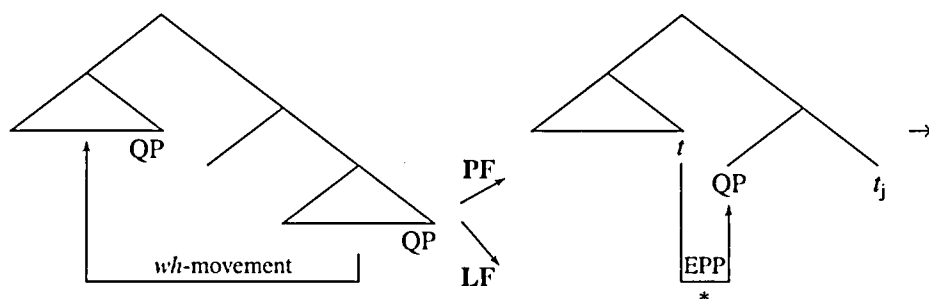
This derivation leads to the overt form in (45). In (45), however, the trace in the *wh*-moved constituent is not c-commanded by its antecedent, the raised subject. As mentioned in connection with (3), *wh*-movement allows partial reconstruction, which does not alter the scope of the *wh*-phrase, but does allow parts of the moved phrase to be bound in the trace position. Partial reconstruction is forced in (45) for the trace to be bound. As mentioned, we assume that partial reconstruction is accomplished by interpreting parts of the moved phrase in the trace position by the copy theory of movement. The LF representation (47) shows how partial reconstruction allows the trace  $t_i$  to be bound. In (47) *an Austrian* must take scope above *likely*.

(47) [how] $_j$  is [an Austrian] $_i$  [likely to  $t_i$  win] $_j$

Now consider the potential derivation of the narrow scope interpretation assuming that PF movement is required for narrow scope. Raising of the subject into the matrix clause must be

delayed to the PF branch of the derivation, to yield total reconstruction. *Wh*-movement, however, as shown by Saito's (3), never allows total reconstruction. Therefore, it must take place in the stem part of the derivation. At this point the standard assumption that movement in the stem precedes movement in the branches of the derivation becomes relevant. According to this assumption, *wh*-movement of the *wh*-constituent must be the first step of the derivation, as sketched in (48). PF movement to the matrix subject position to fulfill the EPP requirement of the PF interface must follow *wh*-movement. Recall from footnote 8 that we assume at this point that there is a PF cycle independent of the cycle for stem movement, during which movement of the subject to the matrix subject position could in principle take place. But in (48) the matrix subject position no longer c-commands the subject of the embedded clause at this point in the derivation, because this c-command relationship has been destroyed by the preceding *wh*-movement. Therefore, the c-command requirement on movement blocks satisfaction of the EPP in the derivation in (48).<sup>19</sup>

(48) *Failing derivation for narrow scope*



Since the derivation in (48) results in an EPP violation, PF movement is blocked in the derivation of (45). This accounts for the lack of narrow scope interpretation in (45) if PF movement is the only mechanism to achieve total reconstruction, as we are claiming.<sup>20</sup>

<sup>19</sup> Movement of material in the lower copy of the *wh*-movement chain is precluded by the general condition that lower copies are inert for movement. One strong argument for this condition comes from cases where two phrases move overtly to the same position (Richards 1997; see also section 4 for relevant data from Japanese scrambling). In such cases movement of the lower phrase to the target is blocked while the higher phrase is in its base position (Superiority), but becomes possible once the higher phrase has moved to the target. Assuming Shortest Attract as the explanation of superiority effects, this shows that the copy of the higher phrase left in the base position cannot be accessible for movement, since otherwise it should block movement of the lower phrase.

<sup>20</sup> Aoun and Benmamoun (1998:fn. 19) claim that in Lebanese Arabic total reconstruction must also be derivable by a mechanism other than PF movement. Their evidence relies on the facts in (i) (the word-by-word English translations of (ia) and (ib) in their footnote 19), where the subject can bind into a topicalized object, where Aoun and Benmamoun argue that topicalization cannot take place in the PF branch.

- (i) a. [mother-his]<sub>i</sub> every boy<sub>i</sub> loves *t<sub>j</sub>*
- b. [the-woman that cared for.him]<sub>i</sub> every boy<sub>i</sub> loves *t<sub>j</sub>*

But in section 2 we argued, following Saito (1989), Chomsky (1995b), and Aoun and Benmamoun (1998:fn. 15), that a second kind of reconstruction is partial reconstruction. In particular, (2) showed that partial reconstruction is sufficient to satisfy binding of parts of the moved phrase in the trace position of movement. Therefore, (ia) and (ib) are predicted to allow binding into the topicalized phrase because partial reconstruction is available. Hence, (ia) and (ib) do not require total reconstruction.

The account presented in (46)–(48) extends straightforwardly to all cases of Barss's Generalization where *wh*-movement destroys the c-command relationship between the embedded subject position and the matrix subject position. Since *wh*-movement does not allow total reconstruction, it must take place in the stem part of the derivation, and it thereby forces raising of the subject to take place in the stem as well. The other two constructions where the effect of Barss's Generalization is observed above are VP-fronting and *though*-raising. These have been argued to share many properties with *wh*-movement: constituents other than DPs are moved; the locality restrictions are the same (Chomsky 1977); some reconstruction is obligatory (Huang 1993, Takano 1995); and there is interaction with  $\bar{A}$ -movement for Shortest Attract (Koizumi 1994). It has therefore been proposed that VP-fronting and *though*-raising together with *wh*-movement form one class of movement operations that all involve the same feature. It seems natural, therefore, to assume that these movements also behave like *wh*-movement in disallowing total reconstruction.<sup>21</sup> So the account presented for the absence of total reconstruction in (45) carries over without modification to the cases involving VP-fronting or *though*-raising.

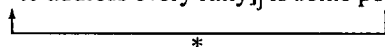
The PF movement analysis of total reconstruction predicts Barss's Generalization, as we have shown. The other three analyses of total reconstruction do not make this prediction. Instead, they would need to stipulate Barss's Generalization. This is directly apparent for the copy theory analysis and semantic reconstruction since these assume that total reconstruction is not visible in the syntactic derivation, but only at a later point. On the copy theory analysis this point is LF, when copies are deleted; on the semantic reconstruction analysis this point is when semantic types are assigned to operators. However, (49a) (repeated from (35a)) has been argued to have an LF structure very similar to (49b) (repeated from (39a)) since partial reconstruction is forced in (49a) (Huang 1993, Takano 1995, Heycock 1995). Therefore, the difference in the availability of total reconstruction between (49a) and (49b) is not expected.

- (49) a. [How likely to address every rally]<sub>j</sub> is some politician  $t_j$ ?  
 b. [How likely]<sub>j</sub> is some politician  $t_j$  to address every rally?

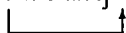
Barss (1986) proposes an explanation of (49a) based on the LF lowering analysis. He proposes that, instead of the c-command requirement assumed above, movement is subject to a mutual c-command requirement. This allows movement from one position to another if either the target position c-commands the source position, or the source position c-commands the target position. The mutual c-command condition allows movement of the subject to a position below *likely* in (50b), but not in (50a).

<sup>21</sup> As with *wh*-movement, we assume that partial reconstruction is possible with VP-fronting and *though*-raising, and in fact often required to bind the trace of the subject. We assume that, just as with *wh*-movement, some material must remain in the fronted position, but in these cases this material may be phonologically null. For example, all three constructions might involve existential quantification over choice functions (Engdahl 1980) that operate on sets of propositions.

(50) a. [How likely<sub>i</sub> to address every rally]<sub>j</sub> is some politician *t<sub>j</sub>*?

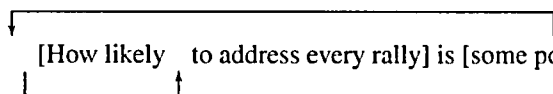


b. [How likely]<sub>j</sub> is some politician *t<sub>j</sub>* to address every rally?



One potential problem for Barss's account is that the derivation sketched in (51) is consistent with the mutual c-command condition.

(51) [How likely<sub>i</sub> to address every rally] is [some politician]<sub>j</sub>?



The raised quantifier first raises to a position above the fronted *wh*-phrase, and then lowers to a position below *likely*. Since the lowering step of this derivation seems to cross material similar to that crossed in (50b), Barss would probably want to rely on the assumption that the first step of (51) is impossible. This, however, is a controversial question—for example, Fox (1995:337), Beck (1996:19–29), and Hagstrom (1998:85–87) support the view that a quantified subject can raise above an interrogative CP.

A second difference between our account of the generalization in (36) and Barss's account concerns the c-command requirement. Despite their superficial similarity, Barss's version and the version we assume differ sharply: the directional c-command requirement that we assume follows from the strict cycle condition discussed by Chomsky (1995b) and others (see also section 5.1), whereas Barss's mutual c-command requirement is an arbitrary condition proposed to allow lowering precisely in the attested cases. This difference argues that the directional c-command requirement is strongly preferable.

In section 4 we will discuss a third argument against the lowering view, based on a restriction on reconstruction in Japanese scrambling.

A third account of Barss's Generalization is based on the work of Lasnik and Saito (1992). These authors propose a condition that blocks any derivation that has an intermediate representation containing an unbound trace, even one where all traces are bound at the LF interface level. To explain cases like (35a), which apparently contain unbound traces in the overt form, the analysis assumes that for every raising verb and adjective there is also a homophonous control verb or adjective. Though Lasnik and Saito do not make this prediction, taken together these two assumptions imply that (35a) has only the control analysis shown in (52). Since control structures do not allow reconstruction, (52) is predicted to lack the narrow scope reading.

(52) How likely PRO<sub>i</sub> to address every rally is some politician<sub>i</sub>?

Of the two assumptions underlying this account of Barss's Generalization, work by Collins (1994), Takano (1994), and Müller (1998) argues that the ban against unbound traces in intermediate representations is untenable (see also footnote 32). But then a raising analysis of (35a) cannot be ruled out, leaving Barss's Generalization unexplained.<sup>22</sup>

<sup>22</sup> In fact, it seems doubtful to us that the control analysis (52) can still be motivated if unbound traces in intermediate

### 3.3 Extraction from Subjects and Timing in Derivations

Our proposal makes a prediction for certain cases of extraction out of subjects. As is well known and illustrated by (53), extraction out of indefinite object DPs can be grammatical, but extraction out of subjects is generally ungrammatical (e.g., Ross 1967).

- (53) a. Who<sub>j</sub> did John invite a friend of *t<sub>j</sub>*?  
 b. \*Who<sub>j</sub> did a friend of *t<sub>j</sub>* invite John?

Consider now the case of derived subjects that entered the derivation as objects. Our proposal predicts that, when an object moves to subject position at PF, it should allow extraction of *wh*-phrases in the stem. Other derived subjects, however, should not allow extraction because of the cycle (Chomsky 1995b:328).

At this point the question is when total reconstruction (i.e., PF movement) is an available option. Fox (1995:301–304) argues that total reconstruction is possible only if the structure with total reconstruction has a different interpretation from the structure without total reconstruction, where the difference in interpretation must be directly related to total reconstruction. While Fox formulates his condition in terms of quantifier lowering, the insight is independent of the particular analysis of total reconstruction. On the PF movement analysis, Fox's condition can be stated as in (54).<sup>23</sup>

- (54) Overt movement of XP can be delayed until PF only if there is a scope-taking element Y such that XP takes scope above Y if movement takes place in the stem but below Y if movement is delayed until PF, and if these two scopal construals are semantically distinct.

Condition (54) captures Fox's insight that total reconstruction of both subjects below *seems* is possible only in (55a). In (55b) PF movement of *Sergey* in the second conjunct is blocked by condition (54), because the different positions of *Sergey* relative to *seems* do not result in interpretive differences. Therefore, the semantic parallelism condition on ellipsis Fox argues for also blocks PF movement in the first conjunct of (55b). In (55a), however, PF movement is possible because there is an interpretive difference in both conjuncts.

- (55) a. An American runner seems to have won and a Russian athlete does too. ( $\exists >$  seems, seems  $> \exists$ )  
 b. An American runner seems to have won and Sergey does too. ( $\exists >$  seems, \*seems  $> \exists$ )

representations are not generally banned, but are allowed under the conditions argued for by Collins (1994), Takano (1994), and Müller (1998).

<sup>23</sup> There is a superficial difference between our statement and Fox's (1995): his condition concerns whether or not covert movement can apply, while ours concerns the point of application of overt movement. However, both proposals determine the choice between two syntactic derivations yielding the same PF output, and both make the same empirical predictions for Fox's data.

Let us return to extraction from derived subjects. We now predict that extraction from a derived subject should be possible if its movement from object to subject position can be delayed to PF according to condition (54). Jon Nissenbaum (personal communication) first pointed out to us that this prediction is indeed borne out. Consider the contrast in (56) (after Nissenbaum 2001). (56a) and (56b) differ in that in (56b) the VP where the derived subject originated contains a second quantifier. Following Pesetsky (1995:221–223), we claim that the derived subject can remain in position  $t_i$  until PF in (56b), taking scope below the quantifier *every student*. In (56a), however, the subject must move to  $t'_i$  in the stem since delaying this movement would not have any effect on interpretation.

- (56) a. \*That's the book  $Op_j$  that [a chapter of  $t_j$ ]<sub>i</sub> seems  $t'_i$  to have been assigned to John  $t_i$ .  
 b. ?That's the book  $Op_j$  that [a chapter of  $t_j$ ]<sub>i</sub> seems  $t'_i$  to have been assigned to every student  $t_i$ .

A second pair testing our prediction is (57a–b) ((57b) provided by an anonymous *LI* reviewer). Of the seven speakers tested so far, five found the indicated contrast. This again bears out our prediction: movement of the derived subject can be delayed until PF in (57b) since this allows *good examples* to take scope below the verb *sought*. In (57a) there is no scopal ambiguity.

- (57) a. \*?Which constraint are good examples of always provided?  
 b. Which constraint are good examples of always sought?

Condition (54) is also important for the account of Barss's Generalization. Consider again the lack of the narrow scope interpretation of (58) (repeated from (37) and (45)).

- (58) [How likely to  $t_i$  win]<sub>j</sub> is [an Austrian]<sub>i</sub>  $t_j$ ?

Derivations (46) and (48) showed that the c-command condition imposes an ordering requirement on the two movements in (58): *wh*-movement of *how likely to win* cannot take place earlier than raising of *an Austrian*. Therefore, derivation (48) with *wh*-movement in the stem and raising in the PF branch is impossible, while derivation (46) with both movements in the stem is possible.

Now consider derivations where *wh*-movement takes place not in the stem but at PF. The c-command condition is not violated in the derivation where *wh*-movement and raising both take place at PF, just as it is not violated in derivation (46). However, recall Saito's (1989) result illustrated in (3): total reconstruction of *wh*-movement is impossible. On the PF movement approach to total reconstruction, this means that *wh*-movement cannot take place only at PF. This empirical observation might be taken to show that the *wh*-feature, which is checked by *wh*-movement, must be checked at both the LF and PF interfaces. This rules out any derivation where *wh*-movement takes place only at PF.

What about a derivation, though, where both raising and *wh*-movement take place at PF and in addition *wh*-movement takes place covertly in the LF branch? Since the subject could also raise at PF, this derivation would result in the unavailable narrow scope construal. The derivation is consistent with the c-command condition, and also with the condition that the *wh*-feature be

checked at both interface levels. However, the derivation violates condition (54): overt *wh*-movement is delayed to the PF branch, but the derivation results in the same scopal position of the *wh*-phrase as the derivation where *wh*-movement takes place in the stem.

### 3.4 Subject and Object Inverse Scope

It is known that inverse scope of the object over the subject in English is blocked by VP-fronting, though this generalization seems to have been mentioned in print only by Huang (1993:125). In this section we first present some evidence corroborating this generalization. We then argue that it is actually an instance of Barss's Generalization, in view of recent arguments that inverse scope of subject and object involves total reconstruction of the subject (Hornstein 1995, Johnson and Tomioka 1997). It therefore supports the PF movement analysis of total reconstruction.

The contrasts in (59) and (60) demonstrate the blocking effect that VP-fronting and *though*-raising have on inverse scope between subject and object. In (59a) the object *every bank* can take scope over the subject *a policeman*. In fact, this is the pragmatically preferred reading of (59a). In (59b), however, this interpretation is not available, and the sentence can be true only if there is one policeman who stood in front of all the banks that day.<sup>24</sup>

- (59) a. ... and a policeman stood in front of every bank that day. ( $\forall > \exists, \exists > \forall$ )  
 b. ... and [stand in front of every bank]<sub>j</sub> a policeman did *t<sub>j</sub>* that day. ( $*\forall > \exists, \exists > \forall$ )

A contrast that is similar, but involves *though*-raising, is shown in (60). (60a) allows inverse scope easily, but (60b) allows only wide scope of the subject.

- (60) a. Though enough of us were defending every gate, the enemy broke through. (enough  $> \forall, \forall > \text{enough}$ )  
 b. [Defending every gate]<sub>j</sub> though enough of us were *t<sub>j</sub>*, the enemy broke through. (enough  $> \forall, * \forall > \text{enough}$ )

We claim that, in general, inverse scope of the subject below the object is blocked when the VP containing the object is moved. This generalization is further corroboration for Barss's Generalization, if inverse scope of the object over the subject requires total reconstruction of the subject into the fronted constituent. Indeed, Hornstein (1995:160–161) and Johnson and Tomioka (1997) have argued that total reconstruction of the subject is required for the object to take scope over the subject. They argue that wide scope of the object requires reconstruction of the subject to a position lower than negation (Johnson and Tomioka 1997) and temporal adjunct clauses (Hornstein 1995). It seems likely that this subject position is in fact the lowest subject position, Spec,vP, as these authors propose. If this reconstruction position is obligatorily part of the fronted constituent in (59b) and (60b), the scope restriction follows from Barss's Generalization.

<sup>24</sup> The temporal adverbial *that day* serves to block a generic interpretation that would make scope illusions in the sense of Fox and Sauerland (1996) possible.

But it is clear that the lowest subject position in Spec,vP must be part of the fronted phrases in (59b) and (60b) since the lexical verb in English moves to *v* (e.g., Chomsky 1995b:305, 315, 369). With the standard assumption that only maximal categories can undergo phrasal movement, it follows that the fronted phrases in (59b) and (60b) include not only the lexical verb in *v*, but also the subject trace in Spec,vP.

These arguments establish that the blocking of inverse scope in (59b) and (60b) is an instance of Barss's Generalization. Consider the structure proposed for (59b) shown in (61). With Hornstein (1995) and Johnson and Tomioka (1997), we assume that total reconstruction of the subject is required for inverse scope. And, as argued by (59) and (60), the position the subject must reconstruct to is part of the fronted constituent. In (61) the reconstruction position is indicated as  $t_i$ .

- (61) ... and [ $t_i$  stand in front of every bank] $_j$  [a policeman] $_i$  did  $t_j$  that day. (\* $\forall > \exists, \exists > \forall$ )

Since the overt position of the subject does not c-command  $t_i$  in (61), total reconstruction is blocked by Barss's Generalization. Therefore, the absence of inverse scope in (61) and (60b) lends further weight to this generalization and supports our account of it.

#### 4 Japanese Scrambling

In this section we argue that total reconstruction of Japanese scrambling can be derived only by PF movement.<sup>25</sup> It is well known that Japanese scrambling allows total reconstruction. In particular, Saito (1989, 1992) and Tanaka (1999) argue that Japanese scrambling must undergo total reconstruction in many cases where it crosses a clause boundary (see also Nemoto 1995, Uchibori 1997). One argument from Saito 1989:(34b) is based on (62). Here, the interrogative phrase is scrambled to a position outside the embedded question, yet takes scope in the embedded question.

- (62) [Dono hon-o] $_i$  Mary-ga [John-ga  $t_i$  tosyokan-kara karidasita ka]  
 which book<sub>ACC</sub> Mary<sub>NOM</sub> John<sub>NOM</sub> library-from checked out COMP<sub>+wh</sub>  
 siritagatteiru.  
 wants to know  
 'Mary wants to know which book John checked out from the library.'

A natural question is whether Barss's Generalization holds for total reconstruction of Japanese scrambling.<sup>26</sup> To investigate this question, we would need to look at examples where the remnant of scrambling undergoes *wh*-movement or a comparable movement, destroying the c-command relationship between the overt position of the scrambled phrase and its trace. It turns out that this test yields the predicted result, but for irrelevant reasons. This is illustrated by (63). In (63) the subject of an embedded small clause is scrambled to the left of the matrix subject, and the remnant

<sup>25</sup> Danny Fox deserves special thanks for his help in developing the arguments in this section.

<sup>26</sup> It seems that German scrambling does not obey Barss's Generalization (Susi Wurmbrand, personal communication). Both (ia) and (ib) exhibit the relevant structure: an object of an infinitival underwent scrambling and the remnant of the infinitival appears in sentence-initial position, such that the trace of scrambling is not c-commanded by the scrambled

of the small clause is moved to sentence-initial position. If we assume that overt movement of interrogative phrases in Japanese can be *wh*-movement (Takahashi 1993, Tanaka 1999), (63) has a structure similar to the English examples examined in section 3. But (63) turns out to be ungrammatical in Japanese, as are all other similarly structured examples that we tested.<sup>27</sup>

- (63) \*[*t<sub>i</sub>* Donokurai kawai-ku]<sub>j</sub> [Kai-to Riku-o]<sub>i</sub> Mary-wa *t<sub>j</sub>* sita-ka?  
           how           cute           Kai-and Riku<sub>ACC</sub> Mary<sub>TOP</sub> made-Q

Nevertheless, it is possible to see that total reconstruction in Japanese scrambling must be derived by PF movement. The argument in this section is completely independent of Barss's Generalization. It relies on a restriction on total reconstruction in cases where two instances of scrambling target multiple specifiers of the same head—a configuration that cannot be created with raising in English.

#### 4.1 Yatsushiro's Observation

The argument we develop in this section relies on an observation by Yatsushiro (1996) concerning the relative scope of two scrambled objects occurring to the left of the subject. Consider first the examples in (64), where both objects occur to the right of the subject. Hoji (1985) notes that a double object construction in Japanese exhibits scopal rigidity in the dative-accusative word order (64a), while the reverse order in (64b) is scopally ambiguous.<sup>28</sup>

phrase (Müller 1998). In contrast to what happens in the English examples in section 3.1, however, in (ia) and (ib) the scrambled phrase can take scope below phrases in the sentence-initial remnant.

- (i) a. [*t<sub>i</sub>* Zu grüssen gewagt], hat niemanden, nur die Maria *t<sub>j</sub>*.  
           to greet dared has nobody<sub>ACC</sub> only the Maria<sub>NOM</sub>  
           'Only Maria dared to greet nobody.' (nobody > dare, dare > nobody)  
   b. [Jedem *t<sub>i</sub>* zu schicken], hat [ein (unterschiedliches) Geschenk], nur der Martin *t<sub>j</sub>* versucht.  
           everyone<sub>DAT</sub> to send has a (different) present<sub>ACC</sub> only the Martin<sub>NOM</sub> tried  
           'Only Martin tried to send everyone a (different) present.' (everyone > a present, a present > everyone)

Possible explanations for the evidence in (i) are that movement to sentence-initial position in German can take place at PF, or that total reconstruction of German scrambling can make use of more than one mechanism (Lechner 1998). However, more research is necessary to determine the reconstruction properties of this type of movement.


<sup>27</sup> Two controls for (63) are given in (i). (ia) shows that a scrambled small clause subject is not required to reconstruct, since binding takes place into the matrix subject. Therefore, the ungrammaticality of (63) must be independent of Barss's Generalization. (ib) shows that movement of the entire small clause to sentence-initial position is possible. (See Kikuchi and Takahashi 1991 for more discussion of small clauses in Japanese.)

- (i) a. [Kai-to Riku-o], otagai-no hahaoya-wa kawai-ku sita.  
           Kai-and Riku<sub>ACC</sub> each other<sub>GEN</sub> mother<sub>TOP</sub> cute made  
           'Kai and Riku's mothers made the other one of them cute.'  
   b. [Kai-to Riku-o donokurai kawai-ku], Mary-wa *t<sub>j</sub>* sita-ka?  
           Kai-and Riku<sub>ACC</sub> how cute Mary<sub>TOP</sub> made-Q  
           'How cute did Mary make Kai and Riku?'

<sup>28</sup> Miyagawa's (1997) judgment on (64) differs from that of the literature we rely on and of our informants. Miyagawa develops a theory where both (64a) and (64b) are predicted to have the same status. However, in a later paper Miyagawa assumes that a scrambling analysis is possible for (64b) (Miyagawa 1996), and Yatsushiro (1998) presents arguments that (64b) must be derived by scrambling.

- (64) a. John-ga dareka-ni daremo-o syookaisita.  
 John<sub>NOM</sub> someone<sub>DAT</sub> everyone<sub>ACC</sub> introduced  
 'John introduced everyone to someone.'  
 unambiguous: someone > everyone, \*everyone > someone
- b. John-ga daremo-o dareka-ni syookaisita.  
 John<sub>NOM</sub> everyone<sub>ACC</sub> someone<sub>DAT</sub> introduced  
 ambiguous: someone > everyone, everyone > someone

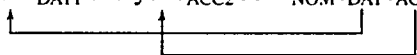
The ambiguity of (64b) argues for an analysis that derives this sentence by means of a scrambling operation that can totally reconstruct, as sketched in (65) (Hoji 1985, Saito 1985). (In (65) and similar structures English translations of the Japanese words are used.)

- (65) John<sub>NOM</sub> everyone<sub>ACC</sub> someone<sub>DAT</sub> *t*<sub>ACC</sub> introduced
- 

Yatsushiro (1996) observes that the relative scope of two objects is rigid even when both the dative and the accusative phrases appear to the left of the subject as in (66a). (66a) contrasts with (66b) and (66c), where both objects also occur to the left of the subject, but in the inverse order.<sup>29</sup>

- (66) a. Dareka-ni daremo-o John-ga syookaisita.  
 someone<sub>DAT</sub> everyone<sub>ACC</sub> John<sub>NOM</sub> introduced  
 unambiguous: someone > everyone, \*everyone > someone
- b. Daremo-o dareka-ni John-ga syookaisita.  
 everyone<sub>ACC</sub> someone<sub>DAT</sub> John<sub>NOM</sub> introduced  
 ambiguous: someone > everyone, everyone > someone
- c. Dareka-o daremo-ni John-ga syookaisita  
 someone<sub>ACC</sub> everyone<sub>DAT</sub> John<sub>NOM</sub> introduced  
 ambiguous: someone > everyone, everyone > someone

The lack of ambiguity in (66a) is, *prima facie*, surprising. One conceivable derivation of (66a) is (67), where the two objects undergo scrambling separately. If in (67) the higher object 'someone<sub>DAT</sub>' underwent total reconstruction but the lower object 'everyone<sub>ACC</sub>' were interpreted in its overt position, the inverse scope would result, contrary to fact.<sup>30</sup>


- (67) someone<sub>DAT1</sub> everyone<sub>ACC2</sub> John<sub>NOM</sub> *t*<sub>DAT</sub> *t*<sub>ACC</sub> introduced
- 

<sup>29</sup> Yuji Takano (personal communication) has pointed out to us that Hoji (1985:354) makes a different empirical claim about similar examples. We have confirmed Yatsushiro's data in (66) with eight informants.

<sup>30</sup> It is well known that, in Japanese, an object that is scrambled to the left of a clausemate subject can take scope there (Hoji 1985 and references therein).

Two potential explanations of the missing inverse scope in (66a) come to mind. Either derivation (67) is not possible for sentence (66a), or (67) is a possible derivation, but total reconstruction of the higher object requires total reconstruction of the lower object. Yatsushiro (1996) pursues the former option. Following Koizumi (1995), she observes that it should also be possible to derive (66a) by moving the verb rightward to C and scrambling the VP remnant, as in (68). Since fronting of the VP leads to a greater c-command domain only for this VP, not for either of the two objects, it does not create new scopal possibilities for either of the objects. Hence, the derivation in (68) is predicted not to allow scope ambiguity. Yatsushiro proposes that the analysis in (68) is forced for (66a) because it involves fewer applications of scrambling than (67).

(68) [someone<sub>DAT</sub> everyone<sub>ACC</sub>  $t_i$ ]<sub>j</sub> John  $t_j$  introduced<sub>i</sub>



Yatsushiro's analysis, however, makes wrong predictions for the examples in (69). On the VP-fronting analysis in (68), neither of the two objects c-commands material in subject position. (69a) shows that even the lower object can bind an anaphor in the subject, and (69b) shows that the lower object can also take scope above the subject. Therefore, we conclude that a multiple scrambling analysis like (67) must be possible for (66a), and that Yatsushiro's observation is explained by a restriction on total reconstruction.

- (69) a. Dareka-ni daremo<sub>i</sub>-o soitsu<sub>i</sub>-no hahaoya-ga syookaisita.  
 someone<sub>DAT</sub> everyone<sub>ACC</sub> his<sub>GEN</sub> mother<sub>NOM</sub> introduced  
 'For everyone<sub>i</sub>, his<sub>i</sub> mother introduced him to someone.'
- b. John-ni daremo-o dareka-ga syookaisita.  
 John<sub>DAT</sub> everyone<sub>ACC</sub> someone<sub>NOM</sub> introduced  
 'Someone introduced everyone to John.' (someone > everyone, everyone > someone)

#### 4.2 An Account of Yatsushiro's Observation

The account of Yatsushiro's observation we present here relies on the assumption that Japanese scrambling is constrained by Shortest Attract. We assume the statement of Shortest Attract in Chomsky 1993, the relevant aspects of which are summarized in (70).

- (70) a. X can attract Y if Y is one of the closest phrases that can satisfy a particular requirement of X.
- b. For three phrases X, Y, and Z, where X c-commands Y and Z: Y is *as close as* Z to X (or Y and Z are *equidistant* from X) if Y and Z occupy specifiers of the same projection; Y is *closer than* Z to X if Y c-commands Z and they are not equidistant from X.

The assumption that scrambling is subject to (70a) is justified in the work of Takano (1994), Kitahara (1994), Koizumi (1994), Müller (1998), Sauerland (1999), and others and receives further

support from the arguments below.<sup>31</sup> These authors show that Shortest Attract accounts for the grammatical status of structures that have an unbound trace in the overt form, as (71) does. In particular, Shortest Attract predicts the ungrammaticality of (71): movement of *sono hon-o* out of the embedded clause violates Shortest Attract, because the embedded clause is closer to the target of this scrambling.<sup>32</sup>

- (71) \*[Hanako-ga  $t_i$  yonda to] $_j$  [sono hon-o] $_i$  Taroo-ga  $t_j$  itta. (Saito 1992:(31c))  
 Hanako<sub>NOM</sub> read that that book<sub>ACC</sub> Taroo<sub>NOM</sub> said

The sensitivity of scrambling to Shortest Attract would seem to rule out the multiple scrambling analysis of (66a), sketched in (67). It might seem that the attractor of 'everyone' is not attracting the closest phrase, since 'someone' is closer to this position. In fact, though, the derivation in (67) is consistent with Shortest Attract if movement of 'someone' precedes movement of 'everyone', as shown in (72).

- (72) someone<sub>DAT</sub> everyone<sub>ACC</sub> John<sub>NOM</sub>  $t_{DAT}$   $t_{ACC}$
- 

At the point of the derivation when 'everyone' is attracted it will be closest to its attractor because 'someone' has already moved to a higher position. Therefore, the two movements in (72) must take place in the indicated order.

The derivation in (72) may seem to violate the cycle, since movement to a structurally higher position precedes movement to a lower position. But Richards (1997) and Mulders (1997) argue for a version of the cycle that allows the order in (72) if both movements target specifiers of the same head—and, in fact, forces this order.

Now Yatsushiro's observation follows from the assumption that total reconstruction of Japanese scrambling can only be accomplished by PF movement, which follows stem movement. The derivation of (66a) that would give rise to inverse scope is one where the dative object moves at PF, but the accusative object moves in the stem, as indicated in (73).

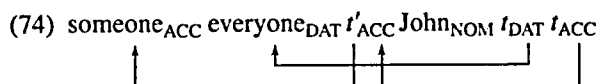
- (73) \*someone<sub>DAT</sub> everyone<sub>ACC</sub> John<sub>NOM</sub>  $t_{DAT}$   $t_{ACC}$
- 

<sup>31</sup> One reason that the sensitivity of scrambling to Shortest Attract is still controversial (e.g., Fukui and Saito 1998) is probably that examples like (66b), where the order of two scrambled phrases is inverted, are grammatical. Here, a superiority effect might be expected if Shortest Attract was applying. However, Sauerland (1999:177–179) argues that in fact multiple scrambling resulting in nested paths can always involve movement through multiple specifiers of a single projection. This would create a configuration where all scrambling phrases are equidistant and the effect of Shortest Attract is suspended (see (74)).

<sup>32</sup> In this way, Shortest Attract renders superfluous earlier conditions postulated specifically to rule out structures like (71)—in particular, Lasnik and Saito's (1992) account mentioned in the discussion of (52). In fact, the works mentioned above show that the account based on Shortest Attract is empirically superior.

But the order of operations forced by Shortest Attract in (73) is such that PF movement of 'someone' must take place before stem movement of 'everyone'. This is ruled out by the assumption that PF movement must follow stem movement.<sup>33</sup>

Now consider the ambiguous examples (66b) and (66c), where the order of the two objects is inverted by scrambling. Given Shortest Attract, it is initially surprising that scrambling that changes the order of two objects is possible at all. However, it is known from the study of *wh*-movement (e.g., Reinhart 1981, Koizumi 1995, Richards 1997) that a higher attractor can attract a phrase occupying the lower specifier of a multiple specifier construction (cf. Chomsky's (1995b) notion of *equidistance*). Therefore, the derivation in (74) for crossing scrambling is predicted to be possible. In (74) both objects are initially scrambled to specifiers of the same projection, and subsequently the lower object is scrambled from the lower specifier position to a higher position. If the first two steps of scrambling take place in the stem, this third step of movement, which in (74) is from the position of  $t'_{ACC}$  to the surface position of 'someone<sub>ACC</sub>', can take place either in the stem or at PF. These two possibilities provide for both possible scopal orders.<sup>34</sup>



In this way, Yatsushiro's observation is a straightforward consequence of the PF movement view of total reconstruction. By contrast, the alternatives to this analysis do not predict Yatsushiro's observation. Recall that all three alternatives assume that stem movement is followed by an undoing operation. On the LF lowering view, nonsurface scope for examples like (66a) results when the higher of the two scrambled phrases moves to adjoin to some lower projection at LF; but there is no evident way to block such an operation in (66a) while allowing it in (66b) and (66c). The only difference between the former example and the latter two is that in (66a) the paths of the scrambled phrases must cross, whereas in (66b) and (66c) the paths of the scrambled phrases nest. Since LF lowering does not take place to the trace position, it would be wholly ad

<sup>33</sup> The account here makes a prediction for the cases with three quantifiers in (i), though we have not been able to determine whether it holds because of the complexity of the judgments involved. Both (ib) and (ic) are predicted to contrast with (ia) in the availability of the dative > nominative > accusative scopal construal. While there seems to be some contrast between (ia) and (ib), some informants also found a contrast between (ib) and (ic).

- (i) a. Futari-no sensei-ga dono-gakusei-ni-mo hon-o yomaseta.  
 two<sub>GEN</sub> teacher<sub>NOM</sub> student<sub>DAT</sub>-every book<sub>ACC</sub> read-made  
 'Two teachers made every student read a book.'  
 b. Dono-gakusei-ni-mo hon-o futari-no sensei-ga yomaseta.  
 student<sub>DAT</sub>-every book<sub>ACC</sub> two<sub>GEN</sub> teacher<sub>NOM</sub> read-made  
 c. Hon-o dono-gakusei-ni-mo futari-no sensei-ga yomaseta.  
 book<sub>ACC</sub> student<sub>DAT</sub>-every two<sub>GEN</sub> teacher<sub>NOM</sub> read-made

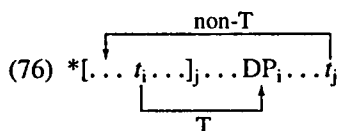
<sup>34</sup> Again, as in footnote 33, this account makes a prediction for an example with three quantifiers: since the outer movement must follow the inner movement in nested paths, the scope dative > nominative > accusative is predicted to be unavailable in (i). However, we could not find a relevant control for (i) that is predicted to allow this scopal construal.

- (i) [Dono-hon-mo]<sub>i</sub> [gakusei-ni]<sub>j</sub> futari-no sensei-ga  $t_i$   $t_j$  yomaseta.  
 book-every<sub>(ACC)</sub> student<sub>DAT</sub> two<sub>GEN</sub> teacher<sub>NOM</sub> read-made

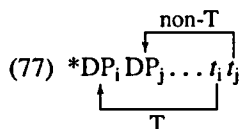


other overt movement. Looking at surface representations, T-movement seems sensitive to general constraints on movement in a different way than comparable non-T-movement is, as argued in sections 3 and 4. The two general constraints on movement we consider are the c-command condition and Shortest Attract.

C-command was relevant in section 3. We argued that the c-command condition applies to T-movement in such a way as to take into account the effects of non-T-movement on the structure. In (76) movement of  $DP_i$  violates the c-command condition if the effect of non-T-movement is taken into account. Section 3 showed that a structure like that in (76) is well formed only when  $DP_i$  undergoes non-T-movement.



As for the Shortest Attract requirement, section 4 showed that it applies to non-T-movement without taking into account the effect of T-movement. In particular, non-T-movement of  $DP_j$  in (77) crossing  $t_i$  was shown to be blocked in the configuration (77) when  $DP_i$  undergoes T-movement but not when  $DP_i$  undergoes non-T-movement.



The interaction between T- and non-T-movement can hence be characterized as follows: non-T-movement bleeds T-movement by destroying the required c-command relationship, and T-movement counterfeeds non-T-movement when it creates a configuration that circumvents Shortest Attract.

This interaction argues for a derivational view of syntax with an inherent ordering between T- and non-T-movement. The interaction can be insightfully described by assuming that general conditions on movement, the c-command condition and Shortest Attract, apply to intermediate representations. The way T- and non-T-movement are sensitive to the general conditions argues that T-movement must follow non-T-movement. Only on this view do the general conditions on movement apply to all movement uniformly. We do not see any obvious way to capture this insight within a purely representational view of syntax, which does not assume any intermediate representations.<sup>35</sup>

<sup>35</sup> Michael Brody (personal communication) points out that our argument does not apply directly to the proposal he makes in Brody 1995 since this does leave room for deriving PF from the semantic representation, his Lexico-Logical Form. However, in our view the resulting mixed system with base-generated chains and a movement transformation would be inferior to a purely derivational system.

The inherent ordering, in turn, argues that T-movement must be purely phonological movement. Recall that T-movement is characterized by the absence of an LF effect. Aoun and Benmamoun (1998) argue that overt movement can take place either in the stem, affecting both the LF and PF interfaces, or in the PF branch, affecting only the PF interface. The obligatory ordering of T- and non-T-movement follows naturally from the following claim, which is stronger than Aoun and Benmamoun's proposal: T-movement must take place at PF and non-T-movement must take place in the stem. We showed above that this claim follows from two independent assumptions. That total reconstruction is blocked for stem movement follows from the view that movement creates open predicates, as shown in example (5). That non-T-movement must take place in the stem follows if it is impossible to move a phrase at both LF and PF to the same position. We proposed in section 3.3 that such parallel movement in both branches is ruled out by economy since one application of stem movement can derive the same interface representations.

## 5.2 Architecture of Derivations

At this point we hope to have established that syntax must be derivational, that total reconstruction must be derived by PF movement, and that PF movement must follow stem movement in the structures (76) and (77). This result distinguishes between different architectures of syntactic derivations that have been proposed. The result is fully consistent with Chomsky and Lasnik's (1977) *T-model*, which we assumed throughout for the exposition. On the other hand, the result is entirely unexpected on the *single output* model of syntax developed by Bobaljik (1995), Groat and O'Neil (1995), and others. This architecture assumes that the derivation yields a single output representation that is accessed by the LF and PF interfaces in different ways and therefore does not predict any ordering between totally reconstructing and other movement.

A third architecture for derivations is the *phases* model proposed by Chomsky (2000), Epstein et al. (1998), and Uriagereka (1999).<sup>36</sup> We argue now that the innovations of this article are compatible with the phases model if and only if a look-ahead mechanism is adopted. Furthermore, we show that Chomsky (2000) independently proposes a look-ahead mechanism of the required type.

In the following discussion we consider two very simple versions of the phases model since the proposals in the literature contain many details not needed for our point. The first simplified version assumes that a phase is a derivation yielding as output an LF-PF pair that can behave like a lexical item in another derivation. In the derivation of a sentence, therefore, subconstituents of the sentence can be derived in independent phases and then combined to create the sentence in a further derivation. Furthermore, we assume that the derivation of a single phase has the structure of the *T-model*. In this version of the phases model, PF movement in one phase can be followed by stem movement in a later phase. Therefore, this version is incompatible with the evidence presented here.

<sup>36</sup> Epstein et al. (1998) use the term *strongly derivational*, Uriagereka (1999) the term *strictly cyclic*. We use Chomsky's term in the text, but the point applies to all three works.

The failure of the first version of the phases model stems from the assumption that, in the earlier phase where PF movement takes place, the information about which phrases undergo stem movement in a subsequent phase is unavailable. If a look-ahead device is added to the first version that makes information about movement in later phases available to an earlier phase, the phases model can account for the evidence presented here. The second version of the phases model incorporates such a look-ahead device.

The second version of the phases model assumes with Chomsky (2000) and Uriagereka (1999) that a phrase in one phase cannot be moved in a later phase. This assumption is natural since the output of one phase is merged as a lexical item into a later phase and it is usually assumed that movement of parts of a lexical item is impossible. Our second version of the phases model furthermore adopts Chomsky's assumption that there is a mechanism to overcome the restriction against movement from one phase into another. In particular, Chomsky proposes that any phrase that moves to the *edge* of a phase is then accessible for movement in a later phase. Since movement to the edge is the only way movement from one phase into another can proceed, Chomsky proposes that movement to the edge is required for all phrases of a phase with an unchecked uninterpretable feature, where uninterpretable features are those that must be checked in the course of the syntactic derivation. Slightly extending Chomsky's idea, we propose that actually the edge of a phase can be distinct for LF and PF and that a phrase in only the LF or PF edge of a phase is accessible only for LF or PF movement, respectively, in a later phase.

In the second version of the phases model, PF movement is prevented from preceding stem movement in the configurations (76) and (77). The unchecked features provide a look-ahead for movement in a later phase, and this look-ahead forces such phrases with unchecked features to undergo movement to the edge even in an earlier phase. But, if each individual phase has the structure of the T-model, PF movement must follow stem movement in each phase. Therefore, our account based on the T-model carries over to the second version of the phases model.<sup>37</sup>

We conclude that the evidence in this article argues for a version of the phases model with a certain amount of look-ahead and a T-model architecture for each phase like the second version we sketched here. However, many details of the phases model need to be filled in and we hope that our evidence will inspire future work on this topic.

<sup>37</sup> An important unresolved issue for the phases model is which nodes can and which nodes must be phases. Our proposal makes predictions about this issue, when conjoined with explicit assumptions about cyclicity and ordering within the phase. For example, assume (as seems plausible to us) that within each phase there is only a single cycle, applying to stem movement and PF movement alike, and that PF movement still must apply after stem movement. Then, if any sentence contains a position Spec,XP to which PF movement has taken place, and if XP has material built on top of it that is visible in that position to both LF and PF interfaces, it follows that XP must be a phase. This is so because by the time PF movement targets Spec,XP, there is no further opportunity for stem movement in that phase, and in order for the subsequent stem movement to occur, a new phase must be begun. An interesting consequence is that under these assumptions TP would be a phase in examples like (i), where the subject moves at PF to Spec,TP but the complementizer *if* is merged in the stem. This would argue against Chomsky's (2000) assumption that only CP and vP can be phases.

(i) I wonder if [an Austrian]<sub>i</sub> is likely to *t<sub>i</sub>* win.

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