

# **Phrasal Movement and its Discontents: Diseases and Diagnoses**

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## **Abstract**

This chapter starts from the observation that a "diagnostic" is simply an argument in which one has particular confidence, put to practical use. The logical space of possible arguments for phrasal movement is sketched and exemplified with examples of such arguments, some well-known and others more recently proposed. Hartman's (2012) discussion of intervention effects is cited as an instance in which an established property of movement (intervention effects in A-movement constructions) diagnosed the distribution of movement in a more poorly understood construction (English *tough* movement). The question of whether phrasal movement exists in the first place is taken up, in the context of the history of its discovery and current syntactic approaches that dispense with it.

keywords: movement, binding, intervention, tough-movement, structure preservation, syntax

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*"We're lucky his heart's where his liver should be, or he'd be dead now."*

-Dr. Leonard McCoy

## 1 Introduction

You are a syntactician, and you have a problem. For some time now, you have been tormented by the seemingly contradictory properties of a phrase X in a particular construction of the language you work on. The word order and several other features of the construction suggest that X occupies a relatively high syntactic position that we might call  $\alpha$  — yet other properties of the construction suggest that it occupies an entirely different position  $\beta$ . You are just at the point of giving up, when a possible solution suddenly pops into your head. Perhaps X exhibits both " $\alpha$ -properties" and " $\beta$ -properties" because it underwent *phrasal movement* from  $\beta$  to  $\alpha$ . You set to work testing the predictions of this hypothesis. After several weeks of work, you conclude that your hunch was probably correct. X does move from  $\beta$  to  $\alpha$ . Problem solved! You have a future in linguistics after all.

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What just happened? What was the actual content of your conjecture that "phrase X moved from  $\beta$  to  $\alpha$ ", and how were you able to test such a hypothesis? In this chapter, I sketch some answers to these questions.

First, a few cautionary notes. For reasons of space and clarity, the scope of our discussion will be limited in many important respects. To begin with, not every researcher who suggests that "X moves from  $\beta$  to  $\alpha$ " has exactly the same proposal in mind. The literature contains a variety of views about the nature of phrasal movement, and vigorous discussion of several alternatives. To keep the discussion manageable, this chapter will focus on just one of these several proposals. Nonetheless, because the various approaches do not differ in the most important details, I believe that most of my remarks can easily be rendered compatible with other views of movement, but I will not attempt this here. It must also be noted that some approaches to syntax purport to dispense with the concept of movement entirely. Though I will not be able to do justice to these alternatives, I will return to the general question of movement-free frameworks in section 6. Finally, I will confine the discussion to the kind of phrasal movement called *overt*, in which the moved element is pronounced in its new position  $\alpha$ , rather than in its former position  $\beta$ .

Before proceeding further, I should make clear that the goals of this chapter are pedagogical. Almost all of its factual content will be old news to knowledgeable readers, (and very little is original with the author of this chapter). What might be interesting nonetheless, even to knowledgeable readers, is the selection and arrangement of this familiar material, in the context of a discussion of "diagnostics". A "diagnostic" is not a term of linguistic theory nor a kind of discovery, but a use to which linguistic theory and linguistic discoveries may be put. A "diagnostic" is just an established finding that helps one interpret new findings, and the only difference between an "argument for  $\phi$ " and a "diagnostic for  $\phi$ " is *confidence*. This chapter presents a few hopefully confidence-worthy findings that are useful in just this way, classifies them according to what they teach us, and explores some of their connections — in an attempt to

offer some practical assistance to syntacticians like the desperate figure with whom this chapter began.

## 2 What are we attempting to diagnose?

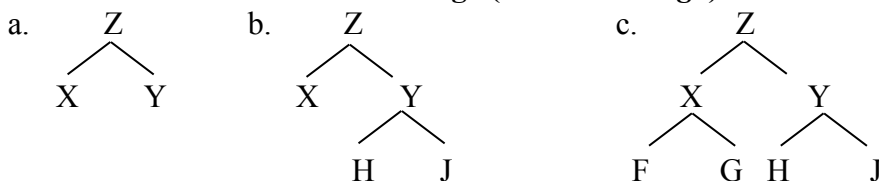
When we diagnose a phrase *X* as having undergone an instance of phrasal movement, we are claiming that the phrase occupies two distinct positions in a single syntactic structure. As a consequence, *X* is immediately dominated by more than one distinct category, a property often called *multidominance* (a notion developed by Engdahl 1986, Blevins 1990, Starke 2001, Gärtner 2002, among many others). An additional property is crucial to the diagnosis of movement: *c-command* between the two positions. To a first approximation, then, when syntacticians diagnose phrasal movement, they have the following characterization in mind:

### (1) A phrase *X* has undergone movement if...

- a. *the multidominance property*:  
... *X* occupies (at least) two syntactic positions  $\alpha$ ,  $\beta$ ; such that...
- b. *the c-command property*:  
...  $\alpha$  *c-commands*  $\beta$ .<sup>1</sup>

The view of movement assumed in this chapter attributes its multidominance property to the rule *Merge*. The attractiveness of this proposal lies in the fact that this is the same rule that builds basic phrase structure configurations independent of movement. *Merge* is a rule with the following properties: it selects two elements *X* and *Y* and groups them into a set  $Z=\{X, Y\}$ . In linguist's terminology, *Z* is *phrase* that immediately dominates *X* and *Y* as a consequence of the operation **Merge**(*X*, *Y*). *X* and *Y* may be lexical items, as shown in (2a), the simplest case of *Merge*. Crucially, either or both may also be a phrase previously formed by *Merge*, as shown in (2b) and (2c). This latter possibility means that *Merge* *iterates* (its iterations constituting a *derivation*) and is *recursive*. To form the structure (2b), for example, *Merge* first combined the lexical items *H* and *J* to form the set  $Y=\{H, J\}$  — and then combined the lexical item *X* with the already formed set *Y* in a second application of the rule, forming *Z*. To form (2c), *Merge* separately constructed *X* (by combining *F* and *G*) and *Y* (by combining *H* and *J*) — and then constructed *Z* from the sets *X* and *Y*, in a third application of the rule:

### (2) Non-movement instances of Merge (*External Merge*)

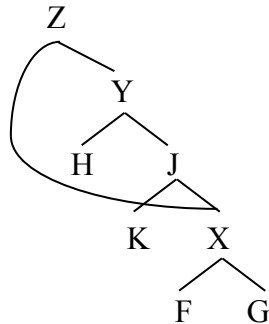


In instances of *Merge* like (2b) and (2c) that exemplify recursion, although one or both of the two Merged elements *X* and *Y* were themselves created by *Merge*, the two elements are *independent*. Neither *X* nor *Y* is a subconstituent of the other. It is also possible to imagine,

<sup>1</sup> If "remnant movement" has occurred (see section 4), the *c-command* relations are more complex, in ways I will not untangle here, for reasons of space.

however, a recursive instance of Merge that is different in this respect: where X, for example, was created as part of the sequence of Merge operations that built Y, and is thus a subconstituent of Y. This possibility is shown in (3). Here Merge first combined F and G to create the phrase X, next combined K and X to create the phrase J, and then combined H and J to create Y. Finally, and crucially, Merge selected the phrase X for a second time and combined it with Y. This variety of Merge has been called *Internal Merge*, and provides the analysis of phrasal movement that I will be assuming in this chapter (Chomsky 2004). Note that as a result of Internal Merge of X with Y, X ends up immediately dominated by both J and Z — yielding the *multidominance* property of movement.

(3) **Phrasal movement as an instance of Merge for a second time (*Internal Merge*) yielding the *multidominance* property**



If we adopt this analysis of movement, the rule that creates movement configurations is the same recursive rule responsible for all other phrasal structure.<sup>2</sup> In the diagram in (3), X is a phrase (itself created by Merge of F and G). Hence, the diagram instantiates *phrasal movement*, the topic of this chapter.<sup>3</sup>

What about the *c-command* property of movement? This does not follow quite as straightforwardly as the multi-dominance property, but has been argued to reflect certain conditions on Merge that have been proposed in the literature. In particular, Chomsky (2000; 2001) has suggested that Internal Merge of X to Y requires the prior establishment of an *agreement* relation between one or more unvalued feature of the head of Y and corresponding valued features on X, and that Internal Merge inherits its c-command requirement from an independently motivated c-command condition on the rule *Agree*.<sup>4</sup> If H is the head of Y in (3) (i.e. Y=HP), and *f* is an unvalued feature of H, *f* obligatorily acts as a *probe*, searching the c-command domain of H until it locates *f* on X (the *goal* of the probe). The rule *Agree* assigns the

<sup>2</sup> In this respect, the analysis assumed in this chapter is superior to earlier attempts to understand movement phenomena, which posited two radically distinct types of rules for generating phrase structure with and without movement (and segregated these rules into distinct components of the model of grammar). I return to this point in the final section of this chapter.

<sup>3</sup> The theory should also countenance internal Merge of a lexical item (e.g. an instance of X that does not result from previous instances of Merge), which would instantiate *head movement*, discussed in chapter X. Though the best theory of movement will make no principled distinction between head movement (in which the head of a complex phrase is extracted from that phrase) and phrasal movement, I will not discuss head movement in this chapter, except where it interacts crucially with phrasal movement. See chapter X.

<sup>4</sup> See Preminger (2011, chapter 4) for a strong recent argument in favor of this proposal.

value associated with  $f$  on  $X$  (e.g. plus or minus) as the value of the corresponding feature on  $H$ . Finally, if  $f$  on  $H$  also bears an "EPP property",  $X$  internally merges with the maximal projection of the element with which it just agreed. If  $H$  c-commands  $X$  before movement, and  $X$  must merge with a projection of  $H$ ,  $X$ 's new position  $\alpha$  will also c-command its old position  $\beta$  — thus deriving the c-command property of movement.

**(4) Phrasal movement as a response to featural needs of a head  $H$  — yielding the c-command property**

Internal Merge of  $X$  with a projection of  $H$  occurs only when  $H$  has featural needs that are satisfied by:

- a. *Agree* between unvalued features of  $H$  and corresponding features of  $X$  (where c-command is a precondition for *Agree*); and
- b. *Merge* of  $X$  as specifier of  $H$  (satisfying an EPP of  $H$ ).

Having clarified what a syntactician might mean by " $X$  moves from  $\beta$  to  $\alpha$ ", we can now ask how such a hypothesis is put to the test. How does one diagnose a configuration in which phrase  $X$  occupies two distinct positions  $\alpha$  and  $\beta$  as a result of Internal Merge?

To begin with, in order to argue that  $X$  occupies both  $\alpha$  and  $\beta$ , we must acquire an independent body of evidence that  $X$  occupies  $\alpha$  and an independent body of evidence that  $X$  occupies  $\beta$ . All things being equal, a phrase  $X$  that occupies two positions  $\alpha$  and  $\beta$  should display the union of the properties expected of every phrase that occupies position  $\alpha$  (henceforth  *$\alpha$ -properties*) and the properties expected of a phrase in position  $\beta$  ( *$\beta$ -properties*). Furthermore, if  $X$  should *fail* to show some  $\alpha$ -property or  $\beta$ -property — or behaves in a distinctive manner not immediately identifiable as an  $\alpha$ -property or a  $\beta$ -property — we should be able to explain such observations as either a consequence of some *interaction* of  $X$ 's  $\alpha$ -properties with  $X$ 's  $\beta$ -properties or a specific property of Internal Merge such as (4). If we fail at these tasks, phrasal movement is probably a wrong diagnosis, and  $X$  has not moved from  $\beta$  to  $\alpha$  after all.

I thus offer (5) as an approximation of the "diagnostic manual" that researchers implicitly follow when investigating the possibility of phrasal movement:

**(5) Diagnostic manual for movement of X from  $\beta$  to  $\alpha$**

**a. Check X for  $\beta$ -properties**

For each property that we expect of an X-like element in  $\beta$ , does X show that property?

**b. Check X for  $\alpha$ -properties**

For each property that we expect of an X-like element in  $\alpha$ , does X show that property?

**c. Check X for  $\alpha\beta$ -properties**

For each negative answer to (5a) or (5b), can the negative answer be attributed to one of the following factors?

*Interactions between  $\alpha$ -properties and  $\beta$ -properties, such as:*

- (i) resolution of a conflict between  $\alpha$ -properties and  $\beta$ -properties that masks one or the other, or
- (ii) non-resolvability of conflict between  $\alpha$ -properties and  $\beta$ -properties, resulting in otherwise surprising judgments of unacceptability; or

*Specific properties of Internal Merge itself, such as:*

- (iii) the precondition to Internal Merge stated in (4).

A number of other useful distinctions can be made among the properties taken to diagnose phrasal movement. For example, some  $\alpha$ -properties,  $\beta$ -properties and  $\alpha\beta$ -properties localize an element *hierarchically*, while others might be argued to localize an element *linearly*. Furthermore some of these properties are syntax-specific, while others interact crucially with semantics or phonology. The more diverse the kinds of evidence that converge on a single conclusion, the stronger the case for that conclusion.

**3 Working with the  $\beta$  and  $\alpha$  parts of the diagnostic manual: syntax-internal and semantically relevant hierarchical properties**

Many of the properties of phrasal movement that fall under (5a) and (5b) are familiar to every student of syntax. These properties are the easiest to spot, and prompted the foundational discoveries that led to the notion of movement in the first place. This section summarizes some ways in which the coexistence of distinct  $\beta$ -properties and  $\alpha$ -properties supports a diagnosis of phrasal movement. Where possible, I draw my examples from *wh*-movement constructions — a well-studied and representative class of phrasal movement constructions. Nonetheless, I will try to call attention to ways in which the properties of other types of phrasal movement differ.

**3.1 Syntax-internal, hierarchical  $\beta$ -properties**

In configurations that have been argued to exhibit overt *wh*-movement in languages like English, though the *wh*-phrase is pronounced in a left-peripheral position that suggests it is a specifier of CP, a multitude of hierarchical properties suggest the existence of a  $\beta$ -position quite distinct from this  $\alpha$ -position. Some of these properties are syntax-internal. For example, the left-peripheral *wh*-phrase in examples like (6c) satisfies idiosyncratic selectional requirements, which must otherwise be satisfied by a phrase c-commanded by the specifier of CP and linearized to its right, as (6a-b) show. Such observations suggest that the  $\alpha$ -position in which the *wh*-phrase is pronounced is distinct from the  $\beta$ -position in which it satisfies subcategorization requirements:

**(6) Selectional properties satisfied by  $\beta$ -position**

- a. Mary placed *her shoes* under the bed.
- b. \*Mary placed \_\_\_ under the bed.
- c. I wonder [<sub>CP</sub> [*whose shoes*] <sub>$\alpha$</sub>  Mary placed \_\_\_ <sub>$\beta$</sub>  under the bed].

In similar fashion, the left-peripheral phrase in examples like (7c) appears to satisfy the requirement that English clauses have an overt subject, as demonstrated by the contrasting examples (7a-b). This can be viewed as a selectional requirement of T, its so-called *EPP* property:<sup>5</sup>

**(7) Obligatoriness of overt subject satisfied by  $\beta$ -position**

- a. I wonder [if *this child* should leave the room]
- b. \*I wonder [ if \_\_\_ should leave the room]
- c. I wonder [[*which child*] <sub>$\alpha$</sub>  Bill thinks [ \_\_\_ <sub>$\beta$</sub>  should leave the room]].

Likewise, a *wh*-phrase whose pronunciation suggests that it occupies an  $\alpha$ -position in the specifier of CP may satisfy idiosyncratic morphological requirements imposed on an entirely distinct  $\beta$ -position. Thus, the idiosyncratic requirement of dative case that the Russian verb 'help' imposes on its direct object is satisfied by the phrase pronounced specifier of CP in (8).

**(8) Morphology assigned to the  $\beta$ -position satisfied by X**

- [*Kakomu studentu*] <sub>$\alpha$</sub>  vy xotite [čtoby ja pomog \_\_\_ <sub>$\beta$</sub> ]?  
 which-DAT student-DAT you want that-SJN I help-SJN (SJN=subjunctive)

**3.2 Semantically relevant, hierarchical  $\beta$ -properties**

Converging evidence for the postulation of a lower  $\beta$ -position for the *wh*-phrase distinct from its higher  $\alpha$ -position also comes from areas where syntax and semantics interact, such as anaphora. The constraint usually called *Principle C*, for example, blocks coreference between a pronoun and a full DP that it c-commands, but has no effect when c-command does not obtain. When a pronoun or full DP is contained within a *wh*-phrase in constructions like those we have been considering, its properties for the purposes of Principle C often reflect precisely the same  $\beta$ -position diagnosed by properties like those in (6)-(9). For Principle C purposes, the *wh*-phrase is evaluated in its hypothesized  $\beta$ -position:<sup>6</sup>

<sup>5</sup> Also called an *OCC* ("occurrence") feature by Chomsky (2004) and an *Edge Feature* in Chomsky's most recent papers (2008 *et seq.*). *EPP* remains the most common designation in the literature.

<sup>6</sup> As discussed by Lebeaux (1991), Chomsky (1993), and many others, the explanation for the effect documented in (10) requires not only a theory of *wh*-constructions in which the *wh*-phrase is merged in a  $\beta$ -position before merging for a second time in an  $\alpha$ -position — it also requires that the *wh*-phrase itself is fully constructed before it merges in its  $\beta$ -position and  $\alpha$ -position. If, for example, Merge of the clause *that John is the rightful heir* could be delayed until after the *wh*-phrase has merged for a second time, the Principle C effect seen in (10a) could be circumvented, since the nominal *John* would not be c-commanded by the pronoun *he*. It is precisely this sort of derivation, as Lebeaux and Chomsky argued, that permits certain exceptions to the effect seen in (10). Modifiers such as relative clauses, for example, may be permitted to "late-merge" in this fashion, while complements must Merge as soon as possible.

(9) **Principle C as a test for c-command**

a. ***Pronoun c-commands DP***

\*He<sub>i</sub> will probably mention my proof that John<sub>i</sub> deserved to share the prize.

b. ***No c-command between pronoun and DP***

His<sub>i</sub> lawyer will probably mention my proof that John<sub>i</sub> deserved to share the prize.

John<sub>i</sub> will probably mention my proof that he<sub>i</sub> deserved to share the prize.

(10) **Principle C effects diagnose a  $\beta$ -position for *wh*-phrase**

a. ***Pronoun c-commands DP within  $\beta$ -position of the *wh*-phrase***

\*[Whose proof that John<sub>i</sub> deserved to share the prize] <sub>$\alpha$</sub>  do you think he<sub>i</sub> will mention \_\_\_ <sub>$\beta$</sub> ?

\*[Whose proof that John<sub>i</sub> deserved to share the prize] <sub>$\alpha$</sub>  does he<sub>i</sub> think [ \_\_\_ <sub>$\beta$</sub>  is relevant to the discussion]?

b. ***No c-command between pronoun and DP within  $\beta$ -position of the *wh*-phrase***

[Whose proof that John<sub>i</sub> deserved to share the prize] <sub>$\alpha$</sub>  do you think his<sub>i</sub> lawyer will mention \_\_\_ <sub>$\beta$</sub> ?

[Whose proof that John<sub>i</sub> deserved to share the prize] <sub>$\alpha$</sub>  do you think [ \_\_\_ <sub>$\beta$</sub>  will impress him<sub>i</sub>]?

The distribution of reflexives ("Principle A" effects) diagnoses the same  $\beta$ -position. An English reflexive must (in general) be c-commanded by its antecedent, as (11) shows. Once again, as (12) shows, a reflexive inside a *wh*-phrase behaves as we expect if the *wh*-phrase occupies a lower  $\beta$ -position as well as the  $\alpha$ -position in which it is pronounced.

(11) **Principle A as a test for c-command**

a. Mary liked these photos of herself best.

b. \*Mary's brother liked these photos of herself best.

(12) **Principle A effects diagnose a  $\beta$ -position for *wh*-phrase (Barss (1986))**

a. [Which photos of herself] <sub>$\alpha$</sub>  did Bill hear that Mary liked \_\_\_ <sub>$\beta$</sub>  best?

b. \*[Which photos of herself] <sub>$\alpha$</sub>  did Bill hear that Mary's brother liked \_\_\_ <sub>$\beta$</sub>  best?

The (b) examples are crucial to the test (a point frequently neglected). It is the c-command-based *contrast* between the (a) and (b) examples that demonstrates that the constraints under discussion are not simply suspended within a *wh*-phrase that is pronounced in the specifier of CP position — but are fully active and sensitive to the  $\beta$ -position of the *wh*-phrase. When the distribution of anaphora is used as a diagnostic for phrasal movement, it is always important to verify that the relevant effects covary with the presence and absence of c-command, as predicted by the relevant constraints. Without such a test, we cannot exclude the possibility that we have discovered some entirely different effect unrelated to the  $\alpha$ -property/ $\beta$ -property distinction.



### 3.3 Syntax-internal, hierarchical $\alpha$ -properties

In the background of the discussion so far is an unquestioned assumption: that the pronunciation of a *wh*-phrase at the left-periphery of its clause reflects pronunciation of the phrase in its  $\alpha$ -position, in accordance with movement-independent laws of pronunciation relevant to that position. Leaving this assumption unquestioned, we began our discussion by focusing on an issue that seemed less obvious: the existence of the  $\beta$ -position. The diagnosis of phrasal movement of X from  $\beta$  to  $\alpha$  in such cases is incomplete, however, without independent evidence that X also occupies the proposed  $\alpha$ -position. Otherwise, we might now begin to imagine that the phrase under investigation occupies *only* the lower  $\beta$ -position, and that its pronunciation at the left periphery of its clause is due to factors other than movement (for example, some unexpected complexity in the mapping from syntax to phonology).

Ideally, the types of evidence marshaled in favor of the  $\alpha$ -position will maximally resemble the evidence used to support the  $\beta$ -position. In the case of *wh*-movement, for example, we would hope that the proposed  $\alpha$ -position is relevant to selectional and morphological requirements like those demonstrated for the  $\beta$ -position in examples (6)-(8) and interacts with principles of anaphora just as the  $\beta$ -position does in examples (10) and (12).

In the case of English *wh*-movement, such evidence is indeed forthcoming. We observe, for example, that a verb like *wonder* or an adjective like *curious* (when its subject is a non-expletive, and its complement is a CP), requires a *wh*-phrase at the left periphery of that CP. Neither a CP without a *wh*-phrase nor a CP with an in-situ *wh*-phrase can satisfy this requirement:

- (13) **Selectional properties correlated with embedding predicate satisfied by  $\alpha$ -position**
- a. I wondered [*whose shoes* <sub>$\alpha$</sub>  Mary placed \_\_\_ <sub>$\beta$</sub>  under the bed].
  - b. \*I wondered [(that) Mary placed *her shoes* <sub>$\beta$</sub>  under the bed].
  - c. \*I wondered [(that) Mary placed *which shoes* <sub>$\beta$</sub>  under the bed].
  - d. We were curious [*which photos* <sub>$\alpha$</sub>  Mary would like \_\_\_ <sub>$\beta$</sub>  best].
  - e. \*We were curious [(that) Mary would like *these photos* <sub>$\beta$</sub>  best].
  - f. \*We were curious [(that) Mary would like *which photos* <sub>$\beta$</sub>  best].

Such facts have been argued to reflect, not direct selection by the higher predicate, but a chain of selection. Under this proposal, it is actually a special [+*wh*] complementizer (null in English) heading the embedded clause whose selectional requirements are directly satisfied by the  $\alpha$ -position of the *wh*-phrase, and what the higher predicate directly selects is the [+*wh*] complementizer.<sup>7</sup> In support of this view, we observe dependencies between the embedded C and the left-peripheral *wh*-phrase that suggest a selectional interaction between these positions. In standard English, for example, a left-peripheral *wh*-phrase is in complementary distribution with overt complementizers such as *that*, as (14a) shows (the so-called *Doubly-Filled Comp*

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<sup>7</sup> For semantically sophisticated versions of this type of proposal, see Hagstrom (1998) and Cable (2007, 2008, 2010), among others.

*Effect*; Keyser 1975, Chomsky & Lasnik 1977), while in matrix questions (but not exclamatives) the C that cooccurs with the left-peripheral *wh*-phrase triggers head movement to C of the finite verb, as (14b) shows:

- (14) **Selectional properties of C diagnose an  $\alpha$ -position for X as specifier of CP**
- a. ***wh*-phrase in Spec,CP  $\alpha$ -position in complementary distribution with overt C**  
I wondered [*whose shoes* <sub>$\alpha$</sub>  (\*that) Mary placed \_\_\_ <sub>$\beta$</sub>  under the bed].
- b. ***wh*-phrase in specifier of interrogative CP cooccurs with T-to-C movement**  
*Whose shoes* <sub>$\alpha$</sub>  **did** Mary place \_\_\_ <sub>$\beta$</sub>  under the bed? (interrogative)  
*What a strange shoe* <sub>$\alpha$</sub>  Mary placed \_\_\_ <sub>$\beta$</sub>  under the bed! (exclamative)

Crucially, these interactions are not specific to situations in which the *wh*-phrase occupies a distinct  $\beta$ -position in addition to its  $\alpha$ -position as specifier of CP. *Yes/no* questions, in which the interrogative element (null in matrix questions) does not appear to have moved from anywhere (i.e. has no distinct  $\beta$ -position), show the same properties:<sup>8</sup>

- (15) **Selectional properties correlated with embedding predicate satisfied by  $\alpha$ -position when there is no distinct  $\beta$ -position**  
I wondered [*whether* Mary placed these shoes under the bed.]
- (16) **Selectional properties of C diagnose an  $\alpha$ -position as specifier of CP when there is no distinct  $\beta$ -position: *yes/no* questions**
- a. ***wh*-phrase in Spec,CP in complementary distribution with overt C**  
I wondered [*whether* (\*that) Mary placed these shoes under the bed].
- b. **(null) *wh*-phrase in specifier of interrogative CP cooccurs with T-to-C movement**  
 **$\emptyset$  did** Mary place these shoes under the bed?

A point similar to (15) can also be made with the English expression *how come* that introduces reason questions. *How come* appears to occupy the same  $\alpha$ -position as its near-synonym *why*, and satisfies the same selectional requirements of higher elements, but differs from it in lacking a distinct  $\beta$ -position (Collins 1991; see also Ko 2005b). A *how come* question asks about reasons for the situation denoted by the clause that contains its  $\alpha$ -position, while a comparable *why* question may ask about reasons for the situation denoted by the clause that contains a distinct  $\beta$ -position:

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<sup>8</sup>Larson (1985) argues that *whether* is essentially a *wh*-form of the disjunction *either* (cf. also Kayne 1991), and tentatively suggests (p. 238, citing an earlier conjecture by Grimshaw 1977) that it might undergo *wh*-movement after all, from a clause-internal position related to disjunction. It is clear, however, that the proposed movement of *whether* lacks the long-distance possibility of standard *wh*-movement, which calls the conjecture into question. Thus *Mary asked whether John guessed that it is raining*, for example, cannot mean "Mary asked whether it is raining, according to John's guess", but can only describe a question about whether or not John made any guess at all about the rain. On the other hand, the possibility cannot be excluded that *whether* has moved from some lower position, and that the failure of movement across a clause boundary reflects some other restriction — in which case it is less relevant to the current discussion.

(17) **Selectional properties of C diagnose an  $\alpha$ -position as specifier of CP when there is no distinct  $\beta$ -position: reason questions**

- a. Mary asked [*how come* John said she had placed these shoes under the bed].  
(*Mary's question concerns the reasons for John's statement.*)
- b. Mary asked [*why* <sub>$\alpha$</sub>  John said [she had placed these shoes under the bed] \_\_ <sub>$\beta$</sub> ] (= a)
- b'. Mary asked [*why* <sub>$\alpha$</sub>  John said [she had placed these shoes under the bed] \_\_ <sub>$\beta$</sub> ]  
(*Mary's question concerns the reasons for her actions, according to John.*)

Observations like these occupy the same logical place in the argument for the  $\alpha$ -position of the *wh*-phrases in (13a, d) and (14) as examples like (6a-b) and (7a-b) occupy for the  $\beta$ -position in (6c) and (7c). They demonstrate that the properties that purportedly identify an  $\alpha$ -position for the *wh*-phrase in constructions like (13a, d) and (14) do not diagnose some independent peculiarity of *wh*-constructions with a particular  $\beta$ -position — but really do identify an  $\alpha$ -position (here, specifier of CP).

The explanation for higher-predicate/ $\alpha$ -position correlations like those in (13) does not always rely on a chain of selection, but may be more direct in other constructions. In the English "Free Relative" construction, whose syntax otherwise strongly resembles interrogatives, the higher predicate does appear to directly select the *wh*-phrase in its  $\alpha$ -position, a phenomenon known as the *Matching Effect* (Grimshaw 1977; Bresnan and Grimshaw 1978; Groos and van Riemsdijk 1981). The italicized elements in the bracketed Free Relatives of (18a-b) not only appear to satisfy selectional requirements of the embedded verb in their underscored  $\beta$ -positions, but also satisfy the main-clause verb's selectional requirements in their  $\alpha$ -positions. (The nominal second object of *hand*, the directional second object of *put*, and the complement to *become* are all obligatory.)

(18) **English Free Relatives:**

**Selectional properties of higher predicate diagnose an  $\alpha$ -position as specifier of CP (and the selectional properties of lower predicate diagnose a  $\beta$ -position)**

- a. Mary placed [*whatever* <sub>$\alpha$</sub>  we handed her \_\_ <sub>$\beta$</sub> ] under her bed.
  - b. Mary put her shoes [*where* <sub>$\alpha$</sub>  the other hikers had put their boots \_\_ <sub>$\beta$</sub> ]
  - c. She vowed to become [*however rich* <sub>$\alpha$</sub>  you have to be \_\_ <sub>$\beta$</sub>  (to get into that club)].
  - cf. \*Mary placed [*however rich* <sub>$\alpha$</sub>  you have to be \_\_ <sub>$\beta$</sub> ] under her bed.
  - \*Mary put her shoes [*whatever* <sub>$\alpha$</sub>  we handed her \_\_ <sub>$\beta$</sub> ]. *etc.*
- [Bresnan and Grimshaw (1978, 335)]

A final type of evidence for the syntactic reality of the  $\alpha$ -position in examples like those discussed above can be drawn from its interaction with other processes that are demonstrably hierarchy-sensitive. A *wh*-phrase's  $\alpha$ -position, for example, may block other movement processes that rely on the availability of that position as an intermediate landing site. Once again, this phenomenon is independent of the existence of an independent  $\beta$ -position for the element. Both *why* and *how come* at the left edge of CP, for example, block a second *wh*-phrase from exiting that CP, as seen in (19). Contrasting examples like (20) show that the effect is crucially

hierarchical and not linear. In both (19) and (20), the second instance of *wh*-movement (indicated with the arrow) linearly crosses the italicized *wh*-elements *why* and *how come*, but only in (19) are these elements hierarchically crossed — on the crucial assumption that they occupy an  $\alpha$ -position that c-commands the contents of the bracketed clause, but does not c-command elements outside it:

- (19)  **$\alpha$ -position blocks other hierarchy-sensitive processes**  
 a. \*Who can we discuss [*why* this happened to \_\_\_]?  
 b. \*Who can we discuss [*how come* this happened to \_\_\_]?  
 (20) **The effect in (19) is indeed hierarchy-sensitive**  
 Who can we discuss [*why* this happened \_\_\_ ] with \_\_\_?

### 3.4 Semantically relevant, hierarchical $\alpha$ -properties

Constraints on anaphora also help us diagnose  $\alpha$ -positions, just as they helped with the diagnosis of  $\beta$ -positions. The effect on reflexives of Principle A is particularly useful in this respect. In (11), we saw that a reflexive in English requires an antecedent that c-commands it. As has often been observed, there is also a locality component to Principle A, which restricts the structural distance between an English reflexive and its antecedent. In particular, as observed by Chomsky (1973), the reflexive and its antecedent may not be separated by a subject or possessor that c-commands the former and is c-commanded by the latter:

- (21) **Locality condition on reflexive binding in English**  
 a. Sue<sub>i</sub> thinks that John<sub>j</sub> admires himself<sub>j</sub>/\*herself<sub>i</sub>.  
 b. Bill<sub>i</sub> heard that Mary<sub>j</sub> liked pictures of herself<sub>j</sub>/\*himself<sub>i</sub> best.  
 c. John<sub>i</sub> liked [Mary<sub>j</sub>'s pictures of herself<sub>j</sub>/\*himself<sub>i</sub>].

In examples (12a-b), we saw that the c-command condition on reflexives may be satisfied in the hypothesized  $\beta$ -position for a *wh*-phrase pronounced at the left periphery of CP — evidence that crucially converges with selectional and other properties that support the reality of the  $\beta$  position. Examples like (22) below, however, show that the locality condition on reflexives may be crucially satisfied in the  $\alpha$ -position (evidence that likewise converges with the independent tests for the reality of this position, as just discussed). It is only in the hypothesized  $\alpha$ -position for the *wh*-phrase that the underscored subjects fail to intervene between the reflexive and its antecedent *John* (Barss 1986, pp. 25, 86):

- (22) **Locality component of Principle A diagnoses an  $\alpha$ -position for *wh*-phrase...**  
 John<sub>i</sub> wondered [*which pictures of himself<sub>i</sub>*] <sub>$\alpha$</sub>  Sue had heard that Mary liked \_\_\_ <sub>$\beta$</sub>  best.

Languages vary in the applicability and details of the locality requirement on reflexive-like elements, but whenever a language has such a requirement, the reality of the  $\alpha$ -position of a putatively moved phrase should be detectable by similar methods. Once again, however, it is important to check that the relevant constraint is not simply suspended within a *wh*-phrase pronounced in the specifier of CP position, i.e. that there is no independent amnestying factor at work in the acceptability of examples like (22). Examples like (23a-b) are thus key components of the argument that (22) supports an  $\alpha$ -position as specifier of CP for the *wh*-phrase:

(23) ...and Principle A remains active in such examples

- a. John<sub>i</sub> heard that Sue<sub>j</sub> had wondered [*which pictures of herself<sub>j</sub>/\*himself<sub>i</sub>*]<sub>α</sub>  
     Mary liked \_\_<sub>β</sub> best. [cf. (21b)]
- b. John<sub>i</sub> wondered [*which actress<sub>j</sub>'s pictures of herself<sub>j</sub>/\*himself<sub>i</sub>*]<sub>α</sub>  
     Mary liked \_\_<sub>β</sub> best. [cf. (21c)]

If *himself* is replaced by *herself* in (22), the locality as well as the c-command components of Principle A can be satisfied by the  $\beta$ -position (rather than the  $\alpha$ -position) of the *wh*-phrase, as already seen in examples like (12). This reflects the fact that Principle A is a "somewhere" condition (Belletti & Rizzi 1988): when a phrase X occupies both an  $\alpha$ -position and a  $\beta$ -position, a reflexive in X is licensed so long as it satisfies Principle A within at least one of these positions.

In examples like (10a-b), Principle C appears to follow a different logic, which one might think should prevent it from diagnosing  $\alpha$ -positions (even though it effectively diagnoses  $\beta$ -positions). If a full nominal contained within a moved phrase were merely required to satisfy Principle C in *one* of that phrase's positions (as is the case with Principle A), then the fact that the pronoun *he* fails to c-command into the specifier of CP might have sufficed to permit *he* and *John* (a subconstituent of the specifier of CP) to co-refer. But this is not the case. When a phrase X occupies a distinct  $\alpha$ -position and  $\beta$ -position, coreference between a full nominal in X and a pronoun is forbidden if X c-commands into *any* of these positions. In this sense, Principle C is an "everywhere" condition, in contrast to the "somewhere" property of Principle A — which makes it impossible to use Principle C in a simple fashion as an  $\alpha$ -position diagnostic.<sup>9</sup>

Principle C is not necessarily useless as a diagnostic for an  $\alpha$ -position, however, if we take into account the derivational possibility called "*Late Merge*", first suggested by Lebeaux (1998) and explored further in much later work (such as Chomsky 1993 and Sauerland 1998, among many others). Lebeaux argued that, under certain circumstances, an element X that has internally merged with Y may subsequently undergo *External Merge* with a third element Z. In particular, he suggested that a modifier (such as a relative clause) might be allowed to Externally Merge with a *wh*-phrase *after* that phrase has undergone *wh*-movement. Crucially, Late Merge is excluded for complements, which must merge as soon as possible with their hosts.

The central motivation for this suggestion is the observation that the Principle C effects seen in *wh*-movement configurations like (10a-b) disappear when the full nominal is contained within a *modifier* of the *wh*-phrase, rather than a complement, as is the case in (10a-b). Recall that Principle C effects arise in (10a-b) because the pronoun *he* c-commands the full noun phrase *John* — and that the pronoun c-commands *John* because it c-commands the  $\beta$ -position of the *wh*-phrase that contains *John*. If the clausal complement to *proof* in these examples could wait to merge with its host until after *wh*-movement has taken place (Late Merge), c-command of the *wh*-phrase's  $\beta$ -position would not entail c-command of *John*, and we would find no Principle C effect — contrary to fact. As Lebeaux notes, however, this is exactly what we do seem to find when the full NP is contained in a modifier, rather than a complement, within the moved phrase

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<sup>9</sup> What I call Principle A's "somewhere" property is (confusingly, I think) called an "anywhere" property by Belletti & Rizzi (1988, 314) and much subsequent literature.

— for example, in (24a-b), which contrast with (10a).

- (24) **Principle C effects targeting  $\beta$ -position disappear for a full NP within a modifier**  
 a. *[[Which proof] <sub>$\alpha$</sub>*  that John<sub>*i*</sub> likes] do you think he<sub>*i*</sub> will mention \_\_ <sub>$\beta$</sub> ?  
 b. *[[Which picture] <sub>$\alpha$</sub>*  near John<sub>*i*</sub>] did the interviewer ask him<sub>*i*</sub> to describe \_\_ <sub>$\beta$</sub> ?

If Late Merge is impossible for the complement containing *John* in examples like (10a), but available for the modifier containing John in (24a-b), then Principle C will find *John* within the *wh*-phrase's  $\beta$ -position in the former, but not in the latter case, explaining the contrast:

- (25)a. **No Late Merge dodge allows *John* to escape Principle C in (10a)**  
 \*[Whose proof that John<sub>i</sub> deserved to share the prize]<sub>α</sub> do you think he<sub>i</sub> will mention  
 [whose proof that John<sub>i</sub> deserved to share the prize]<sub>β</sub> ?
- b. **A Late Merge dodge permits *John* to escape Principle C in (24a-b)**  
**(italics here indicate Late-merged material)**  
 [Which proof *that John<sub>i</sub> likes*]<sub>α</sub> do you think he<sub>i</sub> will mention [which proof]<sub>β</sub> ?  
 [Which picture *near John<sub>i</sub>*]<sub>α</sub> did the interviewer ask him<sub>i</sub> to describe [which picture]<sub>β</sub> ?

Once again, we must make sure that there is no general amnesty for Principle C accorded to full nominals inside modifiers. Examples like (26a-b) make this point straightforwardly. Though the pronoun c-commanding the  $\beta$ -position of the *wh*-phrases in (25b) fails to trigger a Principle C effect when coreferent with *John*, a pronoun commanding the  $\alpha$ -position does:

- (26) **Principle C effects targeting  $\alpha$ -position do not disappear for a full NP within a modifier**
- a. \*He<sub>i</sub> wondered [*which proof that John<sub>i</sub> likes*] <sub>$\alpha$</sub>  you think we will mention \_\_ <sub>$\beta$</sub> .
- b. \*He wondered [*which picture near John<sub>i</sub>*] <sub>$\alpha$</sub>  the interviewer asked us to describe \_\_.

The contrast between (24a-b) and (25b) makes another point as well. Though Principle C configurations like (10a-b) only permit us to diagnose the  $\beta$ -position for a phrase that we suspect has undergone movement, "Late Merge" configurations like those in (24a-b) and (25a-b) allow us to use Principle C effects to diagnose the  $\alpha$ -position as well. Examples (24a-b) and (25b) show that the position in which a *wh*-phrase is pronounced in such constructions is syntactically real, and distinct from its  $\beta$ -position: c-commanded by material outside its clause, but not c-commanded by material inside its clause. Needless to say, clever recombinations of our examples are also possible, permitting us to simultaneously diagnose a  $\beta$ -position as well as an  $\alpha$ -position for the same *wh*-phrase in the same example.

Finally, it is also necessary to note that Principle C effects targeting the  $\beta$ -position of a moved phrase may also fail to appear in other environments besides the *wh*-constructions discussed above. In particular, phrasal movement to a so-called *A-position* (e.g. specifier of TP) may pass virtually every test for movement discussed above, but still fail to show Principle C effects in the  $\beta$ -position. A reflexive inside a DP raised to specifier of TP over a verb like *seem* or *strike*, for example, may be bound by an experiencer argument of the verb, despite the fact that the antecedent fails to c-command the  $\alpha$ -position of the raised DP. It is the  $\beta$ -position that

licenses the binding, as (27a-b) shows (with (27c-d) demonstrating that c-command of the  $\beta$ -position matters). On the other hand, the  $\beta$ -position of these constructions does not yield a Principle C effect when an r-expression coreferent with the experiencer is placed inside the raised DP, as (28) shows:

- (27) **Principle A effects diagnose a  $\beta$ -position for a phrase moved to specifier of TP**
- a. [*This aspect of herself*<sub>i</sub>] <sub>$\alpha$</sub>  seemed to Mary<sub>i</sub> [  <sub>$\beta$</sub>  to be a virtue].
  - b. [*This side of herself*<sub>i</sub>] <sub>$\alpha$</sub>  struck Mary<sub>i</sub> as [  <sub>$\beta$</sub>  problematic].
  - c. \**[This aspect of herself*<sub>i</sub>] <sub>$\alpha$</sub>  seemed to [Mary<sub>i</sub>'s father] [  <sub>$\beta$</sub>  to be a virtue].
  - d. \**[This side of herself*<sub>i</sub>] <sub>$\alpha$</sub>  struck [Mary<sub>i</sub>'s father] as [  <sub>$\beta$</sub>  problematic].
- (28) **Principle C effects targeting  $\beta$ -position disappear for a phrase moved to specifier of TP**
- a. [*This aspect of Mary*<sub>i</sub>] <sub>$\alpha$</sub>  seemed to her<sub>i</sub> [  <sub>$\beta$</sub>  to be a virtue].
  - b. [*This side of Mary*<sub>i</sub>] <sub>$\alpha$</sub>  struck her<sub>i</sub> as [  <sub>$\beta$</sub>  problematic].

The absence of Principle C effects targeting a putative  $\beta$ -position for an element pronounced in a higher position thus cannot be taken as a reliable sign that movement has failed to take place. It might be the case that movement has occurred, but belongs to the class of operations that includes Raising as in (27)-(28) (i.e. A-movement) rather than the class of operations that includes *wh*-movement (i.e. A-bar movement). This issue has been of importance in several domains where a diagnosis of movement has been in doubt, where the ability to distinguish A-movement from A-bar movement was crucial to the diagnosis of movement in the first place — most notably in early debates about the movement nature of scrambling in languages such as German and Hindi (Webelhuth 1989, Mahajan 1990).

Recently, Takahashi (2006) and Hulsey & Takahashi (2009) have suggested an explanation for the Binding-theoretic difference between these two types of movement. They argue that the absence of  $\beta$ -position Principle C effects for A-movement has the same explanation as the comparable effect inside modifiers of phrases that undergo A-bar movement, and is due to the possibility that D and NP may combine by "Late Merge". On their view, NP may merge with D at any point in the derivation, so long as the NP is in place early enough to be case-licensed with the rest of its DP. (See Nikolaeva 2011 for evidence from Russian that supports this aspect of this condition on Late Merge of NP with D.) I will not discuss this aspect of their proposal in further detail here, but will return to it briefly when discussing the English *Tough* construction below.

### 3.5 Explaining absent hierarchical $\alpha$ - and $\beta$ -properties

As noted in our "diagnostic manual", whenever a phrase for which we posit movement from  $\beta$  to  $\alpha$  fails to show some property otherwise characteristic of these two positions, we should be able to attribute this gap either to a conflict between the demands of these two positions (resolvable or irresolvable) or to an independent property of movement itself.

The Principle A effects discussed above may be viewed as a gap of the first sort, involving a resolvable conflict. The reflexives in (12) are unexceptional in the  $\beta$ -position of the

moved *wh*-phrase, but unexpected in the  $\alpha$ -position. The reflexive in (22), on the other hand, is unexceptional in the  $\alpha$ -position of the *wh*-phrase, but unexpected in the  $\beta$ -position. The "somewhere" logic of Principle A resolves the conflict, thereby masking certain otherwise expected effects of the principle. A phrase containing a reflexive that satisfies Principle A only in its  $\alpha$ -position will therefore fail to show an expected consequence of the principle for its  $\beta$ -position, and conversely for a phrase for which the  $\beta$ -position is crucial to Principle A.

Irresolvable conflicts yielding unacceptability can be seen in the domain of selection and subcategorization. Free relatives that fail to satisfy the Matching Effect provide a particularly clear example in languages like Russian, where, as we have seen, predicates may idiosyncratically require a nominal argument to bear a particular case. In (8), we saw a nominal *wh*-phrase that is pronounced in a specifier-of-CP  $\alpha$ -position bearing the dative morphology idiosyncratically required by the verb 'help' in its  $\beta$ -position. In a free relative construction like those in (18), the  $\alpha$ -position of such a *wh*-phrase must satisfy the selectional requirements of higher predicates in addition to those imposed on its  $\beta$ -position. When these requirements conflict, the result is irremediable unacceptability, as (29a) shows. Unlike 'help', which idiosyncratically requires a dative object, the verb 'love' takes an accusative object:

(29) **No case attraction in Russian: irresolvable conflict**

a. Maša pomogla komu ja pomog. ('help' requires DAT)  
M.-NOM helped who-DAT I helped

b. \*Maša pomogla komu ja ljubil. ('love' requires ACC)  
M.-NOM helped who-DAT I loved

I discuss the third type of gap, one that arises from independent properties of movement itself, in the following section.

#### 4 Working with the $\alpha\beta$ part of the diagnostic manual

Recall the problem discussed in the opening paragraphs of this chapter. We discovered a construction in which a phrase *X* seemed to show properties characteristic of two distinct positions  $\alpha$  and  $\beta$  (where  $\beta$  c-commands  $\alpha$ ), and conjectured that *X* might have the properties because it moved from  $\beta$  to  $\alpha$ . Let us imagine that we have already begun to check this diagnosis by carefully following the diagnostic manual sketched in (5), and can *almost* answer in the affirmative to the first two questions listed there: "*for each property that we expect of an X-like element in  $\beta$ , does X show that property?*" and "*for each property that we expect of an X-like element in  $\alpha$ , does X show that property?*" In all likelihood, however, if the construction under investigation instantiates phrasal movement, some of *X*'s properties cannot be attributed solely to its  $\beta$ -position or to its  $\alpha$ -position — but instead reflect some property of the syntactic space between the two positions. Observations of this sort, which our diagnostic manual called " $\alpha\beta$ -properties", also diagnose phrasal movement, as discussed extensively by Ross (1967, ch. 6) and Chomsky (1977b), among many others.

The most well-studied  $\alpha\beta$ -properties involve elements that intervene between a  $\beta$ -position and an  $\alpha$ -position and degrade or block attempts to move a phrase from  $\beta$  to  $\alpha$ . Interveners of



this sort can be sorted informally into two types: *domination interveners* and *c-command interveners*.

#### 4.1 The effect of domination interveners as a hierarchical $\alpha\beta$ -property of phrasal movement

A domination intervener  $\gamma$  (what Ross 1967 called an *island*) blocks movement from  $\beta$  to  $\alpha$  when  $\gamma$  dominates  $\beta$  but not  $\alpha$ , while a c-command intervener  $\gamma$  blocks such movement when  $\gamma$  c-commands  $\beta$  but not  $\alpha$ . Some examples involving *wh*-movement in English are provided in (30):

##### (30) Domination interveners (islands):

*$\gamma$  blocks movement from  $\beta$  to  $\alpha$  in English if  $\gamma$  dominates  $\beta$  but not  $\alpha$ , and...*

a. ... *$\gamma$  is a clausal complement to  $N$  (Complex NP Constraint: Ross 1967)*

\**What $_{\alpha}$  did she challenge the claim [ $\gamma$  that he put \_\_\_  $\beta$  under the bed]?*

b. ... *$\gamma$  is an adjunct (Adjunct Island Condition:*

Cattell 1976, Huang 1982, p.487; Longobardi 1985)

\**What $_{\alpha}$  did she get yell at us [ $\gamma$  because he had put \_\_\_  $\beta$  under the bed]?*

\**What $_{\alpha}$  did she get yell at us [ $\gamma$  mad about \_\_\_  $\beta$ ]?*

c. ... *$\gamma$  is a CP whose specifier is filled (the *wh*-island Condition:*

(Chomsky 1964, 43-44; Chomsky 1977a [orig. 1973], 100)

\**What $_{\alpha}$  did she ask us [ $\gamma$  how come he had put \_\_\_  $\beta$  under the bed]?*

The theory behind island phenomena has been a matter of continuous investigation for almost a half-century, the theory of *phases* being one recent proposal (Chomsky 2001, 2008). In many such proposals, a domination intervener includes an *escape hatch* — a unique position through which movement is possible without triggering an island effect. Consequently, even a domain that permits extraction may actually be a domination intervener, and the discovery of evidence that movement always proceeds through that domain's escape hatch may thus be taken as a diagnostic of movement. The intricate pattern of complementizer mutations in Modern Irish, which appear to correlate with movement/non-movement through specifier of CP (acting as an escape hatch), is a particularly well-known example (McCloskey 2002).

#### 4.2 The effect of c-command interveners as a hierarchical $\alpha\beta$ -property of phrasal movement

A less lengthy but still rich history of investigation has been devoted to c-command interveners. In the domain of *wh*-movement, the best known case is the so-called *Superiority Effect* (Chomsky 1973), illustrated by English contrasts like those in (31). The bold-faced elements are the interveners that block *wh*-movement from  $\beta$  to  $\alpha$  by virtue of c-commanding the moving element's  $\beta$ -position (while being c-commanded by its  $\alpha$ -position):

##### (31) C-command interveners: Superiority effects for A-bar movement

(Chomsky 1973; Kuno and Robinson 1972)

a. He wondered [*who $_{\alpha}$*  \_\_\_ $_{\beta}$  had read what].

b. \*He wondered [*what $_{\alpha}$*  **who** had read \_\_\_ $_{\beta}$ ].

- c. He wondered [*who*<sub>α</sub> we might persuade \_\_<sub>β</sub> to read what].
- d. ??He wondered [*what*<sub>α</sub> we might persuade **who** to read \_\_<sub>β</sub>].

Crucial to the effect is the fact that the intervener is also a *wh*-element, which therefore could have moved instead of the *wh*-element that actually moves in these examples. Replace *who* by a non-*wh*-element such as *Mary* in (31b) or (31d), and the effect disappears. For this reason, one widely supported explanation for such effects links it to the basic mechanism by which movement to the specifier of a head such as C is triggered in the first place: the establishment of an Agree relation between an unvalued feature on C (acting as a *probe*) and a *goal* that bears the same feature (as discussed in section 2 of this chapter). If the probing feature selects as its goal the first element it encounters, it will choose the higher element *who*, rather than the lower element *what*, in structures like those underlying the deviant examples of (31). If movement has Agree as a precondition, the Superiority effect is derived.

As a consequence, whenever a phrase under suspicion of having undergone movement is heard in its putative α-position (so we cannot be dealing with an instance of pure Agree), Superiority-like effects may be taken as confirming a diagnosis of phrasal movement. One much-studied example is the ability of c-commanding nominal experiencers to block subject-forming phrasal movement to specifier of TP. Rizzi (1986) noted this effect as a constraint on A-movement constructions, as exemplified by (32), where the second example shows Raising to Subject blocked by the intervening dative Experiencer:

(32) **C-command interveners: Blocking movement to subject over a dative: raising with *seems*** (Rizzi 1986; Chomsky 2000)

a. ***no Raising***:

Sembra (a Maria) che Gianni è felice  
seems to Maria that Gianni is happy  
'It seems to Maria that Gianni is happy.'

b. ***Raising***

Gianni<sub>α</sub> sembra (\*a Maria) [\_\_<sub>β</sub> essere felice].  
Gianni seems to Maria be.INF happy  
'Gianni seems to Mary to be happy.'

Though most English speakers do not detect a comparable effect with *seems*, Hartman (2012) has pointed out that other instances of movement to subject in English show this effect quite directly (and offers an account of how the English *seems* construction circumvents the effect):<sup>10</sup>

(33) **C-command interveners: movement to subject blocked by dative: passivized ECM verbs**

- a. ***no movement***: It was claimed (to Bill) that John had stolen the art.
- b. ***movement***: *John*<sub>α</sub> was claimed (**\*to Bill**) [\_\_<sub>β</sub> to have stolen the art].

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<sup>10</sup> Examples (32)-(42) are all taken from Hartman (2012), with minor adaptations to serve the present discussion.

- (34) **C-command interveners: movement to subject blocked by dative: raising with *promise***  
 a. **no movement:** John promised (the students) [PRO to perform well]  
 b. **movement:** *John's performance* <sub>$\alpha$</sub>  promised (**\*the students**) [ <sub>$\beta$</sub>  to be the best].
- (35) **C-command interveners: movement to  $\nu$ P-internal position ("Raising to object") blocked by Experiencer (but not by adverb):**  
 a. **no movement:** Mary proved (to me) that John was a liar.  
 b. **movement over adverb:** Mary proved *John* <sub>$\alpha$</sub>  (yesterday) [ <sub>$\beta$</sub>  to be a liar].  
 c. **movement over dative:** Mary proved *John* <sub>$\alpha$</sub>  (**\*to me**) [ <sub>$\beta$</sub>  to be a liar].

If movement to subject position is a result of nominal features ( $\phi$ -features) on T that act as probes, and if the dative phrases in these examples also bear these features, the dative will count as the closest goal. That is why it behaves as a c-command intervener for movement from  $\beta$  to  $\alpha$  in the asterisked examples of (33)-(35). Since agreement with T is a necessary precursor to movement that forms a specifier of TP, the absence of an Agree relation between features of T and the nominal in  $\beta$  in these examples is what makes movement from  $\beta$  to  $\alpha$  impossible.

For the constructions seen in (33)-(35), there is little controversy about the general correctness of analyses that posit phrasal movement to the specifier of TP from the  $\beta$ -positions indicated. Selectional properties and related tests of the sort discussed in standard textbooks all converge on an analysis in terms of phrasal movement. These constructions behave uniformly in other ways as well. For example, they show no sign that movement has proceeded successive-cyclically through any A-bar position like the escape hatch in specifier of CP (through which *wh*-movement has been shown to proceed, as mentioned above). Full CPs appear to act as absolute domination interveners for movement in Raising and passive constructions. (The embedded clause from which a nominal raises in such constructions, for example, is never introduced by a complementizer.) Likewise, parasitic gaps, a phenomenon that diagnoses A-bar movement, are never licensed along the path of movement in constructions like (33)-(35). The widespread association of these properties with  $\phi$ -feature-driven movement has led some linguists to propose that this kind of movement is uniformly impossible from an A-bar  $\beta$ -position (the so-called "ban on improper movement").

For at least one other English construction with superficial similarities to those in (33)-(35), however, there is more controversy: *Tough* movement. Additional research by Hartman (2009; 2012) resolves some parts of the controversy in a way that neatly illustrates the use of  $\alpha\beta$ -properties like c-command intervention as a diagnostic for phrasal movement.

Like raising to subject constructions, *Tough* movement involves a relation between a nominal in subject position and a gap in an embedded infinitival clause, alternating with a nearly synonymous construction in which an expletive occupies a subject position and the gap is filled:

- (36) ***Tough* movement as phrasal movement to specifier of TP?**  
 a. It will be easy [to talk about this book].  
 b. This book will be easy [to talk about \_\_\_\_].

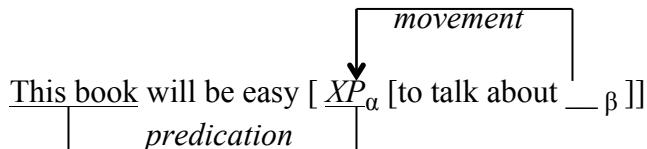
We might immediately conclude that this construction is just another instance of  $\phi$ -feature-driven phrasal movement to the specifier of TP — were it not for an array of respects in which the construction behaves quite unlike garden-variety instances of movement to specifier of TP, and more like constructions that involve movement to an A-bar position (e.g. specifier of CP). As (37a-b) shows, the gap in a *Tough* movement construction may be separated from its filler by a full CP boundary, but shows island effects in the presence of other domination interveners. Furthermore, and as (37c) shows, parasitic gaps are licensed by the construction:

(37) ***Tough* movement as A-bar movement within the embedded infinitive?**

- a. *subject separated from gap by CP boundary...*  
This book will be easy [to forget that you've already talked about \_\_\_ in class].
- b. *...but not by an island boundary (cf. (30a))*  
\*This book will be easy [to challenge the claim that you've already talked about \_\_\_ in class].
- c. *parasitic gaps licensed*  
This book will be easy [to talk about \_\_\_ without actually finishing \_\_\_].

Observations like these led Chomsky (1977b; also Chomsky 1982, 45) to conclude that there is indeed phrasal movement in *Tough* constructions — but only as far as the specifier of the embedded infinitival CP, an A-bar position. The element that moves, indicated as  $XP$  in (38), is phonologically null, and some other process (dubbed *predication* by Chomsky, p.103) is responsible for linking the main-clause subject to the null  $XP$  in specifier of the embedded CP:

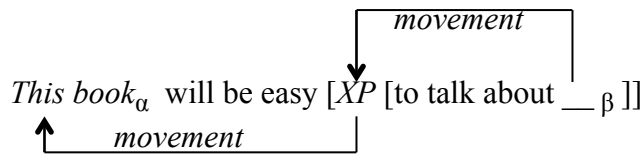
(38) ***Tough* movement: analysis of Chomsky (1977b)**



This proposal accounts for the fact that the gap within the infinitival clause behaves like the  $\beta$ -position of an A-bar movement with properties similar to *wh*-movement<sup>11</sup>, while not abandoning the idea that movement from an A-bar position to an A-position is impossible. Crucially, it fails to account for the paradigm in (36), and the fact that both the  $\alpha$ - and  $\beta$ -positions of  $XP$  in (38) are phonologically null. Alternatively, one might imagine that it is the main-clause subject that raises to the specifier of CP, and that a second step of  $\phi$ -feature-driven movement raises it to the specifier of TP:

<sup>11</sup> Chomsky (1977b) actually identified the process as *wh*-movement, with obligatory deletion of the *wh*-phrase. The reasons for the obligatoriness of the deletion rule remained unknown.

(39) ***Tough movement: alternative analysis***



It is precisely in such situations that an independent  $\alpha\beta$  diagnostic of phrasal movement is most welcome. Hartman (2009; 2012) has argued that just such evidence supports an analysis like (39) over analyses like (38).

Chomsky (1973; reprinted 1977a) had already noted that some kind of intervention effect constrains *Tough* constructions in English. If we construct paradigms analogous to (36) in which infinitival *to* is preceded by one or more sequence of the form *for DP*. Chomsky discovered that one occurrence of *for DP* is acceptable with or without *Tough* movement, but a second occurrence of *for DP* blocks *Tough* movement (despite the acceptability of the corresponding construction with an expletive subject):

(40) **C-command interveners: *for-DP* blocking *Tough* movement (but location of the intervener is unclear)**

- a. It will be easy for the teachers to talk about this book.
- b. This book will be easy for the teachers to talk about \_\_.
- c. It will be easy for the teachers for the students to talk about this book.
- d. \*This book will be easy for the teachers for the students to talk about \_\_.

Because English adjectives like *easy* allow both an experiencer argument introduced by the preposition *for* and an infinitival clausal argument introduced by the preposition *for* (and because the experiencer controls the subject of the infinitival clause when it fails to contain an overt subject), it is unclear from (40a-d) alone whether it is the main-clause experiencer argument or the subject of the embedded clause that blocks *Tough* movement in examples like (40d).

As part of an attempt to analyze *Tough* movement in a manner consistent with his "Specified Subject Condition", Chomsky had suggested that it is the subject of the embedded clause that furnishes the crucial intervener, when phonologically overt (but not when null). Hartman (2009; 2012), however, provides clear evidence against this idea, and in favor of the conclusion that the crucial intervener is the main-clause experiencer argument. When the matrix predicate selects an experiencer argument that is introduced by a preposition other than *for*, for example, there is no ambiguity between the matrix experiencer and a *for-DP* complementizer-subject sequence within the embedded infinitival. When English paradigms analogous to (40) are constructed with such predicates, the main clause experiencer blocks *Tough* movement regardless of the status of the embedded subject:

(41) **C-command interveners: *for-DP* blocking *Tough* movement (unambiguously in the main clause)**

- a. It is important (to Mary) [(for Sue) to talk about this book].
- b. This book is important (\*to Mary) [(for Sue) to talk about \_\_\_\_].
- c. It was very hard (on me) [(for Tom) to give up sugar].
- d. Sugar was very hard (\*on me) [(for Tom) to give up \_\_\_\_].

Similarly, as Hartman also shows (anticipated by Kayne 1981, p. 110), in languages such as French and Italian that do not use 'for' as a complementizer to license an overt subject of an infinitive, the sequence '*for-DP*' in the counterpart of (40a) is unambiguously an argument of the main predicate — and blocks *Tough* movement:

(42) **C-command interveners: French '*for*'-*DP* blocking *Tough* movement (unambiguously in the main clause)**

- a. Il est difficile (pour les chiens) de voir cette couleur.  
it is difficult for the dogs C see this color  
'It is difficult for dogs to see this color.'
- b. Cette couleur est difficile (\*pour les chiens) à voir \_\_\_\_.  
this color is difficult for the dogs C see  
'This color is difficult for dogs to see.'

Hartman notes that the *Tough* movement contrasts seen in (40)-(42) look like the same c-command intervention phenomenon responsible for the contrasts in (32)-(35). If the effect in such examples is a reliable diagnostic of  $\phi$ -feature-driven phrasal movement, then Hartman's observations resolve the mystery of the leftmost arrow in (39). These constructions do indeed show A-bar movement to the embedded specifier of CP — but there is a second step of movement as well:  $\phi$ -feature-driven movement to the subject position of the higher clause.

Just as we hope, independent support for this second step of movement — and for its  $\phi$ -feature-driven A-movement character — comes from its interaction with Binding phenomena. As noted in Pesetsky (1987), a reflexive inside the subject of a *Tough* movement construction may satisfy Principle A by virtue of a  $\beta$ -position within the embedded infinitival clause, as (43a-b) show (cf. (27)). As always, it is important to verify this interpretation of the data by eliminating c-command of the  $\beta$ -position by its would-be antecedent. with the results seen in (43c-d):

(43) **Principle A effects diagnose a  $\beta$ -position for a phrase moved to specifier of TP**

- a. [*This aspect of herself*<sub>*i*</sub>] <sub>$\alpha$</sub>  is easy [ \_\_\_\_ <sub>$\beta$</sub>  for Mary<sub>*i*</sub> to criticize \_\_\_\_ <sub>$\beta$</sub> ].
- b. [*This side of herself*<sub>*i*</sub>] <sub>$\alpha$</sub>  was tough [ \_\_\_\_ <sub>$\beta$</sub>  for John to get Mary<sub>*i*</sub> to deal with \_\_\_\_ <sub>$\beta$</sub> ].
- c. \*[*This aspect of herself*<sub>*i*</sub>] <sub>$\alpha$</sub>  is easy [ \_\_\_\_ <sub>$\beta$</sub>  for [Mary<sub>*i*</sub>'s father] to criticize \_\_\_\_ <sub>$\beta$</sub> ].
- d. \*[*This side of herself*<sub>*i*</sub>] <sub>$\alpha$</sub>  was tough [ \_\_\_\_ <sub>$\beta$</sub>  for John to get Mary<sub>*i*</sub>'s father to deal with \_\_\_\_ <sub>$\beta$</sub> ].

Crucially, despite the fact that these constructions involve A-bar movement within the embedded clause, before the final step of A-movement, the surface subject patterns with A-moved, rather than A-bar-moved, phrases in failing to show Principle C effects that target a  $\beta$ -position within the embedded clause (cf. (28)) — as we might expect, if the final movement step is  $\phi$ -feature-driven movement forming a specifier of TP:

(44) **Principle C effects targeting  $\beta$ -position disappear for a phrase moved to specifier of TP**

- a. [*This aspect of Mary<sub>i</sub>*] <sub>$\alpha$</sub>  is easy [  <sub>$\beta$</sub>  for her <sub>$i$</sub>  to criticize  <sub>$\beta$</sub> ].
- b. [*This side of Mary<sub>i</sub>*] <sub>$\alpha$</sub>  is tough [  <sub>$\beta$</sub>  PRO to get her <sub>$i$</sub>  to deal with  <sub>$\beta$</sub> ].

Recall that Takahashi (2006) and Hulsey & Takahashi (2009) suggested an account of the absence of  $\beta$ -position Principle C effects for A-movement that relied on the possibility of Late Merge of N to D — subject to the condition that NP merge no later than the latest point at which it can participate in Case-licensing. This proposal would in fact allow the NP content of DPs like *this aspect of Mary* to merge late enough to escape Principle C in examples like (44a-b). If so, not only do several diagnostics converge on analysis (39), but we also can make some sense of why these diagnostics work (the most useful and desirable state of affairs, of course).

These discoveries leave many details of the analysis of *Tough* constructions still open. Hartman's conclusions might entail that *Tough* movement is a counterexample to the proposed ban on movement from an A-bar position to an A-position (in which case we must determine the circumstances under which such movement is possible), or one might entertain one of a number of more complex proposals discussed by Hartman (2009) (building on Hicks 2003, further developed in Hicks 2009). Unless some other set of circumstances can mimic the effect of c-command intervention in phrasal movement and the Binding pattern seen in (43)-(44), however, we may conclude from our diagnostic test that the correct analysis of the *Tough* construction must involve  $\phi$ -feature-driven phrasal movement to the specifier of TP as well as A-bar movement within the embedded clause — supporting hypothesis (39).

### 4.3 More complex hierarchical $\alpha\beta$ -properties

Any well-established property of phrasal movement may in principle be used as a diagnostic (though how conclusively depends on the logic of the property in question). Among the hierarchical  $\alpha\beta$ -properties attributed to phrasal movement, there are some whose status remains more controversial than those discussed above, because they are less well-established and logically more complex — but which might nonetheless be useful additions to the armamentarium of a researcher in search of a few more ways to test for phrasal movement. For reasons of space, I will make only the briefest mention of one example that illustrates a logical possibility not represented by the diagnostics already discussed.

In our presentation of  $\alpha\beta$ -properties of phrasal movement, we have focused on circumstances in which a single intervening element (a domination or c-command intervener) blocks the formation of a movement path from  $\beta$  to  $\alpha$ . We might also imagine a situation in which the intervener that blocks phrasal movement is itself a second instance of phrasal

movement.<sup>12</sup> Such a situation has been identified in constructions that involve "remnant movement", which have been argued to obey what is often called the *Müller-Takano Generalization*, a constraint of just this sort.

Remnant movement describes a situation in which a smaller phrase moves out of a large phrase, and the larger phrase itself subsequently moves to a still higher position, as illustrated in (45). I use  $\alpha\alpha$  and  $\beta\beta$  to indicate the  $\alpha$ - and  $\beta$ -positions of the remnant movement step:

(45) **Remnant topicalization fed by scrambling in German**

(Den Besten & Webelhuth 1990)

*step 1: DP scrambling from infinitival complement clause*

... hat keiner [das Buch] <sub>$\alpha$</sub>  [ [  <sub>$\beta$</sub>  zu lesen] versucht].  
has nobody-NOM the-ACC book to read-INF tried

*step 2: Remnant topicalization of the infinitival complement clause*

[  <sub>$\beta$</sub>  zu lesen] <sub>$\alpha\alpha$</sub>  hat keiner [das Buch] <sub>$\alpha$</sub>  [  <sub>$\beta\beta$</sub>  versucht].  
to read has nobody the book tried  
'To read the book nobody tried.'

Takano (1994) and Müller (1996, 1998) observed independently that although remnant movement like the topicalization in step 2 of (45) may be fed by a process such as scrambling in step 1, remnant movement is impossible when the two steps involve the same type of movement. The pattern of remnant movement exhibited in (46a), for example, in which both movements are instances of scrambling, is impossible. Example (46b) shows that non-remnant scrambling of the infinitival clause is fine (as is step 1 without step 2), so it is clear that step 1 is what blocks step 2 in (46a):

(46) **Remnant scrambling blocked if fed by scrambling in German (Müller 1996)**

a. *the blocked derivation*

*step 1: DP scrambling from infinitival complement clause*

... dass keiner [das Buch] <sub>$\alpha$</sub>  [ [  <sub>$\beta$</sub>  zu lesen] versucht] hat.  
that nobody-NOM the-ACC book to read-INF tried has

'...that nobody has tried to read the book.'

*step 2: Remnant scrambling of the infinitival complement clause*

\*.... dass [  <sub>$\beta$</sub>  zu lesen] <sub>$\alpha\alpha$</sub>  keiner [das Buch] <sub>$\alpha$</sub>  [  <sub>$\beta\beta$</sub>  versucht] hat.

b. *step 2 without step 1*

...dass [das Buch zu lesen] <sub>$\alpha$</sub>  keiner [  <sub>$\beta$</sub>  versucht] hat].

The generalization may be stated in the terms of this chapter as in (47):

<sup>12</sup> Another logical possibility would be a situation in which an instance of phrasal movement *facilitates* another relation. Gračanin-Yüksek's (2007, 2008) Constraint on Sharing (COSH) nicely illustrates this possibility in the domain of coordination.



(47) **Müller-Takano Generalization (stated in  $\alpha\beta$  terms)**

If a phrase Y has moved from  $\beta$  to  $\alpha$  and X dominates  $\beta$ , but not  $\alpha$ , X may undergo movement from  $\beta\beta$  to a still higher position  $\alpha\alpha$  (i.e. remnant movement) only if  $\alpha\alpha$  and  $\alpha$  are positions of distinct types.

Kitahara (1994) has offered an explanation for the effect, according to which that the Müller-Takano generalization is a "domination" counterpart of the c-command-based Superiority Effect illustrated in (31) and discussed above. In configurations that illustrate the Superiority Effect, three facts are crucial: (A) a phrase X c-commands Y, (B) both X and Y have the right featural content to serve as goals for a probe F, and (C) F chooses X rather than Y, since X is closer. In environments that illustrate the Müller-Takano generalization, as Kitahara points out, we see exactly the same set of circumstances, except that X *dominates* Y, rather than c-commanding it. If scrambling is a normal instance of phrasal movement, triggered by the properties of a null head H, then the main clause of (46a) must contain two instances of H, a higher instance to the left of the subject, and a lower instance to its right. For step 2 of (46a) to be possible in the first place, the infinitival clause must bear the right features to serve as a goal for any instance of H. If this is so, however, and if Kitahara's proposal is correct, the infinitival clause should have already served as the goal for the lower instance of H, rather than its subconstituent *das Buch*. By contrast, in (45), two different types of heads are involved in the two steps of movement. The fact that the infinitival clause has the right features to serve as a goal for the head that triggers topicalization (and verb-fronting as well) does not entail that it must also bear the right features to undergo scrambling. Consequently, the remnant-movement derivation is possible.

If Kitahara is correct, therefore, the Müller-Takano Generalization reflects a simple, general locality condition that terminates a probe's search for a goal as soon as possible, a condition whose properties we might (tentatively) call empirically well-supported and conceptually well-understood. For these reasons, it is well-suited to serve as an item in the linguist's toolkit of diagnostics for phrasal movement. Note, however, that it is a somewhat specialized member of that toolkit, suitable for simultaneously testing whether two putative instances of movement are both instances of movement — but only when we have reason to believe that they exemplify movements of the same type.

## 5 Phonologically relevant diagnostics for movement

### 5.1 Phonologically relevant $\beta$ -properties

As noted earlier, when the phonology interprets a syntactic structure in which a phrase X has moved from  $\beta$  to  $\alpha$  — and we are dealing with the kind of movement called *overt* — X is linearized according to rules that apply to  $\alpha$ , rather than  $\beta$ . For overt movement, then, linearization provides straightforward evidence for the reality of the  $\alpha$ -position. At the same time, it has repeatedly been argued that some phonological processes take cognizance of the  $\beta$ -position as well. Arguments of this sort in fact played a prominent role in the early development of the theory of movement assumed in this chapter (as sketched in section 2), by arguing that

when an element moves from  $\beta$  to  $\alpha$ , the  $\beta$ -position continues to contain syntactic material throughout the derivation (the so-called "trace theory of movement rules").<sup>13</sup>

King (1970), for example, (cf. Lakoff 1970 and Baker & Brame 1972) noted that the use of contracted auxiliary verbs in English is blocked in a number of environments, including what he described as "the empty place left in the surface syntax of a clause when a relativized noun phrase or some similar element is lifted out and transferred to initial position", i.e. its  $\beta$ -position:

(48) **Contracted auxiliary blocked before  $\beta$ -position**

- a. I wonder *where* <sub>$\alpha$</sub>  Mary is \_\_\_ <sub>$\beta$</sub>  today.
- b. \*I wonder *where* <sub>$\alpha$</sub>  Mary's \_\_\_ <sub>$\beta$</sub>  today.

It has also been suggested occasionally that a segmentally null  $\beta$ -position may count as a phonological hiatus, blocking or enabling phonological processes that would behave differently in the absence of this hiatus. Selkirk (1972), for example, argued that certain null elements — including  $\beta$ -positions of overt movement — block the otherwise optional resyllabification of a preceding word-final consonant with a following word-initial vowel, known as *liaison*. About a decade later, a debate raged in the pages of *Linguistic Inquiry* as to whether there is a phonological process that converts the sequence *want to* into *wanna* as in (49a), and whether this process is blocked when a  $\beta$ -position intervenes between *want* and *to*, as indicated in (49b), just as it is when an overt element intervenes in examples like (49c) (Chomsky & Lasnik 1977, Postal & Pullum 1978, Chomsky & Lasnik 1978, Pullum & Postal 1979, Postal & Pullum 1982; also Lightfoot 1977, Jaeggli 1980, Pesetsky 1982, 257-263, Pullum 1997):

(49) **"Want to → wanna" (allegedly) blocked by  $\beta$ -position**

- a. Do you want [to go home]? → Do you wanna go home?
- b. *Who* <sub>$\alpha$</sub>  do you want [\_\_\_ <sub>$\beta$</sub>  to go home]? → \*Who do you wanna go home?
- c. Do you want [Mary to go home] → \*Do you wan- Mary -na go home?

Most excitingly, perhaps, Bresnan (1971) argued that when a phrase X moves from  $\beta$  to  $\alpha$ , sentence-level stress may be assigned to that element in its  $\beta$ -position by the normal rules that govern sentence-level stress — and remain with the element when it is pronounced in its  $\alpha$ -position. If one posits, as Bresnan did, an analysis of relative clauses in which the head noun is moved from a  $\beta$ -position within the relative clause, then the general rule of English that assigns main stress to the most embedded (usually rightmost) element in a clause will stress the verb *leave* in (50a), but the noun *plans* — in its  $\beta$ -position — in (50b). Crucially, though *plans* in (50b) is linearized in its  $\alpha$ -position after movement, it retains the stress assigned to its  $\beta$ -position, in Bresnan's analysis. (Stress is indicated with small caps.)

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<sup>13</sup> What was left open during this debate was the nature of the material that remains in the  $\beta$ -position — in particular, whether an unpronounced  $\beta$ -position is voided of some of its content in the syntax and, if so, how much material is deleted. In the view taken here, supported by evidence in the previous sections, nothing is deleted. The same element simultaneously occupies the  $\beta$  and  $\alpha$  positions after movement occurs.

(50) **Stress assigned to  $\beta$ -position retained in  $\alpha$ -position**

- a. George has plans to LEAVE.  
'George is planning to leave.'
- b. George has *PLANS* <sub>$\alpha$</sub>  to leave \_\_\_ <sub>$\beta$</sub> .  
'George (an architect, perhaps) has a set of plans that he wants to leave with someone.'  
(cf. George left some PLANS.)                      Bresnan (1971, 258), citing Newman (1946)

It should be clear that the logic of all these findings and proposals can in principal provide us with  $\beta$ -property diagnostics for phrasal movement. If clear evidence from phonological phenomena converges with the kinds of syntax-internal and semantics-relevant diagnostics discussed above in supporting a diagnosis of phrasal movement for a particular construction, the very diversity of this evidence will provide the strongest possible support for that diagnosis. See also Richards (2010, 2011), Ishihara (2007), Kahnemuyipour (2009), Kratzer & Selkirk (2007) for more recent proposals relevant to this discussion.

**5.2 Phonologically relevant linear  $\alpha\beta$ -properties**

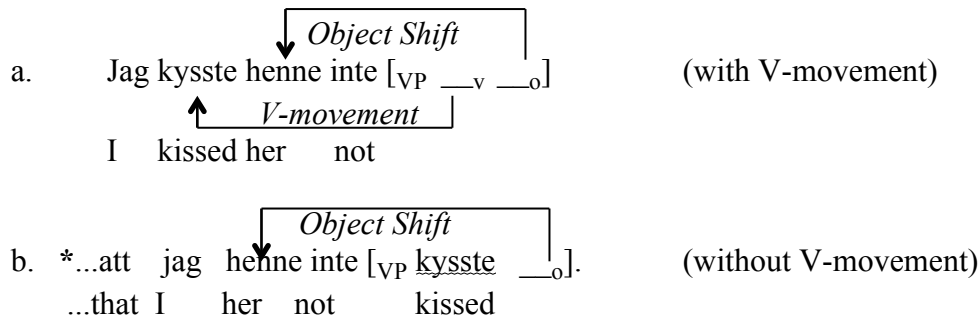
Bresnan's observations discussed above, if correct, provide a way of diagnosing a  $\beta$ -position from phonological evidence found on a phrase linearized in its  $\alpha$ -position. The arguments advanced in Fox & Pesetsky (2005) for "Cyclic Linearization" provide a proposal somewhat similar in spirit that might also be considered an  $\alpha\beta$ -diagnostic. In that paper, we argued that under certain circumstances, both the  $\beta$ -position and the  $\alpha$ -position of an overtly moved phrase send linearization information to the phonology. If these distinct pieces of information are not consistent with each other, the result is an unlinearizable structure, an unusable outcome for the derivation. Crucially, the syntax sends linearization information to the phonology cyclically, each time a "Spell-out domain" is built by Merge. Consequently, the effects of linearization conflicts can diagnose only instances of movement that cross a domain boundary:

(51) **Cyclic Linearization** (Fox & Pesetsky 2005)

- a. The relative precedence of the lexical items of a syntactic structure is communicated to the phonology cyclically, as each Spell-out Domain is fully constructed by Merge.
- b. Ordering contradictions are unacceptable.

The point of interest in the context of this chapter is the " $\alpha\beta$ -property" nature of the effect: linearization of both  $\beta$  and  $\alpha$  matters, and the interaction of their linearizations also matters. Thus, for example, the otherwise obligatory process of *Object Shift* that moves an object pronoun leftward out of VP in the Scandinavian languages may not apply unless the verb also moves in a manner that restores the original linear order "V > Object" — the order established when VP was built and linearized, as required by (51). This is the well-known effect known as *Holmberg's Generalization*:

(52) **Object shift in Swedish blocked unless V-movement restores original V>object linearization**



As Fox & Pesetsky (2005) note, following Holmberg (1998), this is not just a fact about the interaction of Object Shift with verb movement. A similar generalization holds for any element that linearly precedes an object pronoun within VP (such as a particle or indirect object): if Object Shift is to apply to the object pronoun, every element that preceded it within VP must also move, so as to precede it once more in the higher domain. Ko (2005a, 2007) argues at length, for example, that the same generalization governs scrambling in Korean.

If this proposal is correct, then if a linguist observes that an element like the object pronoun in (52a) is heard in an unexpected (plausibly moved) position only when another element such as the verb is also heard in an unexpected (plausibly moved) position, it is reasonable to offer a tentative diagnosis of movement for both displaced elements. The effects of Cyclic Linearization may thus serve as a crucially *linear* and crucially *phonological*  $\alpha\beta$ -diagnostic for movement.

## 6 Phrasal Movement and its Discontents

As we noted early in the chapter, a "diagnostic" is not a special kind of empirical finding or a component of linguistic theory. Instead, the term characterizes a *use* to which a well-supported older finding can be put in when we seek to interpret a newer finding. The more secure we feel about the older finding, the more likely we are to call it a "diagnostic". Repeating our aphorism from the introductory section of this chapter: the only difference between an *argument for X* and a *diagnostic for X* is confidence.

Throughout this chapter, I have written in a spirit of confidence in the very existence of phrasal movement — and in particular the characterization of movement given in in section 2. According to this view, a phrase X is said to have moved from  $\beta$  to  $\alpha$  when it merges first in position  $\beta$  (External Merge) and then merges again in position  $\alpha$  (Internal Merge) — resulting in a syntactic structure within which X occupies both positions. A key feature of this perspective is the fact that  $\alpha$  and  $\beta$  are both quite ordinary syntactic positions, and are governed by the same general laws regardless of whether  $\alpha$  was created by movement or by External Merge. This seems to me to be the simplest possible proposal (or at least a candidate for that honor) that is compatible with the range of phenomena that motivated the discussion in the first place. If this assessment is reasonable, we might have expected the section 2 view of movement to have arisen early in the investigation of the phenomena like those discussed in this chapter — in the late

1950s, perhaps. We might also expect that view of movement to be so attractive that researchers would abandon it only under the most serious empirical or conceptual pressure. In actual fact, however, this view of movement started to be explored surprisingly late in the history of generative syntax, in the late 1990s (Chomsky 2004).<sup>14</sup> Furthermore, it is flatly rejected by several currently prominent schools of syntactic research. Since some of the findings discussed in this chapter are fairly new, and none are universally accepted, it is important to ask whether they should in fact inspire the confidence necessary to earn the designation "diagnostic".<sup>15</sup> A brief consideration of the history of ideas about movement is helpful in this connection.

The attention paid to movement phenomena by generative syntax is a hallmark of modern linguistics that distinguishes it sharply from its structuralist and earlier predecessors. Though the "basic phrase structures" that we now characterize as products of External Merge have some precedent in the "immediate constituents" of structuralist linguistics (Bloomfield 1933, 167; Wells 1947; see Percival 1976), the existence and ubiquity of movement phenomena appears to be a novel discovery of the last half-century. This chronology of discovery (basic phrase structure first, then movement) is strikingly mirrored in the grammatical model to which generative linguists clung during the first three decades of generative grammar, in ways that help explain some of the current theoretical landscape's most puzzling properties.

In particular, standard generative proposals for several decades treated External Merge phenomena and Internal Merge phenomena as products of entirely different components of the grammar — the *base component* and the *transformational component*, respectively (Chomsky 1965), each with its own rule system, each obeying its own laws.<sup>16</sup> Reflecting the chronology of discovery, the rules of the base component applied first, feeding the rules of the transformational component. In every derivation, each syntactic position that the theory of this chapter would attribute to External Merge was created by the rules of the base component before the transformational component created the additional syntactic positions (" $\alpha$ -positions") that we would now attribute to Internal Merge. As the overall logic of phrase structure was clarified in research of the 1960s and 1970s, with the introduction of subcategorization, selection,  $\theta$ -role assignment and X-bar theory (Chomsky 1965; 1975), a coherent and appealing view of "normal phrase structure" emerged that was incorporated into the theory of the base component.

For elements that later underwent movement, this theory of "normal phrase structure" was, in effect, a theory of what I have been calling their " $\beta$ -positions". The set of properties attributable to these element's  $\alpha$ -positions, however, was left an open question for more than a

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<sup>14</sup> Precursors can be found in the earlier work on multidominance cited in section 2, and in some non-derivational models that distinguish  $\alpha$ -positions from  $\beta$ -positions, such as Koster (1978) and especially Brody (1995).

<sup>15</sup> Needless to say, a researcher should *always* ask whether prior findings that get taken for granted in the process of solving a problem actually deserve the confidence invested in them. Challenging received wisdom is a productive way to advance a field, since confidence is sometimes misplaced. Nonetheless, given human finiteness and fallibility, it is also impossible to make progress on any complex problem like the nature of language without placing *some* positive bets, however cautiously, on the validity of certain prior findings. The topic under discussion in this section is nothing more and nothing less than the reasonableness of betting on the existence of phrasal movement. As should be clear, the author of this chapter, at least, considers the odds favorable.

<sup>16</sup> The output of the base component was *Deep Structure* (later called *D-structure*), and the output of the transformational component was initially thought to be *Surface Structure* (later called *S-structure*), but with the discovery of covert movement was extended to *Logical Form* (LF).

decade.<sup>17</sup> Various proposals were advanced concerning the output of movement — but because these element's  $\alpha$ -positions were created by a distinct component of grammar from the component that created their  $\beta$ -positions, there was no particular reason to expect the set of possible  $\alpha$ -positions to look like the set of possible  $\beta$ -positions, or to obey the same laws. At the same time, the positions to which nominals were moved in passive and certain raising constructions were routinely described informally as "subjects", a position assumed to be identical to that in which nominals could also be placed by rules of the base component — triggering the same types of verbal agreement and sharing the same uniqueness property (one subject per clause, in English at least). With a similar informality, syntacticians also referred to other processes as "raising to object" and movement to the possessor position of nominals.

It was not until Emonds (1970), however, that explicit attention was called to the fact that movement of a category X generally has the property that he called *structure preservation*: "the new position of X is a position in which a phrase structure rule [of the base component], motivated independently of the transformation in question, can generate the category X." (p. ii).<sup>18</sup> And even with this discovery in hand, it was almost two decades before Emonds' observation was given its simplest explanation: that the segregation of basic structure building from movement had been a mistake from the very beginning. Such was the force of the standard model that Emonds himself (and the field as a whole) continued to assume a base component that produces movement-free structures that movement rules of the transformational component modify. Emonds framed his findings as a specific technical discovery about the nature of structure-preserving movement: that it is a "substitution" operation that plugs the moved phrase into a placeholder node previously generated in the base component. It was many years before it was finally suggested that the base component and the transformational component might actually produce such similar outputs because they are the same component, and that the single rule *Merge* builds both  $\beta$ -positions and  $\alpha$ -positions.<sup>19</sup> This proposal finally "normalized" the treatment of movement, with the many consequences traced throughout this chapter.

In principle, however, other resolutions of Emonds' puzzle were possible, and in fact served as the springboard for proposals quite different from those supported here. It could be the case that a central premise of structure preservation — that movement exists in the first place — is incorrect. It could be the case that there is no distinction between  $\alpha$ -positions and  $\beta$ -positions: no element ever occupies more than one position in phrase structure. It comes as no surprise on this view that phrases otherwise described as moved occupy (and are pronounced in) the same kinds of positions as their unmoved counterparts, since there is no movement in the first place. This is the approach to movement phenomena called *monotratalism*, which lies at the heart of several schools of syntactic analysis, including *Head-Driven Phrase Structure Grammar* (HPSG), *Lexical-Functional Grammar* (LFG) and others. If there is no distinction between  $\alpha$ -positions and  $\beta$ -positions, the question of structure preservation disappears — but a large family of

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<sup>17</sup> For a summary of the issues, see Lasnik (2000, 59-64).

<sup>18</sup> The only exceptions, Emonds argued, were certain rules restricted to root clauses ("Root Transformations"), a category argued against by Hooper and Thompson (1973) and rules that moved categories smaller than phrases — including much of what would today be considered head movement. See also Emonds (1976).

<sup>19</sup> It should be acknowledged that the transformational component of earlier generative syntax housed processes other than movement, including a wide variety of deletion operations, whose place in the syntactic model of this chapter remains a matter of continued debate.

questions appears in its wake: how to account for phenomena that others have taken to motivate this distinction?

In these approaches, evidence that others have taken to motivate a ubiquitous distinction between  $\alpha$ -positions and  $\beta$ -positions are instead taken to reflect heterogeneous aspects of syntactic structure entirely distinct from traditional phrase structure. Consider, for example, the monostratal treatment of passive first advanced by Freidin (1975) and Brame (1976) — now the standard proposal in LFG (Bresnan 1978, 1982) and HPSG (Sag et al. 2003). In these approaches, a *lexical rule* manipulates the argument structure of verbs that would otherwise appear with active morphosyntax, stipulating that the second argument of an active transitive verb corresponds to the first argument of its passive counterpart. The rules that build phrase structure then map the first argument of verb onto a canonical subject position, regardless of whether the verb is active or passive. The fact that the subject of the passive *would* have been the object of the active has no consequence whatsoever for the phrase structure of the passive. The subject occupies no  $\beta$ -position passive distinct from its  $\alpha$  position.

Consider also the treatment accorded to *wh*-questions in Sag et al.'s HPSG approach to movement phenomena (a descendant of a proposal by Gazdar 1981). Once again, it is denied that a *wh*-phrase that appears in a left-peripheral position within its clause occupies any distinct  $\beta$ -position in phrase structure. Instead, the rules of phrase structure make the structural realization of particular arguments optional. An argument that might otherwise be realized as a direct object nominal sister to V, for example, may be entirely missing from phrase structure. The absence of an argument comes at a cost, however. As a consequence of a rule called the *GAP Principle*, a pointer to the missing argument is entered on a "GAP list" associated with the feature-structure of the verb, and the necessity of a c-commanding "filler" for this gap follows from other rules and constraints on the syntax.

Proposals like these do indeed eliminate the puzzle of structure preservation. If the subject of a passive clause and the *wh*-phrase in a question never occupy any phrase-structure position besides the one we hear, there is no need to even discuss  $\beta$ -positions and  $\alpha$ -positions. The distinction does not exist. Should the existence of movement-free approaches of this sort shake our confidence in the very existence of "diagnostics for phrasal movement"? Have we spent this chapter diagnosing a disease that does not exist?

The answer to this question rests, of course, with you, the reader — but the *logic* by which you should reach your answer should be clear. Since a diagnostic is just an argument put to work, the collection of diagnostics for phrasal movement presented in this chapter is also a collection of arguments that phrasal movement exists in the first place. Taken together, they constitute converging evidence that a phrase that we hear in position  $\alpha$  may also occupy a distinct phrase-structural position  $\beta$ , that  $\beta$  is as real as  $\alpha$ , and that it conforms to the same laws of syntax. If the same selectional properties, the same principles of anaphora and the same laws of syntax-phonology interaction hold of X in both its  $\alpha$ -position and its putative  $\beta$ -position — and if principles of locality and consistent linearization appear to make sense of an array of facts, on the crucial assumption that there is a homogeneity to syntactic gaps and their fillers, and that both are phrase-structurally represented — then we have convergent evidence for the two positions, and phrasal movement exists.

If you agree, and these arguments inspire some appropriate level of confidence, then they may indeed be used as *diagnostics* for phrasal movement. If you recognized yourself in the tormented syntactician with whom we began this chapter, you may relax a little, and start using the diagnostic manual in (5) to good effect. Your syntax-induced misery (some of it, at least) is now a thing of the past.

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