

# Right-Node Raising and Delayed Spell-Out

## Bachrach & Katzir (2009)

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### 1 Some properties of Right Node Raising

- There are three main approaches to RNR:
  - ☞ ATB-movement (Postal 1974, Sabbagh 2007)
  - ☞ Phonological ellipsis (Wilder 1997, Hartmann 2000)
  - ☞ Multiple dominance (McCawley 1982, Wilder 1992)

(1) *Theories of RNR:*

	<i>ATB</i>	<i>Ellipsis</i>	<i>MD</i>
Right Node	✓	✗	✗
Two Copies	✗?	✓	✗

#### 1.1 Islands

- RNR differs from ATB-movement in that it is not sensitive to islands:
  - (2) *Right-Node Raising:*  
John met [<sub>DP</sub> a man [<sub>CP</sub> who wrote \_\_\_]], and Mary met [<sub>DP</sub> a woman [<sub>CP</sub> who published \_\_\_]] **a recent book about bats.**
  - (3) *ATB-movement:*  
\***Who**<sub>i</sub> did [<sub>TP</sub> [<sub>DP</sub> a man [<sub>CP</sub> who loves t<sub>i</sub>] dance] and [<sub>TP</sub> [<sub>DP</sub> a woman [<sub>CP</sub> who hates t<sub>i</sub>]] go home]?

#### 1.2 Right Roof Constraint

- Ross (1967) noticed that movement to the right is subject to the *Right Roof Constraint* stating that rightward movement cannot cross clause boundaries:
  - (4) a. Sam saw \_\_ yesterday **the new headmaster.**  
b. \*John claimed [<sub>CP</sub> that Sam loves \_\_] yesterday **the new headmaster**
- Note that RNR is not subject to this constraint suggesting that RNR does involve rightward movement.

- (5) John claims [<sub>CP</sub> that Sam loves \_\_\_] and Mary claims [<sub>that</sub> Sam hates \_\_\_] **the new headmaster**.

### 1.3 RNR below the word-level

- (6) His theory [under-\_\_\_] and her theory [over-\_\_\_] **generates**

### 1.4 Exceptional scope

- Problems for the ellipsis account are posed by scope data such as the following:

- (7) John knows [a man who speaks \_\_\_] and Mary knows [a woman who wants to learn \_\_\_] **every Germanic language**.  
( $\forall > \exists$ ,  $\exists > \forall$ )

- Furthermore, since there are two copies (of which one is elided), the following data with distributive or summative readings are a problem for ellipsis account:

- (8) a. [John hummed \_\_\_] and [Mary whistled \_\_\_] **different tunes**  
b. [John borrowed \_\_\_] and [Mary stole \_\_\_] **a total of 3,000 dollars from the Chase Manhattan Bank**.

## 2 New observations

### 2.1 RNR can feed wh-movement

- Recall that we showed that RNR is insensitive to islands whereas ordinary wh-movement is of course not:

- (9) a. John met [<sub>DP</sub> a man [<sub>CP</sub> who wrote \_\_\_]], and Mary met [<sub>DP</sub> a woman [<sub>CP</sub> who published \_\_\_]] **a recent book about bats**.  
b. \*Which book<sub>i</sub> did John meet [<sub>DP</sub> a man [<sub>CP</sub> who wrote t<sub>i</sub> ] ] ?

- Interestingly, wh-movement is possible in configurations in which RNR is possible:

- (10) Which book<sub>i</sub> did John meet [<sub>DP</sub> a man [<sub>CP</sub> who wrote t<sub>i</sub>]], and Mary met [<sub>DP</sub> a woman [<sub>CP</sub> who published t<sub>i</sub>]] ?

- It is also not possible in constructions where RNR would not be possible, e.g. those that violate the Right Roof Constraint:

- (11) a. [<sub>DP</sub> A man [<sub>CP</sub> who loves *a book by Kafka*]] danced and [<sub>DP</sub> a woman [<sub>CP</sub> who hates *a book by Kafka*]] went home.  
b. [<sub>DP</sub> A man [<sub>CP</sub> who loves \_\_\_]] danced and [<sub>DP</sub> a woman [<sub>CP</sub> who hates \_\_\_]] went home **a book by Kafka**.  
c. Which book<sub>i</sub> does [<sub>DP</sub> a man [<sub>CP</sub> who love t<sub>i</sub> ] ] danced and [<sub>DP</sub> a woman [<sub>CP</sub> who hates t<sub>i</sub> ] ] go home?

- Furthermore, it also seems to be possible to subextract from RNRed constituent:

(12) *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>**?

- Intuitively, the idea is that RNR *feeds* wh-movement:

(13) a. John met [the man [who wrote \_\_\_]] and Mary met [the man [who published \_\_\_]] **an encyclopedia article about tigers**  
 b. *Which animal* did meet [the man [who wrote \_\_\_]] and Mary met [the man [who published \_\_\_]] **an encyclopedia article about t<sub>i</sub>** ?

- This interaction is a problem for ellipsis accounts that claim that RNR does not involve movement. For them, island insensitivity comes from that fact that there movement never actually takes place: so how can RNR feed wh-movement?

## 2.2 Spell-Out Islands

- B&K assume that islands are ‘Spell-Out islands’, i.e. they are a PF phenomenon and not a direct result of syntactic locality.
- Thus, RNR cannot allow one to circumvent *bona fide* syntactic locality constraints such as Relativized Minimality:

(14) a. [Who cooked \_\_\_] and [who ate \_\_\_] **the black beans**?  
 b. \*What did [who cook \_\_\_] and [who eat \_\_\_] ?

- Furthermore, B&K note that islands repair if one adds an island above the coordination:

(15) \**Which animal<sub>i</sub>* does John know [<sub>DP</sub> a reporter [<sub>CP</sub> who made famous [<sub>DP</sub> a man who published \_\_\_] and [<sub>DP</sub> a woman who illustrated \_\_\_] **a book about t<sub>i</sub>** ] ?

## 2.3 Interim summary

- Ellipsis accounts face the problem that (as well the scope data), RNR seems to feed wh-movement. This is unexpected if no movement is involved.
- Movement accounts suffer from the problem of non- or sub-constituents also being able to undergo RNR as well as RNR not being subject to the same locality conditions as other kinds of rightward movement.
- Thus, they conclude that the only approach left is the multiple dominance approach.
- Under this approach however it is unclear how both locality and linearization works: These are two crucial aspects of RNR and B&K will develop a system to derive all the relevant properties of RNR.

## 3 Proposal

- Recall that the islands RNR is insensitive to are PF islands related to Spell-Out. Their approach rests on the following assumption:

(16) Syntactic material is spelled out only when it is completely dominated.

- Thus, if a constituent is not completely dominated (e.g. in a multiple dominance structure), then it will not be subject to Spell-Out and therefore not be trapped in the Spell-Out island.
- Their approach predicts that material shared in a conjunction will not be spelled out until the coordination is complete and thus, delaying it will allow the RNRed constituent to remain visible for wh-movement.
- Their approach consists of three main parts: (i) *structure formation* (Parallel Merge), (ii) *Cyclic Spell-Out* under a modified view of phases, (iii) linearization.

### 3.1 Merge

- As we know, Merge combines two syntactic objects X, Y to form a new syntactic object Z:

(17) Merge(X, Y)  $\Rightarrow$

```

graph TD
  Z --- X
  Z --- Y

```

- Internal Merge can be modelled as ‘Rmerge’:

(18) Merge(Y, Z)  $\Rightarrow$

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graph TD
  W --- X
  W --- Z
  X --- Y
  subgraph " "
    X
    Y
  end
  Z --- " "

```

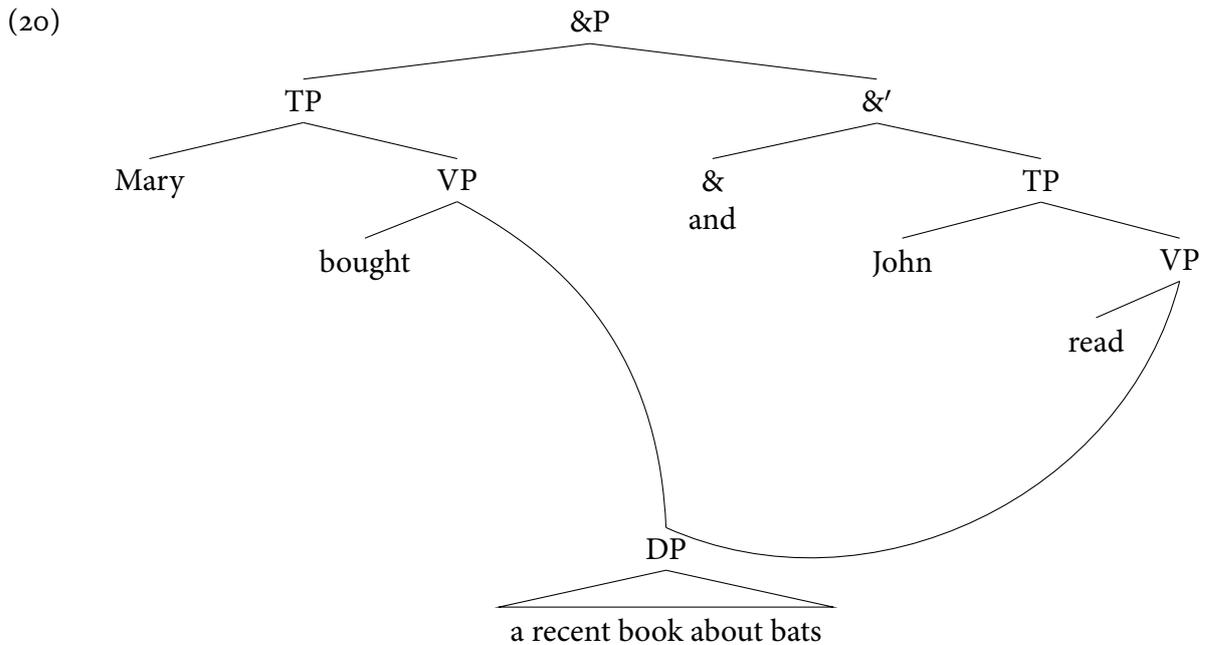
(19) Merge(X, Y)  $\Rightarrow$

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graph TD
  Z --- W
  Z --- X
  Q --- X
  Q --- Y

```

- Thus, B&K assume a multiple dominance analysis of RNR:

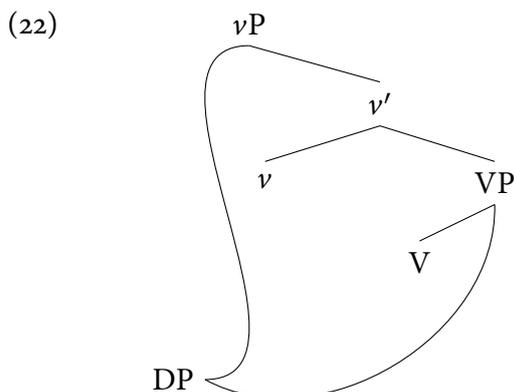


### 3.2 Spell-Out in MD structures

- One problem faced by any multiple dominance analysis is how Spell-Out and phases work.
- A standard approach might be something like the following:

- (21)
- Spell-Out Domain:** The Spell-Out domain of a node X is the set of nodes dominated by the sister of X.
  - Phase Head:** A designated syntactic object that triggers Spell-Out of its Spell-Out domain after all of its specifiers have been merged. The phase head itself and all of its specifiers (the *edge*) are not spelled out until the next phase.
  - Spell-Out:** 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.

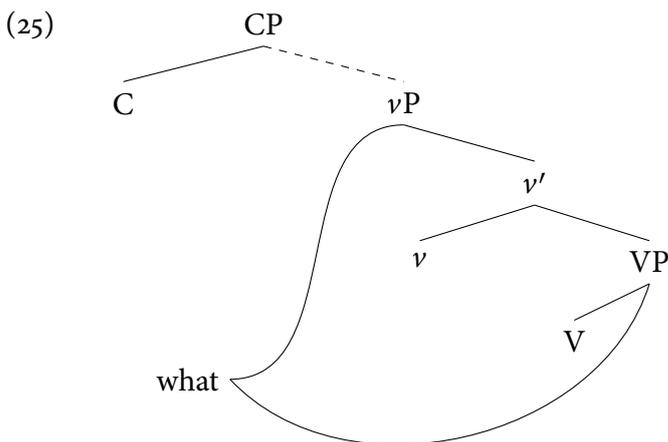
- One of the problems faced by copy theories of movement is that you need some mechanism to ensure that only one copy of the chain (normally the highest) is pronounced (i.e. *Chain Reduction*).
- In MD approaches, this problem doesn't necessarily arise since there is by definition only one copy to pronounce.
- Instead, the question arises as to what Spell-Out actually means for MD. Consider (22):



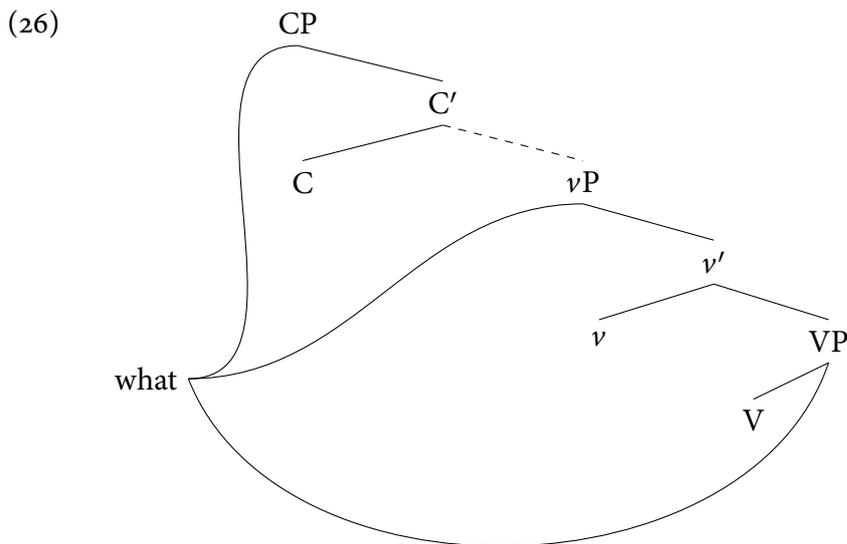
- If  $\nu$  spells out its complement domain, (VP) then we would expect that it also spells out DP. However, DP is simultaneously in the edge of  $\nu$ P and should not be subject to Spell-Out. Thus, it is unclear what happens under the assumption that VP is spelled out. If there is one copy of the DP, is it spelled out at this point?
- Clearly, the answer has to be no. But why?
- Furthermore, B&K point out that Spell-Out is inherently counter-cyclic since one has to first Merge any specifiers of a phase head (extended the cycle to  $\nu$ P, for example) and then go back to affect a lower domain (VP).
- Their proposal is to redfiefine Spell-Out domains:

(23) **Complete Dominance:** A node X completely a node Y iff (a) 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 of X*; CDD(X)).

- (24) a. **Spell-Out Domain (Revised):** The Spell-Out domain of a node X is CDD(X).  
 b. **Phase Node:** A designated syntactic object that triggers Spell-Out of its Spell-Out domain.  
 c. **Spell-Out:** (same as before)



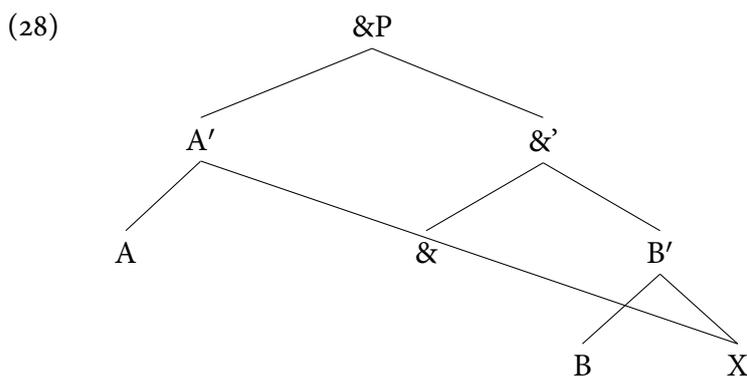
- If we consider the tree in (25), we have replaced the phase head  $\nu$  with the Phase Node  $\nu$ P. Now if we consider the definition of *Complete Dominance* in (24b), the wh-phrase is not in the CCD( $\nu$ P) since (a)  $\nu$ P is not the only mother of *what* and (b)  $\nu$ P does not dominate every mother of *what* since does not dominate itself (!).
- If we conceive of the CCD as a set of terminals that are spelled out, then  $CCD(\nu P) = \{\nu, V\}$  but *what*  $\notin$  CCD( $\nu$ P). Thus, *what* will only be spelled out when the next phase node (CP) is merged.
- Now, it is clear that successive-cyclic movement to Spec-CP will keep the wh-phrase 'alive' and protected from Spell-Out as the same logic as before will hold for CCD(CP)



- B&K claim that this assumption leads to successive-cyclic movement being blocked if the specifier is blocked:

(27) \* $[_{CP} \text{What}_i \text{ did John } [_{vP} t_i \text{ know a man } [_{CP} \text{who } [_{vP} t_i \text{ ate } t_i ]]]]$  ?

- Here, they assume that relative pronoun blocks the specifier of CP. At the point when the Phase Node CP is merged, it will completely dominate all *what* and this is what prevents its further movement.
- *Note:* It is somewhat odd that they now appeal to a syntactic account of relative clause islands when they actually claim that these are PF islands.
- How does this work for RNR?



- If we take this as our abstract multi-dominance structure, then even if A' and B' contain (Spell-Out) islands, then the RNRed node X will not be spelled out since A' does not dominate itself and thus X will not be in CDD(X). (Note that the crucial assumption here is that &P is not a phase).
- X can then be remerged above the coordinate (e.g. in Spec-*vP* if it is a *wh*-phrase) and will remain transparent for extraction. Crucially, this means that islands inside the conjuncts will not affect an element shared across them (RNR).
- This explains why RNR feeds *wh*-movement as we saw.

- (29) Which book<sub>i</sub> did John meet [<sub>DP</sub> a man [<sub>CP</sub> who wrote t<sub>i</sub>]], and Mary met [<sub>DP</sub> a woman [<sub>CP</sub> who published t<sub>i</sub>]] ?
- Now, recall that a RNR + wh-movement derivation cannot save a derivation with an island above the coordination:
- (30) \*Which animal<sub>i</sub> does John know [<sub>DP</sub> a reporter [<sub>CP</sub> who made famous [<sub>DP</sub> a man who published \_\_\_] and [<sub>DP</sub> a woman who illustrated \_\_\_] a book about t<sub>i</sub>]] ?
- Here, the story goes that the relative pronoun (that they assume is base-generated in CP) blocks *which book* from moving to the specifier of CP. When the Phase Node CP is merged, then *which book* is completely dominated and will be spelled out preventing further movement.

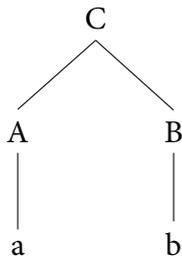
### 3.3 Linearization

- Traditionally, it is assumed that linearization involves strict precedence relations:
- (31) *Strict Linearization:*  
If A is linearized before B, then  $\forall a \in A. \forall b \in B. a < b$
- This assumption immediately poses a problem for MD structures such as (37) since we would get the conflicting linearization statements: X must both precede and follow B for example.
- (32) a. John bought \_\_\_ and Mary sold \_\_\_ books about bats  
b. books about bats  $\not<$  books about bats
- Their suggestion is to make linearization no longer absolute but relative to edges, i.e. *reflexive*. So the left edge of of an item can precede the left edge of that same item.
- (33) a. John bought \_\_\_ and Mary sold \_\_\_ books about bats  
b. books about bats  $\leq$  books about bats
- In (33b), the left edge of the first of the copy of *books about bats* precedes the left edge of the second copy.
  - More concretely, when linearizing a node, a node X has a list of terminals that it dominates (the *D-list*).
  - in (37), the D-list of B' would be  $\langle B, X \rangle$
- (34) *Linearization Well-Formedness Condition*
- The D-list for a node X has all the terminals dominated by X as members, and only them.
  - If  $y \in \text{CDD}(X)$ , then y appears on the D-list of X exactly once.
- This means that multiple occurrences of a single terminal node are allowed, but only for nodes that are not completely dominated by X (i.e. multiply dominated ones).
  - (34) is coupled with the following condition:
- (35) *Linearization Mapping Condition:*  
In an 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:

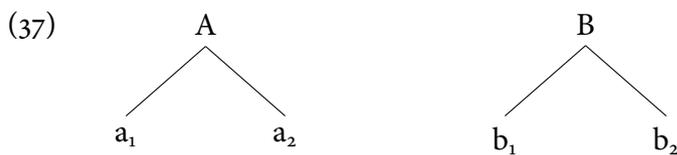
- a. *Edge Alignment*:  $a_1 \leq b_1$  and  $a_m \leq b_n$
- b. *Conservativity*:  $a_1 \leq a_2 \leq \dots \leq a_m$  and  $b_1 \leq b_2 \leq \dots \leq b_n$

- The first part basically just means that if you linearize A a before B then the left edge of A must precede the left edge of B and the same holds for the right edges.
- For nodes containing a single element, this is relatively straight forward

(36)  $\langle a \rangle \bullet \langle b \rangle \Rightarrow \langle a, b \rangle$

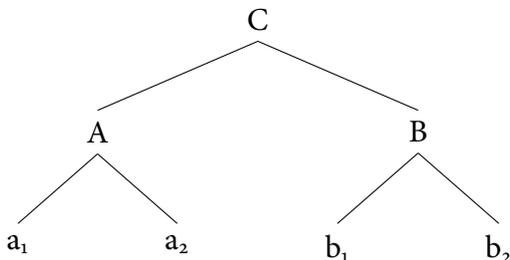


- In (36), the only option is to linearize  $a$  before  $b$ . This satisfies *Edge Alignment* since the left edge of A ( $a$ ) is linearized to the left of the right of edge of B ( $b$ ), etc.
- Furthermore, since no copies occur multiple times and there are no additional elements not in  $CDD(C)$  the *Linearization Well-Fordness Condition* is also satisfied.
- This gets more interesting if the nodes we are linearizing are complex. For example, assume we want to linearize A and B in (37)



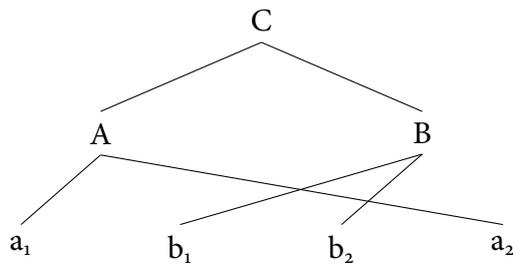
- The simplest option is concatenation:

(38)  $A \bullet B = \langle a_1, a_2, b_1, b_2 \rangle$



- Here, all relevant conditions are met since the left and right edges of A precede the respective edges of B.
- What is not possible is 'wrapping' as in (39):

(39)  $*A \bullet B = \langle a_1, b_1, b_2, a_2 \rangle$



- This is ruled out since, while the left edge of A ( $a_1$ ) precedes the left edge of B ( $b_1$ ), the right edge of A ( $a_2$ ) does not precede the right edge of B ( $b_2$ ).
- Furthermore, they claim that ‘interleaving’ ( $a_1, b_1, a_2, b_2$ ) is permitted by linearization, but filtered out later.

*Linearizing MD structures:*

- RNR is subject to the *Right Edge Restriction* that we can summarize as follows:

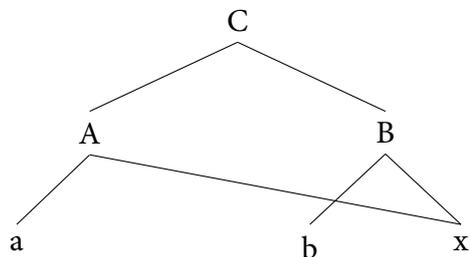
(40) *Right-Edge Restriction*

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

(41) \*John should [give \_\_\_ the book] and [congratulate \_\_\_] **that girl**

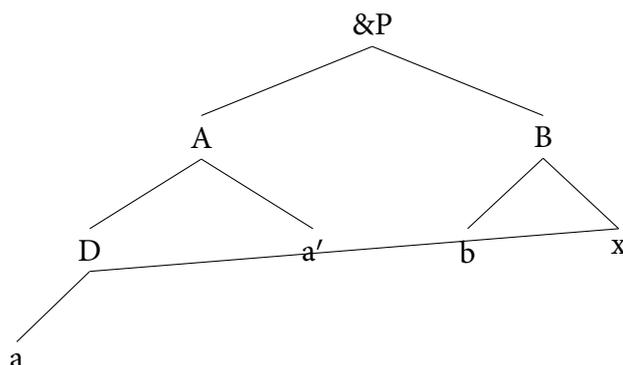
- This is captured by the previously discussed assumptions about linearization:

(42)  $\langle a, (x) \rangle \bullet \langle b, (x) \rangle = \langle a, b, x \rangle$



- Note that  $\langle a, b, x \rangle$  is the only possible ordering:  $\langle a, x, b \rangle$  would violate *Conservativity* as the original order  $\langle b, x \rangle$  would not be maintained.
- Furthermore, spelling out both copies of the multiply-dominated  $x$  is ruled out since this would entail having two occurrences of  $x$  in  $CDD(C)$ .
- Now why is a sentence such (41) ungrammatical? Let us consider an abstract version:

(43)



- What we observe is that there is no good way of linearizing a structure where the gap in the first conjunct is followed by some material:

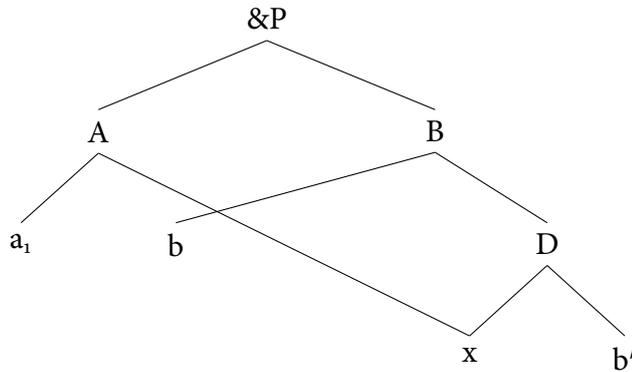
- (44) a.  $\langle a, (x), a' \rangle \bullet \langle b, (x) \rangle \not\Rightarrow \langle a, x, a', b, x \rangle$   
 b.  $\langle a, (x), a' \rangle \bullet \langle b, (x) \rangle \not\Rightarrow \langle a, a', b, x \rangle$   
 c.  $\langle a, (x), a' \rangle \bullet \langle b, (x) \rangle \not\Rightarrow \langle a, x, a', b \rangle$

- (44a) is ruled out since there are two instances of  $x$ . In (44b),  $x$  occurs to the left of  $a'$  in the D-list of A ( $\langle a, (x), a' \rangle$ ) and this has not been maintained in the output structure. In (44c), Edge Alignment requires that  $x$  be aligned to the left of  $a'$  and thus rules out this linearization structure.

- Thus, since this structure cannot be linearized, it is (correctly) predicted to be impossible.

- Interestingly, this is different when there is material following the RNRed material in the second conjunct:

- (45)  $\langle a, x \rangle \bullet \langle b, x, b' \rangle \Rightarrow \langle a, b, x, b' \rangle$



- There is nothing in the system at present that rules this out. B&K see this as a serious problem since it seems to rule in the following ungrammatical sentences:

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

- B&K rule this derivation out on the assumption that the interleaving construction would entail modifying/interrupting structure that has already been spelled out.

- It is worth noting that Hartmann & Schmitt (2013) point out a number of exceptions to the RER involving exactly this configuration:

- (47) Die Schauspieler verbeugten \_\_\_ aber bedankten \_\_\_ **sich** nicht.  
 the actors bowed but thanked REFL not  
 'The actors bowed but did not thank the audience.'

- Here, the reflexive pronoun *sich* has undergone RNR but there is still an element following it in the second conjunct. Since negation is only interpreted in the second conjunct, we know that it must be internal to it.

- Thus, the prediction B&K's system makes might actually have some empirical advantages.

## References

- Bachrach, Asaf & Roni Katzir (2009): Right Node Raising and Delayed Spell-Out. *In*: K. K. Grohmann, ed., *InterPhases*. Oxford University Press, Oxford, pp. 283–316.
- Hartmann, Katharina & Viola Schmitt (2013): ‘Violations of the Right Edge Constraint in Right Node Raising’, *Snippets* 27, 8–9.