

# Right-Node Raising and Delayed Spellout<sup>\*</sup>

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## 1 Introduction

Across the Board (ATB) movement is generally subject to the same islands that constrain regular *wh*-movement:<sup>1</sup>

- (1) \***Who**<sub>*i*</sub> did [a man who loves *t*<sub>*i*</sub> dance], and [a woman who hates *t*<sub>*i*</sub> go home]?

In (1) a *wh*-element is extracted from subjects within both conjuncts. Not surprisingly, the result is ungrammatical. We observe a systematic exception to this pattern: if the gaps corresponding to the extracted element are rightmost within both conjuncts, extraction is possible even across certain islands:

- (2) **Which book**<sub>*i*</sub> did [John meet the man who wrote *t*<sub>*i*</sub>], and [Mary meet the woman who published *t*<sub>*i*</sub>]?

There is another construction involving coordination, Right-Node Raising (RNR; Ross, 1967), that has long been known to be insensitive to conjunct-internal islands:

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<sup>1</sup>For expository convenience we mark conjuncts with brackets, and material that is shared between conjuncts with boldface. We indicate leftward movement with indexed traces, and rightward movement with underscores. None of this should be taken to have any theoretical import.

- (3) [John met the man who wrote \_] and [Mary met the woman who published \_] **the recent bestseller about bats.**

In addition to island insensitivity, RNR shares with (2) the property that rightmost within each conjunct is a gap associated with the shared material. We will argue that these similarities are not accidental, and that (2) is an instance of RNR that has fed a subsequent operation of *wh*-movement. We will further argue that the interaction of RNR and *wh*-movement allows us to settle certain open questions about the structure of RNR. The remainder of this section reviews some of the known empirical puzzles of RNR and their implications on possible syntactic analyses. In section 2 we present our new observations about the interaction of RNR and *wh*-movement. Combined with the facts discussed earlier, we show that the *wh*-movement facts argue for a multiple-dominance structure, an idea originally proposed by McCawley (1982) and defended more recently by Wilder (1999).

While multiple-dominance is required in order to account for the empirical facts, it cannot do so without a clear theory of locality. We develop our proposal, presented in section 3, within the framework of the Minimalist Program, where locality, in the form of cyclic spellout, is a central notion, and where multiple-dominance, in the form of re-merge, has been recently used as an account of movement. We observe, however, that current re-merge accounts of movement can be considerably simplified by taking complete dominance, rather than dominance, as the relevant notion for spellout. Significantly, this simplification also makes the correct predictions about the interaction of RNR, *wh*-movement, and islands.

After describing how multiple-dominance structures are formed and spelled out, we turn to the question of how such structures should be linearized. In addition to general problems regarding the linearization of multiple-dominance structures, RNR exhibits a puzzling mix of strict linear-order requirements and extreme freedom. We show that as long as each node keeps track of the linearization of all the terminals that it dominates, we can use a weak linearization procedure that makes possible the required freedom, while the strict linearization requirements are taken care of by the independently needed spellout mechanism. The full pattern of RNR, with and without *wh*-movement, is now predicted, including a surprising and previously unnoticed fact about potentially ungrammatical RNR rescued by *wh*-movement.

## 1.1 RNR puzzles: a short survey

The literature contains three types of RNR analyses. ATB Movement (Postal, 1974; Sabbagh, 2007), phonological ellipsis (Hartmann, 2000; Wilder, 1997) and multiple dominance (McCawley, 1982; Wilder, 1999). In order to choose among the three, we need to answer two questions. The first question is whether RNR depends on the existence of a syntactic host for the shared material (RN<sup>2</sup>) above the conjunction, or whether it remains *in situ*. The answer to this question will distinguish between the movement approach (which assumes a conjunction external position) and both phonological ellipsis and multiple dominance approaches which do not require such position. To distinguish among the latter two approaches we need to answer the question of whether RNR is structurally identical to fully pronounced coordination structure, or whether there is a syntactic difference between the two. The phonological ellipsis account assumes that RNR and full coordination structures are syntactically identical, in the sense that each conjunct contains a separate instance of the RN, pronounced once in RNR and multiple times in full coordination. The multiple dominance account assumes that RNR is syntactically distinct from full coordination, since in RNR there is only one instance of the RN in the structure.<sup>3</sup>

As mentioned in the introduction, our answer to the first question will be that the RN remains *in situ*, and our answer to the second question will be that there is only one instance of the RN, shared between the two conjuncts. In the rest of this section and in section 2 we will present data which address the two questions above. We will see that RNR is not sensitive to conditions on either leftward or rightward movement, posing a challenge to the idea that the RN moves above coordination; we will also see that the RN has scopal interactions that are unexpected under the view that each conjunct has a distinct instance of the RN. In section (3.3.2) we will return to an important linear restriction on RNR that argues for a similar perspective on the two questions here.

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<sup>2</sup>Also known as Target, Pivot, and Right Node. We will usually refer to it as RN.

<sup>3</sup>Movement accounts may differ regarding the answer to the second question, depending on the assumptions the particular account makes with respect to the general mechanism underlying ATB movement.

### 1.1.1 Islands

RNR is insensitive to islands for leftward movement such as relative clause islands:

- (4) [John met a man who wrote —], and [Mary met a man who published —] **a recent book about bats.**

Significantly, as mentioned above, ATB *wh*-movement does not share this property. Consider again (1) above, repeated here as (5):

- (5) \* **Who<sub>i</sub>** did [a man who loves  $t_i$  dance], and [a woman who hates  $t_i$  go home]?

The contrast between (4) and (5) suggests that RNR is not simply a mirror image of ATB. We return to this point when we discuss *wh*-extraction from RNR in section 2.

### 1.1.2 The Right-Roof Constraint

Ross (1967) noticed that movement to the right is bounded by a highly restrictive locality condition. Heavy NP Shift (HNPS) demonstrates this restriction, often referred to as the Right-Roof Constraint (RRC).<sup>4</sup> A heavy NP may be dislocated to the right (6), but it can only cross local material on its way. In this example, the intervening *yesterday* originates within the same clause, and perhaps even the same verb phrase, as the heavy NP *the new headmaster*. When the intervening material is less local (7), HNPS is blocked.

- (6) Sam saw — yesterday **the new headmaster.**  
(7) \* John claimed that Sam loves — yesterday **the new headmaster.**

As with the islands discussed above, RNR is not subject to the RRC:

- (8) [John claims that Sam loves —], and [Mary claims that Sam hates —] **the new headmaster.**

In (8), each conjunct contains two clauses, and the shared material is related to the most embedded position in each conjunct. A movement analysis for RNR has to explain how it is possible for rightward movement to escape two CPs (and at least as many cyclic nodes) in such cases.

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<sup>4</sup>Ross first used the term *upward boundedness*, introducing the term *Right-Roof Constraint* in subsequent lectures. (Háj Ross and Alex Grosu, p.c.)

### 1.1.3 Non-constituents and RNR below the word level

The insensitivity of RNR to islands and bounding conditions has been taken to suggest that the movement analysis is incorrect, and that the RN remains *in situ*. Additional support for this direction comes from an observation by Abbott (1976) that RNR can affect non-constituents (9). Moreover, as noted by Booi (1985), RNR sometimes operates below the word level (10), further complicating the task of a movement analysis.

- (9) [John borrowed —], and [Mary stole —] **large sums of money from the Chase Manhattan Bank.**
- (10) [His theory under—], and [her theory over—]**generates.** (*Example from Sabbagh, 2007*)

One *in situ* approach to RNR analyzes the RN as appearing in each conjunct but being pronounced only within the rightmost one. All other instances undergo some kind of ellipsis. Such an approach has been argued for by Swingle (1995), Wilder (1997), and Hartmann (2000), among others. Island insensitivity, under this approach, is no longer a challenge since no movement takes place. Example (9) is explained if we assume that non-constituents and word parts can be deleted.

### 1.1.4 Exceptional scope

Treating the raising of the RN as illusory obviates many of the locality problems raised by RNR. However, evidence from Quantifier Raising discussed by Sabbagh (2007) suggests that the movement characterization of Ross (1967) is more accurate, at least as far as interpretation is concerned. Sabbagh notes that a quantifier in the RN can scope over elements that are too high for it if no RNR takes place.

- (11) a. [John knows a man who speaks —], and [Mary knows a woman who wants to learn —] **every Germanic language.** ( $\exists \succ \forall, \forall \succ \exists$ )
- b. [John knows a man who speaks every Germanic language], and [Mary knows a woman who wants to learn every Germanic language]. ( $\exists \succ \forall, * \forall \succ \exists$ )
- c. John knows a man who speaks every Germanic language. ( $\exists \succ \forall, * \forall \succ \exists$ )

In (11a) the universal quantifier in the RN can scope over the indefinites *a man* and *a woman* inside the conjuncts. Pronouncing ‘every Germanic language’ within each of the conjuncts (11b) does not allow the universal to scope over the indefinites. The tensed clauses inside each conjunct prevent QR, just as they would in a single conjunct version (11c).<sup>5</sup>

Other interpretive effects that seem to favor a movement analysis over an *in situ* approach are the ability of distributive and cumulative elements to take both conjuncts within their scope. The prominent reading of (12a) is that where the tunes that John hummed were different from the tunes that Mary whistled. Repeating ‘different tunes’ within each of the conjuncts blocks this reading, as in (12b), which can only mean that the tunes that John hummed were different from each other and that the tunes that Mary whistled were different from each other. Similarly, the prominent reading of (13a) is that where the total of what John borrowed and of what Mary stole amounts to 3000 dollars. This would be true, for example, if each took 1500 dollars. Overt substitution blocks this reading, and (13b) can only mean that each of them took 3000 dollars.

- (12) a. [John hummed \_], and [Mary whistled \_] **different tunes**.  
b. [John hummed different tunes], and [Mary whistled different tunes].
- (13) a. [John borrowed \_], and [Mary stole \_] **a total of 3000 dollars from the Chase Manhattan Bank**.  
b. [John borrowed a total of 3000 dollars from the Chase Manhattan Bank], and [Mary stole a total of 3000 dollars from the Chase Manhattan Bank].

### 1.1.5 Summary

RNR is both less local than movement usually is and can also target objects that do not undergo movement otherwise. At the same time, RNR exhibits semantic effects that are surprising if there is no syntactic difference between RNR and full coordination. In the following section we will present new data from the interaction of RNR with *wh*-movement. We will argue that the fact that RNR can sometimes feed *wh*-movement is an argument against

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<sup>5</sup>The focus of the current paper is the effect of delayed spellout on the phonological interface, and we will ignore the interpretative effects of RNR in much of what follows. In Bachrach and Katzir (2007) we propose an account of scope facts such as (11) that makes use of similar effects of delayed spellout on interpretation at the semantic interface.

the claim that the syntactic structure of RNR is identical to the structure of full coordination. Though at first sight it might seem that these new data support the existence of a syntactic position for the RN outside the conjunction, we will present further data which argue against this conclusion.

## 2 New observations: RNR and leftward dislocation

### 2.1 RNR can feed *wh*-movement

Consider again (4), repeated below:

- (14) [John met a man who wrote —], and [Mary met a man who published —] **a recent book about bats.**

We observe (15) that a *wh*-phrase corresponding to the RN in (14) can appear on the left, even though each of the conjuncts contains a relative clause island (16).

- (15) **Which book<sub>*i*</sub>** did [John meet the man who wrote —], and [Mary meet the man who published —] *t<sub>i</sub>*?
- (16) \* Which book<sub>*i*</sub> did John meet the man who wrote *t<sub>i</sub>*?

We describe (15) as *wh*-movement of the RN in (14). Our conclusion that the availability of RNR in (14) underlies the exceptional movement in (15) is supported by the fact that configurations where RNR is not available (17a) also do not allow for leftward ATB movement (17b):

- (17) a. \* [a man who loves — danced], and [a woman who hates — went home] **a book by Kafka**
- b. \* Which book<sub>*i*</sub> did [a man who loves *t<sub>i</sub>* dance], and [a woman who hates *t<sub>i</sub>* go home]?

In addition to extracting the whole RN (as in 15), it is also possible to extract only part of it, leaving overt material on the right:

- (18) **Which animal<sub>*i*</sub>** did John say that Mary knew [a man who wrote —], and [a woman who published —] **an encyclopedia article about *t<sub>i</sub>***?

(18) contains both RNR and *wh*-extraction from within the RN. Here, too, the conjuncts contain relative clause islands, making it unlikely that the *wh*-phrase was extracted before RNR applied to the remnant.

The interaction of RNR and *wh*-movement is particularly puzzling for the ellipsis account (where RNR is assumed to be syntactically identical to full coordination) since for them the island insensitivity of RNR is only illusory. By relegating RNR to the PF interface, they manage to avoid a modification of the general island and locality conditions of the grammar. But if RNR takes place after the syntactic derivation, it is hard to understand why (syntactic) *wh*-movement is exempt from certain islands precisely in those configurations that correspond to an RNR configuration. (18) also provides a straightforward argument against a linearization-based account of locality, where RNR is analyzed as rightward movement of a rightmost element, avoiding islands by virtue of being string vacuous. A relevant case here is the analysis of Sabbagh (2007), who uses the linearization mechanism of Fox and Pesetsky (2005) together with a constraint on available landing sites on the right to derive the bounding conditions on RNR. The RN is linearized on the right edge of its immediate cyclic node, and then waits for the root to be merged. In the absence of intervening material, the RN can then right-adjoin to the root, ignoring all islands along the way. Crucially, in order to capture the RER, the linearization of the RN to the right of the rest of all other conjunct-internal material is fixed. Nothing, after the first cycle is over, can move the RN to the left. But this is exactly what happens to the *wh*-phrase in (18).

## 2.2 Islands that never go away

In the last section, we have presented data that argue against a linearization based movement account of RNR. These data leave open the question of whether a different movement account could be made to work. In this section we present data that argue against movement accounts more generally. In recent minimalist literature, it is often observed that locality in grammar has two sources. One source are syntax-internal conditions such as Relativized Minimality (and related conditions on search). The other source are interface conditions which filter out certain derivations at spell-out. Forshadowing the discussion of our proposal in the next section, we take relative clause islands to be spellout islands, while effects such as Superiority are Relativized Minimality islands. A movement account of RNR would probably try to explain island bleeding (15,18) as the consequence of the RN having moved to a position above the conjunction.<sup>6</sup> However, if

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<sup>6</sup>Or being base-generated there, as proposed to us by N. Chomsky p.c.



the RN is syntactically above the conjunction, leftward extraction should, in principle, be exempt not only from spellout islands, but also from Relativized Minimality islands internal to the conjuncts. This, however, is not the case. RNR does not bleed Relativized Minimality violations within the conjunction:

- (19) [Who cooked  $\_$ ] and [who ate  $\_$ ] **the black beans**?  
 (20) \*What<sub>*i*</sub> did [who cook  $t_i$ ] and [who eat  $t_i$ ]?  
 (21) **Which book**<sub>*i*</sub> did [John meet the man who wrote  $\_$ ], and [Mary meet the man who published  $\_$ ]  $t_i$ ?

It is not clear how a movement account of RNR can distinguish between Relativized Minimality islands and spellout islands.

### 2.3 Islands reappear

We saw above that RNR is insensitive to islands, and that this insensitivity is (sometimes) inherited by subsequent overt movement (15) and covert movement (11a). Those examples, repeated here as (21) and (22) respectively, involve only islands within the conjuncts.

- (21) **Which book**<sub>*i*</sub> did [John meet the man who wrote  $\_$ ], and [Mary meet the man who published  $\_$ ]  $t_i$ ?  
 (22) [John knows a man who speaks  $\_$ ], and [Mary knows a woman who wants to learn  $\_$ ] **every Germanic language**. ( $\exists \succ \forall, \forall \succ \exists$ )

As soon as we add an island above the coordination, it will restrict the movement of the RN just as it would restrict any other element.

- (23) \***Which animal**<sub>*i*</sub> does John know a reporter who made famous [a man who published  $\_$ ] and [a woman who illustrated  $\_$ ] **a book about**  $t_i$ ?  
 (24) Some student made the claim that [John can speak  $\_$ ], and [Mary can write  $\_$ ] **every Germanic language**. ( $\exists \succ \forall, * \forall \succ \exists$ )

The relative clause modifying *a reporter* in (23) blocks the overt *wh*-extraction of the RN. The embedded tensed clause in (24) and the complex NP island containing it prevent the RN from taking scope over the existential quantifier.<sup>7 8</sup>

<sup>7</sup>As mentioned above, the details of how the scope facts follow from the current framework are presented in Bachrach and Katzir (2007).

<sup>8</sup>The contrast between the insensitivity of RNR to islands below coordination and its sensitivity to islands above coordination is a problem not only for ATB and *in situ* analyses of RNR, but also for analyses in other frameworks. Categorical Grammars, for example, have offered accounts of RNR (Steedman, 1987; Oehrle, 1990; Morrill, 2002)

## 2.4 Interim conclusion

In the introduction we presented two main structural questions that we wanted to answer:

- (25) a. Does RNR depend on an additional attachment site for the RN above conjunction (as in movement accounts)?
- b. Are there separate instances of the RN for each attachment site (as in PF-deletion accounts; the alternative is to attach the same instance multiple times into separate positions)?

The new data presented in this section allow us to answer both questions to the negative, thus narrowing down the range of possible analyses. Recall that one of the main obstacles facing movement accounts was the insensitivity of RNR to islands and other bounding conditions. To our knowledge, the only movement account to offer a solution to this problem is that of Sabbagh (2007), where the RN avoids islands by never having to cross overt phonological material after being linearized on the right. The observation the RNR can feed *wh*-movement is a counter-example to the most direct prediction of this approach. In addition, if RNR provided an attachment site above conjunction, we would expect all conjunct internal locality conditions to disappear, contrary to fact. These observations add to the familiar facts from the introduction regarding the possibility of using non-constituents and word parts as the RN. We conclude that there is, in general, no higher attachment site above conjunction.

As for the implications that the *wh*-movement facts have for the second question, notice that if there are separate instances of the RN, then an unpronounced copy in one conjunct allows a pronounced copy in a second conjunct to move across islands in a way that is unavailable for conjunction with two pronounced copies. It is not clear what kind of syntactic mechanism could account for this behavior. One of the main attractions of the PF-deletion approach was that it avoided the problem of island insensitivity by denying that movement takes place. The evidence from *wh*-movement lessens the appeal of this approach. This evidence adds to the other problems for the multiple-instance approach mentioned in the introduction, such

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that are interestingly different from those discussed here. But there, too, a global choice must be made: either islands interfere with composition, in which case no type will be created for the conjuncts and conjunct-internal islands will not allow RNR, or they do not interfere, in which case islands outside coordination will also cause no problem. Either way, the contrast cannot be accounted for.

as the exceptional scopal effects and the lack of sloppy identity. We conclude that RNR does not involve multiple instances of the RN.

### 3 Proposal

Combining our answers to the two structural questions in (25) we arrive at a structure in which the RN occurs once and is attached multiple times. However, while multiple-dominance is the only approach that is compatible with the empirical facts, it does not, on its own, derive them. In particular, it is not clear why the fact that the RN is shared by the two conjuncts should exempt it from conjunct-internal islands. We will suggest that the islands to which the RN is immune are related to spellout, and that the special behavior of the RN with respect to those islands is the result of the following principle:

- (26) Syntactic material is spelled out only when it is completely dominated

The RN is shared between the two conjuncts. By (26), it will not be spelled out until the height of the coordination. This means that locality effects that depend on spellout will not apply to the RN until that point.

As we will shortly see, (26) will not be specific to RNR; rather, it will be the result of general considerations regarding the construction of syntactic representations, the encoding of locality, and the mapping of structures onto linear strings. All of these considerations arise independently once multiple dominance is assumed. Our system, which we describe below, addresses these issues. We will propose to derive RNR from the interaction of three processes: a) structure formation, b) cyclic spellout, and c) linearization. We develop our analysis within the Minimalist framework, which already contains the means for the construction of multiple-dominance structures, discussed in section 3.1, and which incorporates cyclicity in the form of phases, discussed in section 3.2. While our empirical concern remains RNR, much of the discussion will focus on general architectural issues, and in particular on *wh*-movement and locality within a multiple-dominance system. We show that current Minimalist treatments of long-distance movement can be simplified by making spellout sensitive to a properly defined notion of complete dominance, and that the pattern of interaction between RNR and *wh*-movement described in section 2 can be derived without making any further assumptions. Our third component, linearization, which we present in

section 3.3, is a highly local process that applies independently of spellout. Each node in the structure must satisfy certain linearization well-formedness constraints with respect to the nodes that it dominates.

### 3.1 Merge

The basic structure-building operation within the Minimalist Program (Chomsky, 1995) is MERGE, by which two syntactic objects,  $X$  and  $Y$ , are combined to form a new syntactic object,  $Z$ . For the simple case in which  $X$  and  $Y$  are disjoint, this is nothing more than a tree-forming operation. We follow Chomsky (2004) in referring to this case as EXTERNAL MERGE:

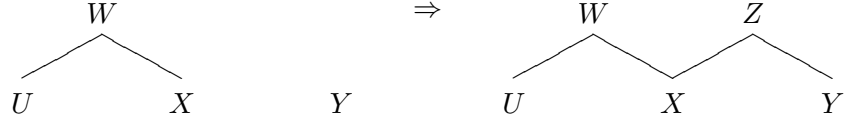
$$(27) \quad X, Y \Rightarrow \begin{array}{c} Z \\ \swarrow \quad \searrow \\ X \quad Y \end{array}$$

If MERGE is not restricted to disjoint syntactic objects, we may re-merge an object with a containing object. This operation, named INTERNAL MERGE in (Chomsky, 2004), has been used to capture movement-like phenomena:

$$(28) \quad \begin{array}{c} Z \\ \swarrow \quad \searrow \\ X \quad Y \end{array} \Rightarrow \begin{array}{c} W \\ \swarrow \quad \searrow \\ \begin{array}{c} Z \\ \swarrow \quad \searrow \\ X \quad Y \end{array} \end{array}$$

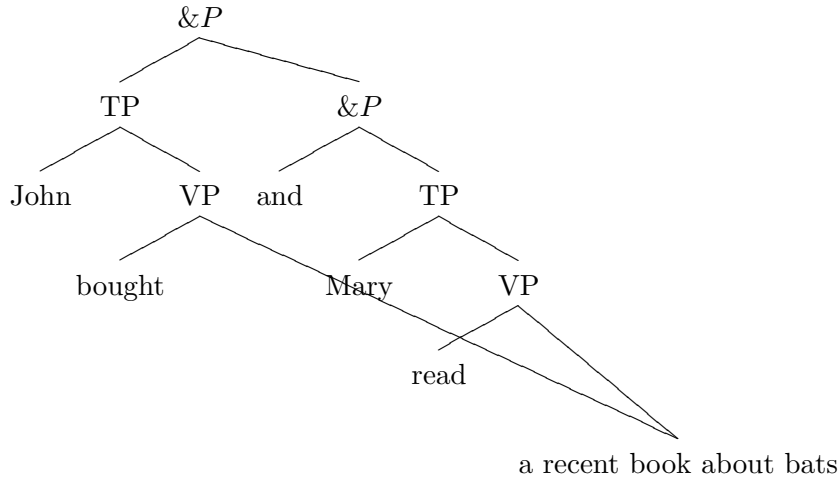
Applying INTERNAL MERGE results in structures where some nodes have more than one mother, a structural representation of movement that has already been proposed by Engdahl (1986). Other multiple-dominance structures have been used by McCawley (1982) to account for various discontinuous phenomena, including RNR. Within current Minimalism, it has been noticed by Citko (2005) that if MERGE is a general structure-forming operation, it should apply not only between disjoint objects (EXTERNAL MERGE) or between an object and a containing object (INTERNAL MERGE), but also across structures. We follow Citko in referring to this form of MERGE as PARALLEL MERGE:

(29)



PARALLEL MERGE makes possible a Minimalist version of the multiple-dominance of RNR proposed by McCawley (1982, 1988), and argued for more recently by Wilder (1999):

(30) John bought and Mary read a recent book about bats



## 3.2 Phases and Spellout

### 3.2.1 Spellout and External Merge

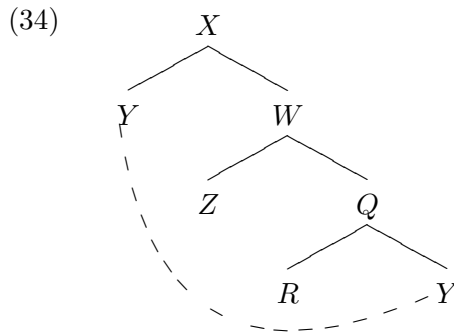
Current Minimalism (Chomsky, 2001, 2004) posits a cyclic architecture (Bresnan, 1971), in which the construction of syntactic structure is interspersed with non-syntactic operations, such as phonological or semantic interpretation. In Minimalist terms, syntactic derivations are broken down into *phases*. At the end of each phase, an operation called *spellout* sends the current syntactic structure to the phonological interface.<sup>9</sup> Phases are mediated by *phase heads*, syntactic categories that trigger the spellout of their sisters. Structure that has been spelled out cannot be modified by subsequent operations. The relevant definitions are summarized below:

<sup>9</sup>It is less clear what the result of spellout is on the semantic side. We do not deal with semantic interpretation in this paper, and so we will ignore the semantic results of spellout here.

- (31) **Spellout Domain (First Version):** The spellout domain of a node  $X$  is the set of all nodes dominated by the sister of  $X$ .
- (32) **Phase Head (First Version):** A designated syntactic object that triggers spellout of its spellout domain after all of its specifiers have been merged. The phase head itself and all of its specifiers (the *edge* of the phase) are not spelled out until the next phase.
- (33) **Spellout:** A syntactic structure transferred to the interfaces is mapped onto an object that cannot be modified by further operations. In the case of the phonological interface, the resulting immutable object is a string.

### 3.2.2 Some concerns

Spellout as just described is relatively straightforward to implement as long as structure is limited to trees, the output of EXTERNAL MERGE. The tree is traversed in some order, usually the order in which it is constructed, and each terminal node is spelled out when its mother is spelled out. For copy theories of movement some additional machinery is required in order to ensure that only one copy will be pronounced within a chain. The re-merge theory of movement obviates the need for such mechanisms, since a chain consists of only one object. However, as has been observed (Frampton, 2004; Fitzpatrick and Groat, 2005), re-merge makes it difficult to define the relevant notion of spellout in the first place. Since under re-merge there are no indexed copies or traces, the information required to distinguish the different occurrences of a node is no longer contained within the node itself:



In (34), a schematized version of *wh*-movement, we would like to say that the higher occurrence of  $Y$ , standing for the *wh*-element, is pronounced while the lower occurrence is not. This is not possible by talking about  $Y$  alone. If  $Z$  is a phase head, it will trigger the spellout of the set of terminals dominated by its sister,  $Q$ , including  $Y$ . Under a copy theory of movement we

could mark the lower copy of  $Y$  as phonologically null (cf. Chomsky, 2004). Re-merge makes this impossible. There is only one occurrence of  $Y$  in the structure, and if it is marked as phonologically null it will not be pronounced anywhere at all. The fact that multiple dominance complicates the notion of occurrence is not necessarily a serious problem, and proposals such as (Frampton, 2004) have offered ways to address the issue. Our only point here is that such proposals provide additions to the theory. The Minimalist framework on its own does not offer a solution.

A second concern regarding cyclic spellout is that it involves a counter-cyclic operation, at least as formulated by Chomsky (2001, 2004). In (34), for example, the phase head  $Z$  merges  $Y$  as its specifier and spells out its sister  $Q$ . In order to avoid spelling out  $Y$  in its lower position, the order of operations must not be changed:  $Q$  can be spelled out only after the tree has been extended by re-merging  $Y$ . As with the notion of occurrence, the counter-cyclic behavior of spellout can be addressed in any of a variety of ways. All things being equal, however, it would be reassuring to have a system where the issue does not arise in the first place.

### 3.2.3 Redefining Spellout Domains

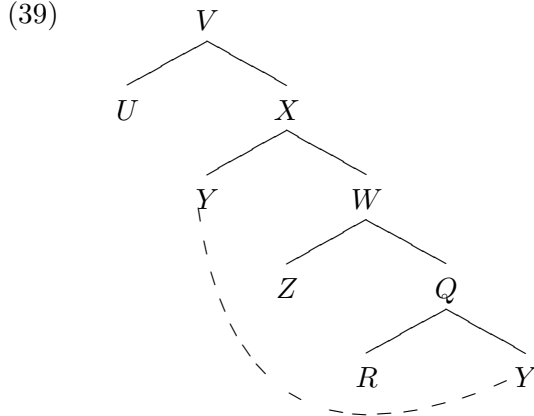
As a first step towards integrating re-merge and cyclic spellout we propose the following definitions for complete dominance and for spellout domains:<sup>10</sup>

- (35) **Complete Dominance:** A node  $X$  completely dominates a node  $Y$  iff (a)  $X$  is the only mother of  $Y$ , or (b)  $X$  completely dominates every mother of  $Y$ . The set of nodes completely dominated by  $X$  will be called the *Complete Dominance Domain* of  $X$ , written  $CDD(X)$ .
- (36) **Spellout Domain (Revised):** The spellout domain of a node  $X$  is  $CDD(X)$ .
- (37) **Phase Node (replaces Phase Head):** A designated syntactic object that triggers spellout of its spellout domain.<sup>11</sup>
- (38) **Spellout (Repeated from (33)):** A syntactic structure transferred to the interfaces is mapped onto an object that cannot be modified by further operations. In the case of the phonological interface, the resulting immutable object is a string.

<sup>10</sup>A different definition for complete dominance is offered by Wilder (1999).

<sup>11</sup>For the purposes of this paper we will assume that  $vP$  and  $CP$  are the only relevant phases.

The new definitions have the immediate result of making spellout a cyclic operation. Going back to the schematized *wh*-movement example in (34), notice first that we now have  $X$  as a phase node instead of  $Z$  as a phase head. This is a minor modification. The significant change is that under the new definition,  $Y$  is not completely dominated by  $X$ :  $X$  is not the only mother of  $Y$ , since  $Q$  is also a mother of  $Y$ ; furthermore,  $X$  does not dominate every mother of  $Y$ , since  $X$  does not dominate itself. Consequently,  $Y$  is not in  $CDD(X)$ , and when  $X$  is spelled out,  $Y$  will not be affected. More generally, our new definition exempts re-merged specifiers, but not uniquely merged specifiers, from spellout by their mothers.<sup>12</sup> Notice that as soon as we merge a new object as a sister of  $X$  in (34),  $Y$  becomes completely dominated by the new root:



If  $V$  is a phase node,  $Y$  will now be subject to spellout.

### 3.2.4 Successive cyclic movement

Consider the following case of long-distance *wh*-movement:

- (40)  $[_{CP_2} \text{What}_i \text{ did Mary}[_{vP_2} t_i \text{ say}[_{CP_1} t_i \text{ that John }[_{vP_1} t_i [_{VP} \text{ate } t_i?]]]]]$

*What* is initially merged as the object of the embedded verb *ate*. At this point it is completely dominated by the verb phrase, but since  $VP$  is not a phase, this has no spellout effect. The first phase is the embedded  $vP_1$ , and *what* is re-merged at its daughter, triggering spellout. As described above, a

<sup>12</sup>This raises several questions with respect to the interaction of spellout and predicate-internal subjects. We will have to assume that subjects are first merged at a position that is higher than any  $vP/VP$ -internal phase node, though we will have nothing to say about what that position is.



re-merged daughter is not completely dominated by its mother and is therefore not part of its spellout domain. Consequently, *what* is not spelled out by  $vP_1$ . We will discuss the results of spellout in more detail below. For our immediate purposes we only need the part of (38) that says that spellout creates a string that cannot be altered later on. In the current case, the string will consist of ‘ate’ alone. At the next few merges, *what* is again completely dominated, but since the next phase has not yet been reached, no spellout takes place. The next phase is the embedded  $CP_1$ . Here again *what* is merged as a specifier, allowing it to escape spellout, which now results in the string ‘that John ate’. Similar application of re-merge and spellout happens in the matrix  $vP_2$  and  $CP_2$ .

Notice that by our definitions *what* is not completely dominated at the root level. A potential concern at this point is that *what* will never be spelled out. A possible explanation is that the whole sentence is the daughter of a higher root node, which triggers one final spellout. In that case, since *what* is now completely dominated, it will be spelled out. An alternative is to say that while not being completely dominated allows an element to escape spellout, it does not force it to do so. We do not have data that would suggest which option is correct.<sup>13</sup>

We can also now block successive cyclic movement when an intermediate position is occupied. Consider the following ill-formed sentence:

$$(41) \quad * [_{CP_2} \text{What}_i \text{ did John } [_{vP_2} t_i \text{ know a man } [_{CP_1} \text{who } [_{vP_1} t_i \text{ ate } t_i?]]]]$$

As before, *what* is initially merged as the sister of *ate*, and escapes the first spellout, at the embedded  $vP_1$ , by being re-merged at its specifier. At the second phase, however, *who* is merged as the first specifier of  $CP_1$ , triggering spellout. The phase node  $CP_1$  completely dominates all the mothers of *what*, and so by our definitions it completely dominates *what*. This, in turn, means that *what* is part of the spellout domain of  $CP_1$ . Spellout of  $CP_1$  results in the string ‘who what ate’. Since strings are immutable (33), no subsequent operation will be able to extract *what* from its current position and cause it to appear in the position required for (41). Notice that we do not need any constraint on the number of possible specifiers in order to derive the blocking of *what* by *who*. All we require is the general restriction to binary branching, which makes it impossible for the two *wh*-words to be daughters of the same phase node. This ensures that the phase node that is

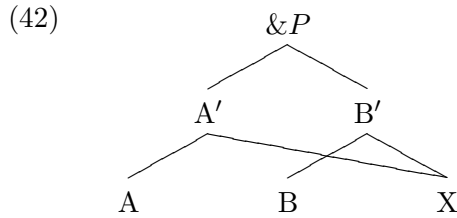
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<sup>13</sup>Similar considerations arise in the framework of Chomsky (2001, 2004).

the mother of *who* will completely dominate *what*.<sup>14</sup>

### 3.2.5 Application to RNR

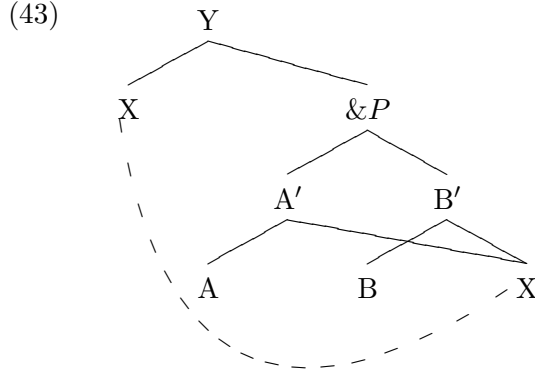
Our derivation of long-distance *wh*-movement in the examples above involved successive cyclic movement. In a way, though, this was an accident. All that was needed for long-distance dislocation to work was that the *wh*-element remain only partially dominated during each of the intermediate phases. Successive re-merge into phase specifiers was one way to do that, but our analysis predicts that any other operation that prevents the *wh*-element from being completely dominated at spellout would license the same kind of long-distance result. RNR allows us to test this prediction. Recall our multiple-dominance structure for RNR:



The first step in generating the structure in (42) is an application of PARALLEL MERGE that combines *X* with *A* to form *A'* and with *B* to form *B'*. At this point, *X* is not completely dominated by anything in the structure. This means that even if *A'* or *B'* are phases, *X* will not be spelled out. The first occasion on which *X* becomes completely dominated is when *A'* and *B'* combine to form *&P*. If *&P* is not a phase, and if it has a specifier position, *X* can be re-merged above both conjuncts:

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<sup>14</sup>A question that arises at this point is how multiple *wh*-movement can be accounted for. We just saw that in our system at most one constituent can escape spellout. This makes the prediction that if two (or more) *wh*-elements are to move outside of an embedded clause, they must first cluster together to form one constituent. Discussing the implications of this prediction for instances of long-distance multiple *wh*-movement lies outside the scope of this paper.



Crucially, spellout inside the conjuncts cannot freeze  $X$ . We therefore expect islands below the conjunction to be transparent for extraction from RNR. As we have seen above, this is indeed the case:

- (44) **Which book<sub>*i*</sub>** did [John meet the man who wrote  $\_$ ], and [Mary meet the man who published  $\_$ ]  $t_i$ ?

Consider now the effect of islands above conjunction.  $X$  in (42) is completely dominated by  $\&P$ . At the next phase,  $X$  will be spelled out unless it is re-merged as a daughter of that phase node. The same will apply for every subsequent phase. If  $X$  cannot be re-merged to one of these phase nodes, it cannot be extracted further. Above conjunction, then, we expect island effects to reappear. Again, this prediction is confirmed:

- (45) a. **Which book<sub>*i*</sub>** did John say that he met [the man who wrote  $\_$ ], and [the woman who published  $\_$ ]  $t_i$ ?
- b. \***Which book<sub>*i*</sub>** does John know a reporter who made famous [a man who published  $\_$ ], and [a woman who published  $\_$ ]  $t_i$ ?

### 3.2.6 Interim summary

We have seen that the combination of cyclic spellout and re-merge, under their current formulations in the literature, gives rise to certain difficulties. Re-merge allows multiple occurrences for a single object, requiring special care in the discussion of what gets pronounced where. Successive cyclic movement requires a counter-cyclic spellout operation. We solved these problems by making cyclic spellout sensitive to the notion of complete dominance we have defined.

By our new definition a multiply-merged object is not completely dominated by any of its mothers, which makes re-merged specifiers available for subsequent operations. This obviated the need for a counter-cyclic definition of spellout. The task of specifying where an object is spelled out was relegated to the phonological interface: strings can be concatenated but not internally changed, so once two objects are spelled out next to each other, they cannot be re-ordered or separated by future spellout operations. The choice of occurrence is a by-product of this interface condition, the definition of multiple dominance, and the timing of spellout. One further factor in determining where an object is pronounced is the linearization component, described in detail in the next section.

Finally, and most importantly, we saw how our definitions predict that multiply-dominated elements will be available for re-merge even in the absence of movement-like operations. We noticed that this is exactly the pattern of interaction between RNR and *wh*-movement observed in (2). Missing at this point is the specification of ordering within any particular phase. This will require a more detailed discussion of the linearization of syntactic structures, to which we now turn.

### 3.3 Linearization

Linearizing two objects,  $A$  and  $B$ , with respect to each other is often implemented by requiring every element in  $A$  to be ordered in a certain way with respect to each element in  $B$ . The ordering of choice is usually strict precedence (Kayne, 1994; Chomsky, 2004), written here as  $<$ :

- (46) STRICT LINEARIZATION  
 If  $A$  is linearized before  $B$  then  $\forall a \in A. \forall b \in B. a < b$

Multiple dominance poses an immediate problem for this definition. If  $A$  and  $B$  share an element  $X$ , ordering  $A$  before  $B$  will result in  $X$  being ordered strictly before itself. This predicts, for example, that any instance of *wh*-movement will give rise to a linearization contradiction, as in (47). A similar problem arises with respect to RNR, as in (48).

- (47) a. **What<sub>i</sub>** did John eat **What<sub>i</sub>**  
 b. **What**  $\not<$  **What**
- (48) a. [John bought  $\_\$ ] and [Mary sold  $\_\$ ] **books about bats**.  
 b. **books about bats**  $\not<$  **books about bats**

To resolve the linearization conflict in (47), a standard solution is to state that when one position of a re-merged element c-commands another position of the same element, the two positions are exempt from (46) with respect to each other. While this kind of solution does not solve the problem of multiple-dominance of the PARALLEL MERGE type, as in (48), it can be extended to such cases by requiring an additional movement (or re-merge) of the shared material to a position c-commanding both *A* and *B*. If only the highest occurrence is taken into account for linearization, as assumed by Nunes (2004); Citko (2005), no contradiction arises. As we have seen, however, there are many reasons to reject a movement analysis for RNR.

A way to reconcile (46) with multiple dominance while maintaining an *in situ* approach to RNR has been developed by Wilder (1999), who proposes to exempt from the linearization of *A* any element not completely dominated by *A*.<sup>15</sup> We will not be able to discuss Wilder’s proposal in any detail in this paper. The proposal predicts correctly many of the properties of RNR; as noticed by Sabbagh (2007), however, it also makes the incorrect prediction that the RN can sometimes be non-rightmost within its conjunct.<sup>16</sup> In particular, the following is predicted to be grammatical:

- (49) \* [A man who loves — sang a song], and [a woman who hates — read a book] **the new headmaster**.

The ungrammaticality of (49) suggests that excluding elements from linearization is incorrect, and that the well-formedness of the ordering of *A* and *B* depends on all the elements within them, including elements that are not completely dominated.

### 3.3.1 Reflexive linearization

We believe that the incompatibility of multiple-dominance and (46) is fundamental. Rather than trying to find a better method to exempt elements from linearization, either in the configuration of INTERNAL MERGE or in that of PARALLEL MERGE, we propose to weaken the linearization principle itself. As we will see, the resulting system will capture both kinds of configurations, as well as their interaction. Informally speaking, we will replace the total ordering requirement in (46) with a condition on the edges of the

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<sup>15</sup>Wilder’s definitions are different from ours, but the difference does not affect the current point.

<sup>16</sup>We will have more to say about the linear conditions in RNR shortly.

linearized objects only, and we will avoid the ordering violation in (47) and (48) by replacing the irreflexive  $<$  in (46) with its reflexive version  $\leq$ :

- (50) a. **What<sub>i</sub>** did John eat **What<sub>i</sub>**  
b. **What**  $\leq$  **What**
- (51) a. [John bought  $\_$ ] and [Mary sold  $\_$ ] **books about bats**.  
b. **books about bats**  $\leq$  **books about bats**

More formally, we separate linearization into two well-formedness conditions. The first condition concerns the well-formedness of linearization within each node. We represent the information about linearizing a node  $X$  by associating  $X$  with a list of nodes,  $\langle x_1, \dots, x_n \rangle$ , which we refer to as the *D-list* of  $X$ . The list contains all the terminal nodes that  $X$  dominates and nothing more. The possible D-lists of a node are determined compositionally by the D-lists of its daughters: if  $X$  is a terminal node, and its lexical content is  $x$ , the D-list of  $X$  is  $\langle x \rangle$ ; if  $X$  has daughters, the D-list of  $X$  is determined by a function that maps positions on the D-list of the daughter nodes of  $X$  onto positions in the D-list of  $X$ . Below we will see the details of how D-lists are constructed in several simple cases. Multiple occurrences of a single terminal node are allowed, but only for nodes that are not completely dominated by  $X$ , using the same notion of complete dominance as before (35). We define the condition as follows:

- (52) LINEARIZATION WELL-FORMEDNESS CONDITION
  - a. The D-list for a node  $X$  has all the terminals dominated by  $X$  as members, and only them
  - b. If  $y \in CDD(X)$  then  $y$  appears on the D-list of  $X$  exactly once<sup>17</sup>

While (52) allows multiple occurrences of elements that are not completely dominated, the availability of such multiple occurrences will be limited. The reason is that, as mentioned above, the D-lists for non-terminal nodes are the image of a function from the positions on the D-lists on the daughter nodes. This means that every occurrence of an element on the D-list of a mother has to have at least one corresponding position on some daughter D-list.

The mapping from the D-lists of the daughters to the D-list of the mother is further constrained by the weakened linearization condition hinted to above. The first half of the condition (53a) involves the replacement of the universal

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<sup>17</sup>We use (52b) to ensure that the D-list for  $X$  induces a linear ordering on  $CDD(X)$ .

condition with two existential ones, and the replacement of the strict  $<$  with the reflexive  $\leq$ : it requires that the left edge of the left daughter reflexively precede the left edge of the right daughter, and that the right edge of the left daughter reflexively precede the right edge of the right daughter. The second half of the condition (53b) is more standard. It requires that the elements of the D-list of a daughter node will stay in their original order when mapped onto the D-list of a mother node.<sup>18</sup>

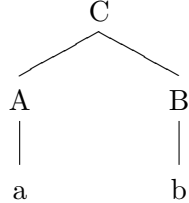
(53) LINEARIZATION MAPPING CONDITION

In ordering  $A = \langle a_1, \dots, a_m \rangle$  to the left of  $B = \langle b_1, \dots, b_n \rangle$ , written  $A \bullet B$ , the following must hold:

- a. EDGE ALIGNMENT:  $a_1 \leq b_1$  and  $a_m \leq b_n$
- b. CONSERVATIVITY:  $a_1 \leq a_2 \leq \dots \leq a_m$  and  $b_1 \leq b_2 \leq \dots \leq b_n$

Before discussing the predictions of these linearization conditions for multiple-dominance structures such as *wh*-movement and RNR, it will be helpful to observe their consequences for structures that do not involve multiple-dominance. First, notice that linearization is unambiguous for atomic objects. If  $A$  consists of a single element  $a$ , and if  $B$  consists of a single element  $b$ , the only way to order  $A$  before  $B$  is by mapping them to an object where  $a$  precedes  $b$ :

(54) Linearizing atomic objects:  $\langle a \rangle \bullet \langle b \rangle \Rightarrow \langle a, b \rangle$



The ordering of  $a$  before  $b$  satisfies EDGE ALIGNMENT: the left edge of  $A$  is  $a$ , and it is linearized to the left of  $b$ , the left edge of  $B$ ; similarly, the right edge of  $A$  is  $a$ , and it is linearized to the left of  $b$ , the right edge of  $B$ . Ordering  $a$  to the right of  $b$  would have violated EDGE ALIGNMENT. CONSERVATIVITY

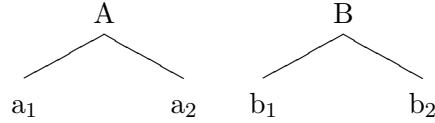
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<sup>18</sup>Under its present formulation, (53) makes it difficult to get rid of multiple occurrences of material that is not completely dominated. Once a D-list is formed with two non-adjacent occurrences of the same element  $\alpha$ , conservativity (53b) will prevent them from being mapped onto a D-list with only one occurrence of  $\alpha$ . As soon as complete dominance is reached, such a D-list will be ruled out by (52b). This problem will get in our way in derivations such as (61) below, and we will then suggest a slight modification to (53) that will make such derivations possible.

is trivially satisfied in our example:  $A$  and  $B$  are atomic, and so nothing can change in their internal ordering. The two conditions of (52) are similarly satisfied: the D-list for each node contains exactly the terminals dominated by it –  $A$  linearizes  $a$ ,  $B$  linearizes  $b$ , and  $C$  linearizes  $a$  and  $b$  – and every element that appears in a D-list appears there exactly once. Consequently, every D-list induces a linear order over its elements. Condition (52) would rule out a configuration where  $A$  and  $B$  above are mapped onto  $C$  with anything other than one occurrence of  $a$  and of  $b$ . For example, the D-list  $\langle a, b, c \rangle$  is excluded since it includes terminals not dominated by  $C$ , and the D-list  $\langle a, a, b \rangle$  is excluded since it has two occurrences of  $a \in CDD(C)$

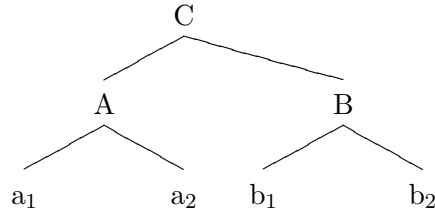
If  $A$  and  $B$  are not atomic, more mappings are possible. Consider, for example, the following linearization configuration:

(55) Linearizing complex objects:



As in the case of atomic objects, concatenating the contents of  $A$  to the left of the contents of  $B$  is possible. The edges of the two daughters are aligned correctly, the internal ordering within each daughter is preserved, and all the relevant linearization relations are linear orderings:

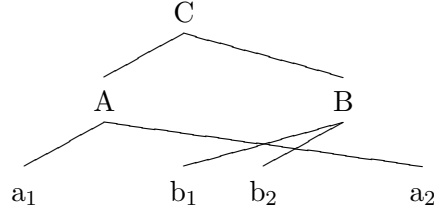
(56)  $\surd$  Concatenation:  $\langle a_1, a_2, b_1, b_2 \rangle$



Next, notice that the linearization conditions rule out wrapping of the elements of one daughter around the elements of its sister. Such a configuration would violate **EDGE ALIGNMENT**:

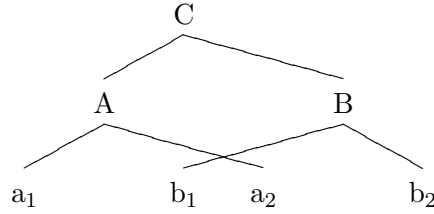


(57) \* Wrapping:  $\langle a_1, b_1, b_2, a_2 \rangle$



Finally, our conditions make possible the interleaving of the elements of  $A$  with those of  $B$  as long as the edges are aligned correctly:

(58)  $\surd$  Interleaving:  $\langle a_1, b_1, a_2, b_2 \rangle$



This last point might be seen as a cause for concern. After all, interleaving is not normally considered a possible outcome of combining two syntactic objects. Notice, however, that we use our linearization conditions in a system that includes a cyclic spellout mechanism. Under normal conditions, by the time two complex objects are merged together, at least one of them has already undergone spellout. Assume, for example, that  $A$  in (58) above has been spelled out before the merger of  $A$  with  $B$ . Recall that the output of spellout is a string, in this case  $\langle a_1 a_2 \rangle$ , which is an immutable object. While interleaving in the syntax is licensed, the output of the next spellout will contain the substring  $\langle a_1 b_1 a_2 b_2 \rangle$ . This result cannot be obtained without modifying the previous output,  $\langle a_1 a_2 \rangle$ , and the attempt to modify an immutable object will crash the derivation.<sup>19</sup>

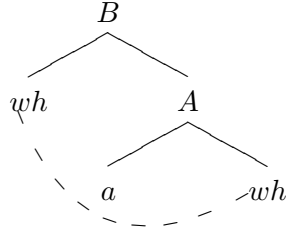
<sup>19</sup>In addition to categories such as  $vP$  and  $PP$ , which are treated here as designated spellout nodes, one may want to consider various configurational notions of spellout. Danny Fox (p.c.) suggests a condition that forces spellout whenever multiple linearizations would otherwise arise. Alternatively, complex specifiers and adjuncts can be thought of as configurational spellout domains. A proposal along different lines, suggested to us by Adam Albright (p.c.), is to embed the linearization within a competition framework, where interleaving is usually ruled out by markedness. We leave the investigation of these directions for future work.

### 3.3.2 Linearizing multiple-dominance structures

We have seen how our linearization conditions (53) and (52) account for the possible linear orderings of disjoint objects. The motivation behind our change from  $<$  to  $\leq$ , however, came from multiple-dominance structures, of both the INTERNAL MERGE and the PARALLEL MERGE kinds. We are now in a position to test the predictions of the new definitions for these cases. We start by looking at *wh*-movement.

Simple *wh*-movement will have the following schematic form, where multiply dominated material is written within parentheses:

$$(59) \quad < wh > \bullet < a, wh > \Rightarrow < (wh), a, (wh) >$$



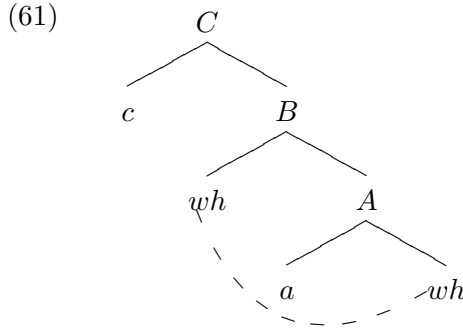
The D-list of  $B$  is  $< wh, a, wh >$ , which contains two occurrences of *wh*. We need to show that both of the linearization conditions, (52) and (53), are satisfied. The reason that *wh* can occur twice in the D-list for  $B$  without violating (52) is that *wh* is not completely dominated by  $B$ : it has been re-merged as the daughter of  $B$ , which means that  $B$  is not the only mother of *wh* and that it does not completely dominate every mother of *wh*. Consequently, by definition (35), *wh* is not completely dominated by  $B$ .  $CDD(B) = \{a\}$ , and  $a$  has only one occurrence in the D-list, satisfying (52). As to (53), since we are linearizing  $X = < wh >$  to the left of  $Y = < a, wh >$ , we need to check two things:

- (60) a.  $\leq$  holds between the left edge of  $X$  and the left edge of  $Y$ , as well as between the right edge of  $X$  and the right edge of  $Y$
- b. Conservativity holds

$X = < wh >$  is atomic, which means that its two edges are identical. In this case, both are mapped onto the leftmost position in  $< wh, a, wh >$ , the D-list for  $B$ , and that position is to the left of where the edges of  $Y = < a, wh >$  are mapped to. With respect to conservativity, since  $X$  is atomic we only need to check  $Y$ . By mapping  $Y = < a, wh >$  onto the two rightmost positions of  $< wh, a, wh >$ , the D-list for  $B$ , we preserve the original ordering within  $Y$ . Notice that the appearance of *wh* in both positions in  $< wh, a, wh >$

was crucial for (53): the leftmost position made possible the satisfaction of edge-alignment with respect to the left edge of  $Y$ , and the rightmost position made possible the satisfaction of conservativity in  $Y$ . The appearance of  $wh$  in two positions, in turn, was made possible by the fact that it was not completely dominated by  $B$ : if it were completely dominated, (52) would be violated. Summing up, re-merging an element in a c-commanding position allows reorganization of linear order by making the re-merged element only partially dominated.

Consider now the next step in the derivation of long-distance  $wh$ -movement from (59). A new element,  $c$ , is merged to  $B$  in (59) to form  $C$ :



Since  $C$  completely dominates  $wh$ , the D-list  $\langle c, wh, a, wh \rangle$ , in which  $wh$  occurs twice, is ruled out by (52b). As alluded to in fn. 18 above, we will need to modify (53) in a way that would allow us to choose one occurrence of  $wh$  before it becomes completely dominated. The modification we propose is that the domain of the mapping in (53) can be somewhat smaller than all the positions on all the D-lists of the daughters. If some element  $\alpha$  appears in more than one position on the same D-list, the mapping can ignore one or more of those positions, as long as at least one position of  $\alpha$  is taken into account. Once we relax our definition in this way, two other D-list become possible based on (53) and (52):  $\langle c, wh, a \rangle$  and  $\langle c, a, wh \rangle$ . In English, the former option is chosen.

Let us now turn to the linearization of multiple-dominance structures of the PARALLEL MERGE kind. We start by looking at some empirical facts. RNR has been known to be subject to a strict constraint concerning the position of the RN. We model our characterization after Sabbagh (2007):

(62) RIGHT-EDGE RESTRICTION (RER)

- a. The RN or a gap associated with it must be rightmost within each conjunct
- b. The RN cannot surface in a non-rightmost conjunct

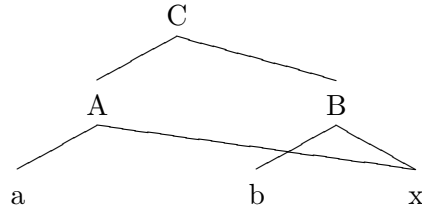
The RER covers judgments such as the following:

- (63) \* John should [give \_ the book] and [congratulate \_] **that girl**  
(Wilder, 1999, p. 595, ex. 34d)
- (64) a. \* [Joss will donate \_ to the library today \_], and [Maria will donate **several old novels** to the library tomorrow] (Sabbagh, 2007, p. 47, ex. 87)
- b. [Joss will donate \_ to the library today \_], and [Maria will donate \_ to the library tomorrow \_] **several old novels**.

In (64a), the RN *several old novels* appears before *to the library tomorrow*, which can only be interpreted inside the second conjunct. The RER is violated, and the result is ungrammatical. When *several old novels* is made rightmost within the second conjunct (64b), the result is grammatical.<sup>20</sup>

Let us now see how our linearization conditions capture the RER. We start with simple RNR, marking with parentheses any element on the D-list of  $X$  that is not in  $CDD(X)$ :

$$(65) \quad < a, (x) > \bullet < b, (x) > \Rightarrow < a, b, x >$$

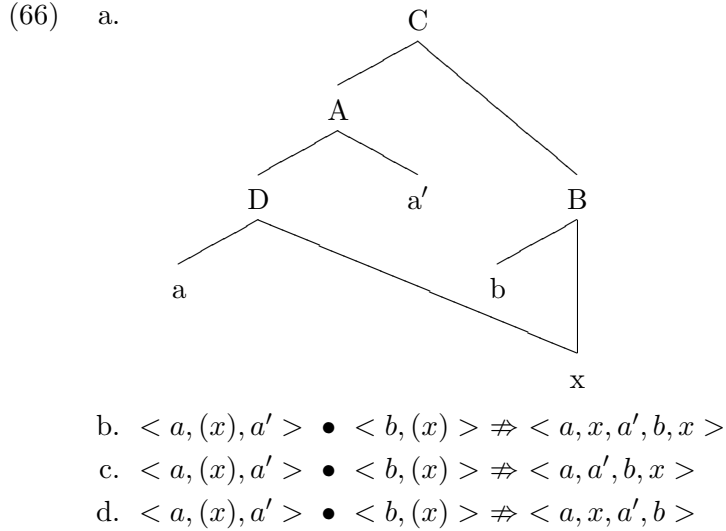


The correct linearization of the mother node,  $< a, b, x >$  is the only one licensed by the linearization conditions. The left edge of  $A$  is  $a$ , and it is linearized to the left of  $b$ , the left edge of  $B$ . Similarly, the right edge of  $A$  is  $x$ , which is linearized to the (reflexive) left of  $x$ , the right edge of  $B$ . Notice that here, for the first time, reflexivity makes a difference. CONSERVATIVITY is satisfied by the ordering  $< a, b, x >$  since each of the internal orderings  $< a, x >$  and  $< b, x >$  is maintained. CONSERVATIVITY would have ruled out the ordering  $< a, x, b >$  since the original ordering of  $x$  to the right of

<sup>20</sup>The RN is made rightmost through Heavy-NP Shift, an account of which falls outside the scope of the current paper.

$b$  is not preserved. Finally, condition (52) rules out the potential ordering  $\langle a, x, b, x \rangle$ , which includes two occurrences of  $x \in CDD(C)$ .<sup>21</sup>

Turning to more complex RNR configurations, we can see why RER violations are ungrammatical. The examples in (66) show an attempt to linearize  $A = \langle a, x, a' \rangle$  to the left of  $B = \langle b, x \rangle$ :



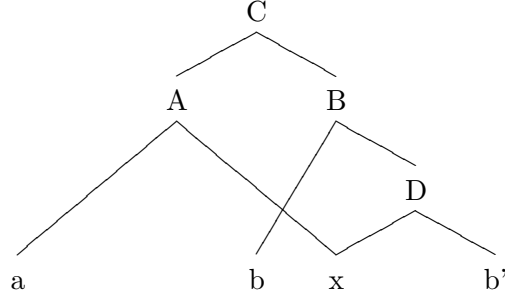
By (52),  $x$  may only appear once in the result, as in the case of simple RNR, ruling out (66b). In the D-list for  $A$ ,  $x$  occurs to the left of  $a'$ . Consequently, using CONSERVATIVITY, the occurrence of  $x$  in the D-list for  $C$  must be to the left of  $a'$ , ruling out (66c). At the same time, EDGE ALIGNMENT requires that  $x$  be linearized to the right of  $a'$ , ruling out (66d). No other ordering can rescue this structure, and so we correctly predict it to be bad.

The same reasoning does not apply to RER violations within the right conjunct:

$$(67) \quad \langle a, x \rangle \bullet \langle b, x, b' \rangle \not\Rightarrow \langle a, b, x, b' \rangle$$

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<sup>21</sup>Example (69) extends naturally to account for more complex cases, where each conjunct can contain more than one terminal before the RN. As long as the first conjunct is a spellout domain, no interleaving will take place.



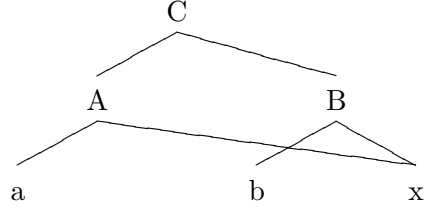
EDGE ALIGNMENT is satisfied by (67):  $a$  is linearized before  $b$ , and  $x$  is linearized before  $b'$ . Similarly, CONSERVATIVITY is satisfied, since no internal ordering is changed. Finally, all three D-lists,  $\langle a, x \rangle$ ,  $\langle b, x, b' \rangle$ , and  $\langle a, b, x, b' \rangle$ , are linear orderings. But in fact orderings like (67) are bad:

(68) \* [John congratulated  $\_\_$ ] and [Mary gave **the winner** the prize].

Our explanation for the ungrammaticality of (68) is based on spellout, and follows the explanation for the ungrammaticality of most interleaving configurations. Each conjunct within (68) is a clause, which under standard assumptions means it will undergo spellout before conjunction takes place. At that point, the shared material is not completely dominated within either conjunct. Consequently, it is not spelled out: the left conjunct maps onto the string ‘John congratulated’, and the right conjunct maps onto ‘Mary gave the prize’. While the ordering of (68) according to the schema in (67) is licensed by the syntax, the next spellout will attempt to modify the string of the right conjunct to insert ‘the winner’ between ‘gave’ and ‘the prize’. Since strings cannot be modified, the derivation crashes. The fact that (67) crashed at spellout and not because of linearization means that if we prevented the shared material from being spelled out in its conjunct-internal position, the structure could be rescued.

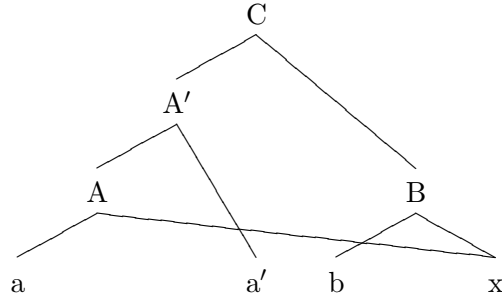
The timing of the change between complete and partial dominance is an important difference between *wh*-movement and RNR. In *wh*-movement the re-merged material is not completely dominated at the relevant point in the derivation, allowing re-organization of overt material. In RNR, the re-merged material was not completely dominated within each conjunct, but it becomes completely dominated once the two conjuncts are merged together. Consequently, the shared material must satisfy (52) and appear only once:

(69)  $\langle a, (x) \rangle \bullet \langle b, (x) \rangle \Rightarrow \langle a, b, x \rangle$



Since the shared material may have only one occurrence in the linearization of conjunction, CONSERVATIVITY has a restrictive effect, ruling out reorderings:

$$(70) \quad \langle a, (x), a' \rangle \bullet \langle b, (x) \rangle \not\Rightarrow \langle a, a', b, x \rangle$$



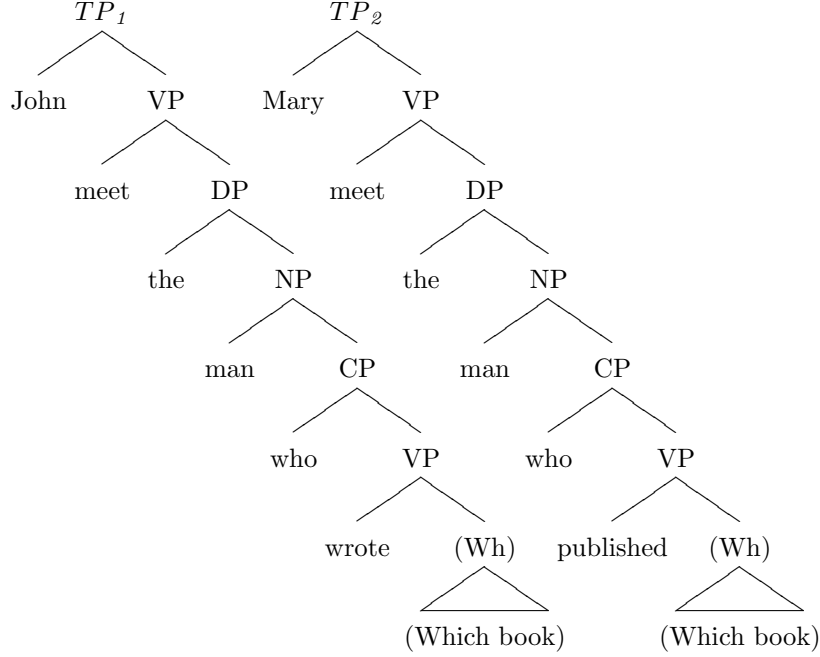
### 3.3.3 Putting it all together

We conclude this section by showing the linearization steps involved in *wh*-movement from within RNR:

$$(71) \quad \textbf{Which book}_i \text{ did [John meet the man who wrote } \_], \text{ and [Mary meet the man who published } \_] t_i?$$

We start at the point in the derivation where both conjuncts have been formed but before conjunction has taken place. The shared material *which book* is linearized at the right within each conjunct. It is not yet completely dominated at this point, hence the parentheses:

$$(72) \quad TP_1 \langle \text{John, meet, the man who wrote, (which book)} \rangle, \\ TP_2 \langle \text{Mary, meet, the man who published, (which book)} \rangle$$



At the next step, the conjuncts are merged together to form  $TP_3$  (or perhaps  $\&P$  if conjunction projects a phrase; we will not try to settle this matter here, and we also leave out the terminal  $\&$  in the current examples). The shared material is now completely dominated by  $TP_3$  (or  $\&P$ ). As discussed above, the D-list of  $TP_3$  may only include one occurrence of *which book*. CONSERVATIVITY requires that this instance be on the right.<sup>22</sup>

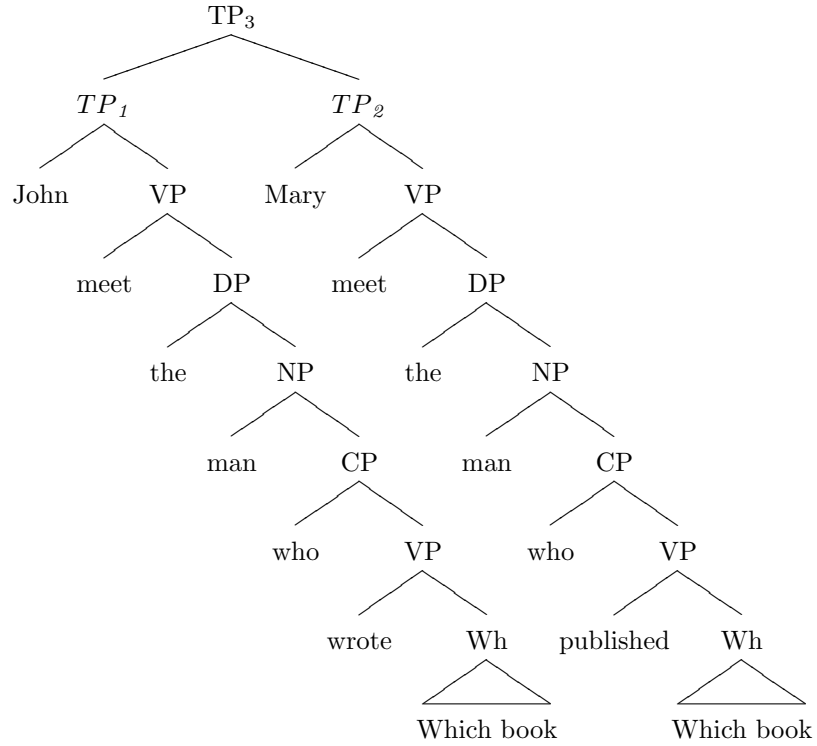
<sup>22</sup>Our claim has been that derivations such as the current one, where an element is extracted across conjunct-internal islands, must involve an RNR configuration. We argued, on the basis of cases like (17) above, that when an RER violation makes an RNR configuration impossible, extraction is ungrammatical. As pointed out to us independently by Klaus Abels and Danny Fox, our system currently does not predict this dependence on RNR. In the current derivation, for example, there is nothing to prevent the *wh*-element from being re-merged on the left edge of each conjunct, as in standard ATB-movement, resulting in the following D-lists:  $\langle (\text{which book}), \text{John}, \text{meet}, \text{the man who wrote}, (\text{which book}) \rangle$  for  $TP_1$ , and  $\langle (\text{which book}), \text{Mary}, \text{meet}, \text{the man who published}, (\text{which book}) \rangle$  for  $TP_2$ . This, in turn, will make it possible to combine the two conjuncts via a form of *Left-Node Raising* (LNR), regardless of the original position of the RN inside each conjunct. If LNR can allow us to extract across islands regardless of linearization, our system is in trouble. We acknowledge the problem, of course, but we think that there is an asymmetry between the RNR-based extraction and the LNR-based extraction that has the potential of explaining why only the former can be used to obviate islands. In RNR, the RN starts its way as being incompletely dominated inside each conjunct. When conjunction is formed, the RN becomes completely dominated. For *wh*-movement, the



- (73)  $TP_1 \bullet TP_2 \Rightarrow$   
 $TP_3 <\text{John,meet, the man who wrote, Mary, meet, the man who}$   
 $\text{published, which book}>$

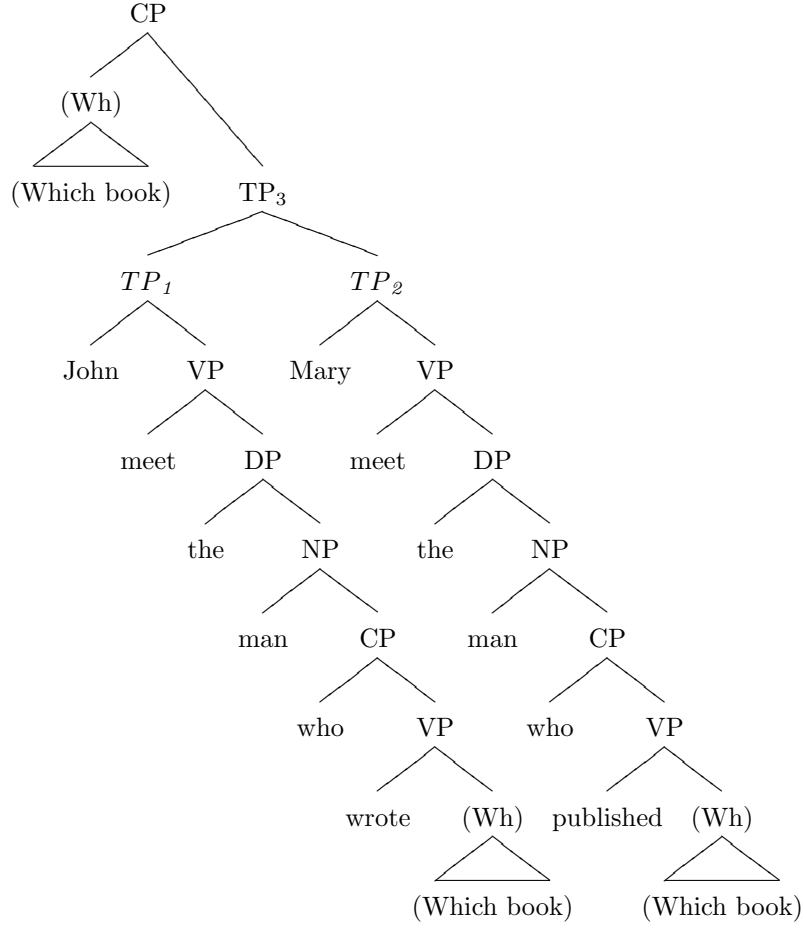
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first time in which the RN must be re-merged is after it has already been completely dominated by conjunction. By being re-merged it changes its status once again. Each time the RN is re-merged, then, results in a change of either dominance or complete dominance. In LNR, the RN also starts its way as being incompletely dominated, but then it must be re-merged conjunct-internally, in a way that changes neither dominance relations nor completely dominance relations. If we require that every operation of Merge must change either dominance or complete dominance, shared material will no longer be allowed to re-merge conjunct-internally. While restoring order to the domain of extraction across islands, such an economy condition seems to prohibit any form of ATB-movement from non-edge positions. This, we suggest, can be solved once the relativization of complete dominance to workspaces is made more explicit. In RNR, each conjunct must be aware of the other conjunct for purposes of complete dominance. In our current derivation, for example, it is only by taking into account the use of the RN in  $TP_2$  that  $TP_1$  can exempt it from complete dominance and consequently from spellout. Awareness of other workspaces (under currently ill-understood conditions) is what allows RNR to happen. But there is no reason to think that awareness of other workspaces is always required. If it is possible to choose not to see other workspaces, the RN will be considered completely dominated within each conjunct. This will mean that conjunct-internal spellout will trap the RN inside the conjunct, but it will also mean that the economy condition on Merge, suggested above, will not block the RN from being re-merged conjunct-internally. The RN will start its way as being completely dominated inside each conjunct. By being re-merged in a conjunct-internal c-commanding position, the RN will become incompletely dominated inside that conjunct. This, we suggest, can be the explanation for simple ATB-movement from non-edge positions. Exploring the implications of this condition in any detail is beyond the scope of the current paper.



$TP_3$  is not a phase, and consequently *which book* is not yet spelled out. The next phase is the root  $CP$ , the result of re-merging *which book* with  $TP_3$ . Spellout takes place, but since *which book* is not completely dominated by  $CP$ , it is not spelled out, and can feed subsequent operations:

- (74)  $Wh \bullet TP_3 \Rightarrow$   
 $CP <(\text{which book}), \text{John, meet, the man who wrote, Mary, meet, the}$   
 $\text{man who published, (which book)}>$



## 4 Conclusion

In this paper we explored the consequences of reformulating movement as a special case of syntactic sharing, or re-merge, thus making it more similar to another case of sharing, namely RNR. Since in this framework there is no primitive movement operation, all known features of dislocation phenomena must follow from more general principles. In particular, the grammar cannot make reference to traces or copies, and locality cannot be defined via constraints on movement operations. In agreement with the general guidelines of the Minimalist Program, we turned to the interfaces, and in particular to the cyclic operation of spellout of the syntactic structure, as the locus of explanation. We proposed that the major import of syntactic sharing is

in altering the (complete) dominance relations within the syntactic object. (In)complete Dominance, in turn, plays an important role both in the definition of the spellout domain of phases and in the well-formedness of the linearization list of each node in the structure.

The double role of (in)complete dominance gives rise to two independent effects which are usually difficult to distinguish in movement phenomena but which are dissociated in RNR. Incompletely dominated objects are not part of the spellout of a phase. Consequently, these objects are not frozen and remain available for manipulation in consequent stages of the derivation. This freedom underlies cyclic *wh*-movement but is also found in RNR, where it explains the possibility of the RN surfacing separately from the material in all non-final conjuncts, giving rise to the appearance of rightward dislocation but without requiring a high attachment site for the RN. The same freedom also enables the RN to be available for further operations, such as *wh*-movement, regardless of any conjunct-internal spellout. The other effect of incomplete dominance is in permitting the same object to appear twice in the D-list of a single node. This is the only source for re-ordering within the D-list, and it arises only in a restricted set of configurations, when an object is also dominated by its sister. In other words, re-ordering is possible only in a configuration that corresponds to movement to a c-commanding position. Only in such cases will the linearization list of the mother contain two incompletely dominated instances of the same object. This explains why only cases of re-merge at a c-commanding position allow for reordering, while other cases of syntactic sharing such as RNR do not.

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