

## Right-Node Raising and Delayed Spellout\*

### 1 Introduction

- Right-Node Raising (RNR):

- (1) [John bought \_], and [Mary read \_] **a book**.
- (2) Previous proposals:
  - a. RNR is movement (Ross, 1967; Postal, 1974; Sabbagh, 2003/2006)
  - b. RNR is not movement (Abbott, 1976; Swingle, 1993; Wilder, 1999)
- Core property: RNR is about the Right Edge (Wilder, 1999; Sabbagh, 2003/2006)
- (3)
  - a. \* [John bought **a book**], and [Mary read \_].
  - b. \* [Joss will donate \_ to the library today], and [Maria will donate **several old novels** to the library tomorrow].
  - c. \* [A man who loves \_ danced], and [a woman who hates \_ went home] **the new headmaster**.
- (4) RIGHT-EDGE RESTRICTION (RER) (*Modeled after Sabbagh, 2003/2006*)  
The shared material must be rightmost in all conjuncts.
- (5) Goals of this talk:

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- a. Present new observations about the interaction of RNR and wh-movement.
  - b. Derive the known facts of RNR.
- (6) Our proposal:
- a. RNR involves multiple-dominance.
  - b. Shared material is not spelled out until it is completely dominated.
  - c. Linearization is reflexive and is checked at each node.

### 1.1 Arguments for movement

- RNR allows scope reversal out of coordination, which is otherwise unavailable (examples from Sabbagh, 2003/2006)
- (7) a. Some nurse [gave a flu-shot to  $\_$ ], and [administered a blood test for  $\_$ ] **every patient who was admitted last night.**  
( $\exists \succ \forall, \forall \succ \exists$ )
- b. Some nurse gave a flu-shot to every patient, and administered a blood test for every patient. ( $\exists \succ \forall, * \forall \succ \exists$ )
- RNR allows scope reversal out of islands inside coordination, which is otherwise unavailable (examples from Sabbagh, 2003/2006)
- (8) 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. ( $\exists \succ \forall, * \forall \succ \exists$ )
- RNR allows distributive elements to distribute over both conjuncts, otherwise unavailable.
- (9) a. [John bought  $\_$ ], and [Mary read  $\_$ ] **the same book.**
- b. John bought the same book, and Mary read the same book.
- (10) a. [John hummed  $\_$ ], and [Mary sang  $\_$ ] **different tunes.**
- b. John hummed different tunes, and Mary sang different tunes.

## 1.2 Arguments against movement

- Island insensitivity

(11) [John met a man who wrote \_], and [Mary met a man who published \_] **a recent book about bats.**

- Right-Roof Constraint insensitivity

(12) \* John claimed that Sam loves \_ yesterday **the new headmaster.**

(13) [Jim claims that Sam loves \_], and [Joe claims that Sam hates \_] **the new headmaster.**

- The shared material may be a non-constituent (Abbott, 1976)

(14) [John borrowed \_], and [Mary stole \_] **large sums of money from the Chase Manhattan Bank.**

- RNR applies below the word level

(15) a. [Your theory under-\_-], and [my theory over-\_-] **generates.**

## 1.3 Recent Approaches

- Shared intuition: the syntax-phonology mapping is central. The Right-Edge Restriction should be derived within the system.

### 1.3.1 Wilder (1999)

A multiple-dominance *in situ* account based on c-command and the LCA (Kayne, 1994).

(16) MODIFIED LCA

- a.  $X$  c-commands every node  $Y$  dominated by its sister, even if  $X$  also dominates  $Y$ .
- b. Only completely dominated material counts for linearization.

- Consequence: the linearization algorithm is blind to the presence of the shared material in non-final conjuncts.

### 1.3.2 Sabbagh (2003/2006)

An ATB account based on the linearization procedure of Fox and Pesetsky (2005). Explains the Right-Roof Constraint and the Right-Edge Restriction with the following:

(17) LINEARIZATION PRINCIPLE

- a. At the end of each cycle linear order is fixed.
- b. The only two positions available for the right attachment of an element  $\alpha$  are the original cyclic node in which  $\alpha$  was merged and the matrix CP.
- c. Other than that, movement (to the right) is free.
- d. Other conjuncts do not count as intervening material.

- Consequence: movement to the right of a rightmost element can escape islands since it does not violate previously established linearization constraints.

## 2 New Observation: RNR can feed movement to the left

- RNR can feed wh-movement

- (18) a. [John met a man who wrote  $\_$ ], and [Mary met a man who published  $\_$ ] **a recent book about bats**.
- b. **Which book<sub>*i*</sub>** did [John meet the man who wrote  $\_$ ], and [Mary meet the man who published  $\_$ ]  $t_i$ ?

- **wh + RNR  $\neq$  ATB**: ATB movement is island sensitive.

- (19) a. \* [A man who loves  $\_$  danced], and [a woman who hates **the new headmaster** went home].
- b. \* **Who<sub>*i*</sub>** did [a man who loves  $t_i$  dance] and [a woman who hates  $t_i$  go home]?

- Islands above conjunction block wh-movement

- (20) a. \* **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  $t_i$** ?

- b. **Which animal<sub>i</sub>** did John say that Mary knew [a man who wrote  $\_$ ], and [a woman who published  $\_$ ] **an encyclopedia article about  $t_i$** ?

- Islands above conjunction block QR

- (21) a. Some student made the claim that [John can speak  $\_$ ], and [Mary can write  $\_$ ] **every Germanic language**. ( $\exists \succ \forall, * \forall \succ \exists$ )  
b. [John knows a man who speaks  $\_$ ], and [Mary knows a woman who wants to learn  $\_$ ] **every Germanic language**. ( $\exists \succ \forall, \forall \succ \exists$ )

- Questions:

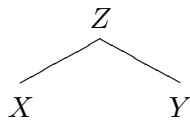
1. If RNR is a PF operation, how can it feed a syntactic operation such as wh-movement?
2. If the island insensitivity of RNR is due to fixing the linear order of the shared material on the right, how come subsequent leftward movement is possible?
3. If RNR is captured by weakening island constraints, why do island effects reappear above conjunction?

### 3 Proposal

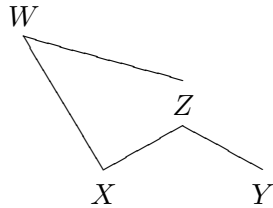
- (22) Our proposal (= (6)):
- a. RNR involves multiple-dominance.
  - b. Shared material is not spelled out until it is completely dominated.
  - c. Linearization is reflexive and is checked at each node.
- (23) Things we will not talk about:
- a. Delayed spellout and semantic interpretation
  - b. The source of ordering instructions (head-parameter, LCA, etc.)
  - c. Information structure, parallelism, and intonation

#### 3.1 Merge

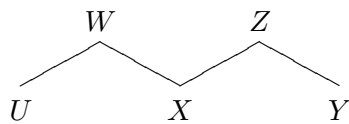
- (24) a. External Merge (Chomsky, 2004)



b. Internal Merge (Chomsky, 2004)

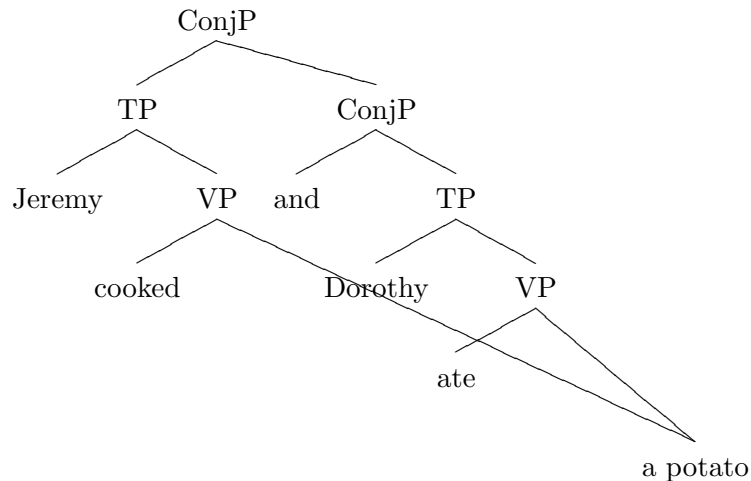


c. Parallel Merge (Citko, 2005)



- RNR as Parallel Merge

- (25) a. Jeremy cooked and Dorothy ate a potato  
 b. (Structure modeled after McCawley, 1982; Wilder, 1999)



### 3.2 Phases and Spellout

#### 3.2.1 Spellout and External Merge

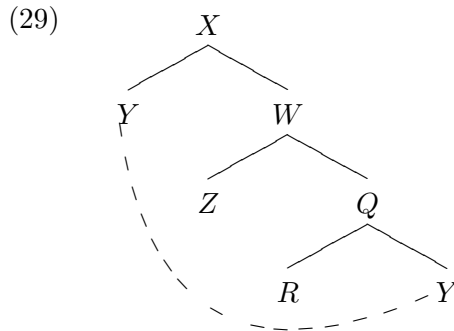
- (26) **Spellout Domain (First Version):** The spellout domain of a node  $X$  is the set of all nodes dominated by the sister of  $X$ .
- (27) **Phase Head (First Version):** A designated syntactic object that triggers spellout of its spellout domain after all of its specifiers have

been merged. The phase head itself and all of its specifiers (the *edge* of the phase) are not spelled out until the next phase.

- (28) **PF Spellout:** A syntactic structure transferred to PF is mapped onto a phonological object that cannot be modified by further operations.

### 3.2.2 Some concerns

- With re-merge there are no indexed copies or traces, so there is no meaningful way to distinguish the first and second occurrences of  $Y$  in (29) (cf. Frampton, 2004; Fitzpatrick and Groat, 2005).

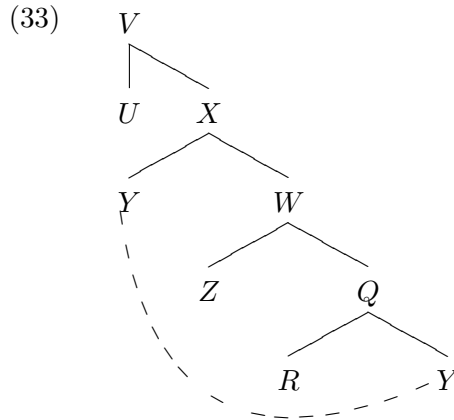


- In (Chomsky, 2001) spell-out is a counter-cyclic operation. A phase head spells out its complement, but only after movement out of the complement to the specifier of that phase head.

### 3.2.3 Redefining Spellout Domains:

- (30) **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  $CDD(X)$ .
- (31) **Spellout Domain (Revised):** The spellout domain of a node  $X$  is  $CDD(X)$ .
- (32) **Spellout Node (replaces Phase Head):** A designated syntactic object that triggers spellout of its spellout domain.
- Since dominance is not reflexive, a re-merged specifier, like  $Y$  in (29), will not be completely dominated by any of its mothers:  $[_X(Y) Z R (Y)]$ .

- Notice that as soon as we merge a new object as a sister of  $X$  in (29),  $Y$  becomes completely dominated by the new root:



### 3.2.4 Cyclicity

(34)  $[_{CP} \text{What}_i \text{ did Mary}[_{vP} t_i \text{ say}[_{CP} t_i \text{ that John }[_{vP} t_i \text{ ate } t_i?]]]]$

- **Cyclic movement:**

- *What* escapes spellout in its base position and in all intermediate positions since it is never completely dominated at spellout. For example, after the first phase we have  $[_{vP} (\text{what}) \text{ ate } (\text{what})]$ .
- *What* is spelled out at the root phase and is linearized in its latest position as the specifier of the matrix  $CP$ .

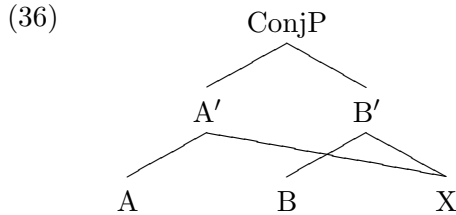
- **Locality constraints:** forcing a wh-element to be spelled out prevents it from moving further.

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

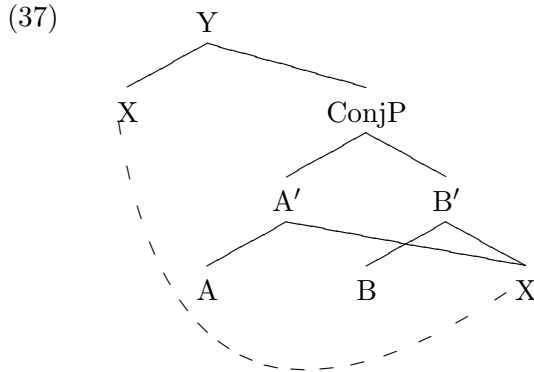
- **Blocking cyclic movement**

- *What* is not completely dominated within the first  $vP$ :  $[_{vP} (\text{what}) \text{ ate } (\text{what})]$ .
- *What* is not spelled out at the first phase. At the second phase, however, *who* is merged as the first specifier of  $CP$ , triggering spellout. The phase node  $CP$  completely dominates all the mothers of *what*, and so by (30) it completely dominates *what*. Consequently, *what* is part of the spellout domain of  $CP$ .
- Further movement of *what* is blocked.

### 3.2.5 Application to RNR



- The shared material is not *completely dominated* inside either of the conjuncts.
- Consequence: the shared material cannot be spelled out before the conjunction is formed. As a result, it may re-merge as a specifier of the first phase above conjunction.



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

- Once the conjunction has been formed, the shared material is completely dominated.
- Consequence: island effects reappear. If the shared material has not been re-merged as a specifier of the first phase above the conjunction, it cannot escape spellout inside the conjunction.

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

b. \***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**  $t_i$ ?

### 3.3 Linearization

- The standard linearization condition:

- (40) STRICT LINEARIZATION (Kayne, 1994; Chomsky, 2004).  
If  $A$  is linearized before  $B$  then  $\forall a \in A. \forall b \in B. a < b$

**The multidominance problem:** If a terminal is contained within both  $A$  and  $B$ , a linearization contradiction arises.

- (41) a. [John bought  $\_$ ] and [Mary sold  $\_$ ] **a book**.  
b. **a book**  $\not<$  **a book**

- Possible solutions:

1. Disallow multiple mothers (Kayne, 1984)
2. Resolve multidominance configurations with additional ATB movement to a position c-commanding both  $A$  and  $B$  (Nunes, 2004; Citko, 2005)  
Problem: RNR exhibits many non-movement like preproperties (cf. Section 1.2)
3. Exempt from (40) terminals that are not completely dominated within either  $A$  or  $B$  (Wilder, 1999)  
Problem: Too permissive.

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

4. Our solution: weaken the linearization condition.

#### 3.3.1 Reflexive linearization

- For the mapping between the linearization of daughter nodes and that of their mother, we replace the irreflexive  $<$  with the reflexive  $\leq$  (\* $A < A$ ,  $\sqrt{A} \leq A$ ):

- (43) a. [John bought  $\_$ ] and [Mary sold  $\_$ ] **a book**.  
b. **a book**  $\leq$  **a book**

(44) LINEARIZATION WELL-FORMEDNESS CONDITION

- a. The linearization list for a node  $X$  has all the terminals dominated by  $X$  as members, and only them.
- b. The restriction of the linearization list of  $X$  to  $CDD(X)$  is a linear order.

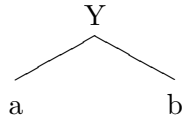
(45) LINEARIZATION MAPPING CONDITION

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:

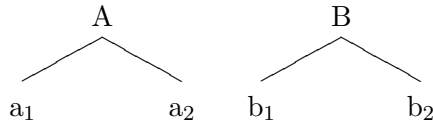
- a. EDGE ALIGNMENT:  $a_1 \leq b_1$  and  $a_m \leq b_n$ .
- b. CONSERVATIVITY:  $a_1 \leq a_2 \leq \dots \leq a_m$  and  $b_1 \leq b_2 \leq \dots \leq b_n$

- Consequences of reflexive linearization:

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

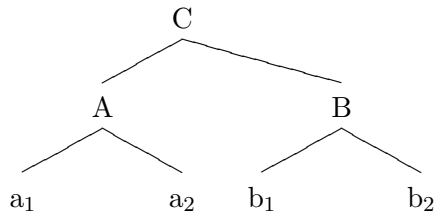


(47) Linearizing complex objects:

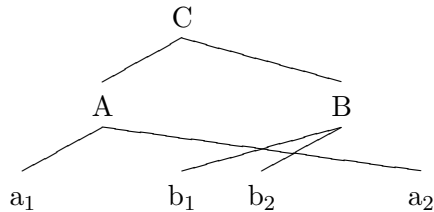


Possible orderings:  $\langle a_1, a_2 \rangle \bullet \langle b_1, b_2 \rangle \Rightarrow ?$

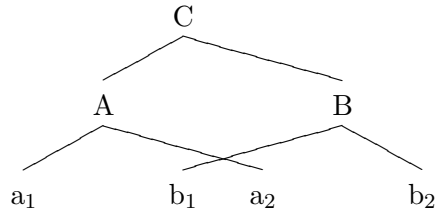
- a.  $\surd$  Concatenation:  $\langle a_1, a_2, b_1, b_2 \rangle$



- b. \* Wrapping:  $\langle a_1, b_1, b_2, a_2 \rangle$



c.  $\surd$  Interleaving:  $\langle a_1, b_1, a_2, b_2 \rangle$

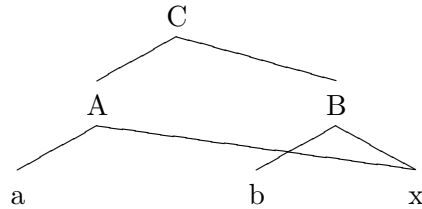


- Interleaving is not excluded by the linearization algorithm itself. However, if A and B in (47) have been already subject to Spellout then interleaving would be blocked.

### 3.3.2 Linearizing multidominance structures

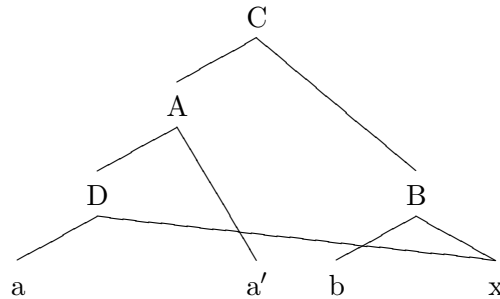
- Right-Node Raising:

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

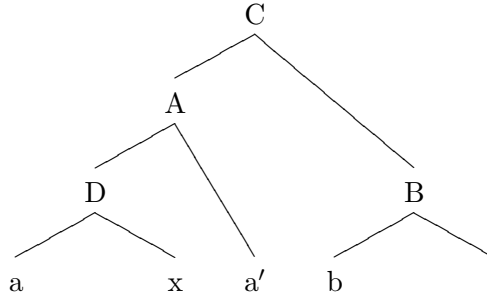


- RER violation:

(49) a.  $\langle a, x, a' \rangle \bullet \langle b, x \rangle \not\Rightarrow \langle a, a', b, x \rangle$



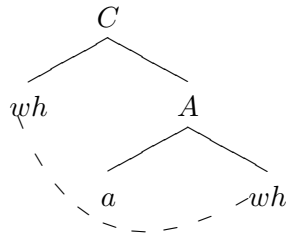
b.  $\langle a, x, a' \rangle \bullet \langle b, x \rangle \not\Rightarrow \langle a, x, a', b \rangle$



### 3.3.3 Linearization and wh-movement

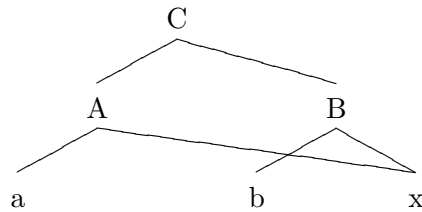
- If linearization involves CONSERVATIVITY, how is wh-movement possible?
- Recall: at the re-merge of a wh-element it is no longer completely dominated.

(50)  $\langle wh \rangle \bullet \langle a, wh \rangle \Rightarrow \langle (wh), a, (wh) \rangle$



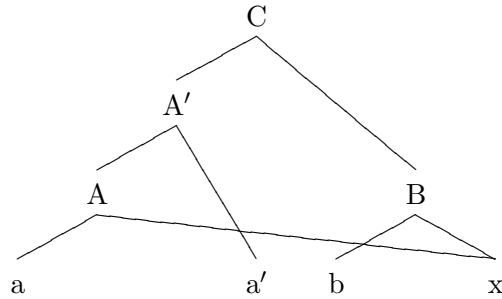
- In RNR, merging the two conjuncts makes the shared material completely dominated.

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



- Result: the shared material in RNR, unlike the wh-element in wh-movement, must be mapped onto a single position, respecting CONSERVATIVITY.

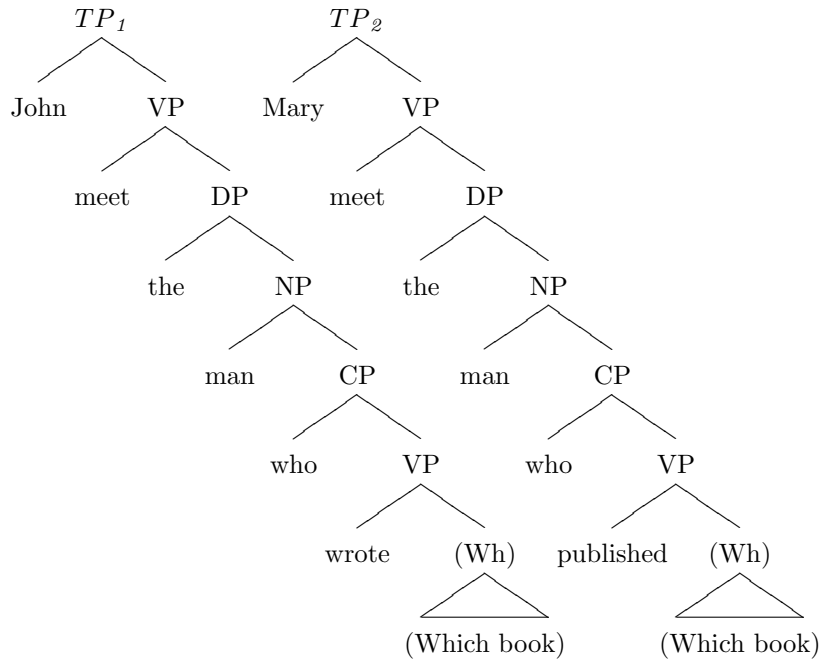
(52)  $\langle a, (x), a' \rangle \bullet \langle b, (x) \rangle \not\Rightarrow \langle a, a', b, x \rangle$



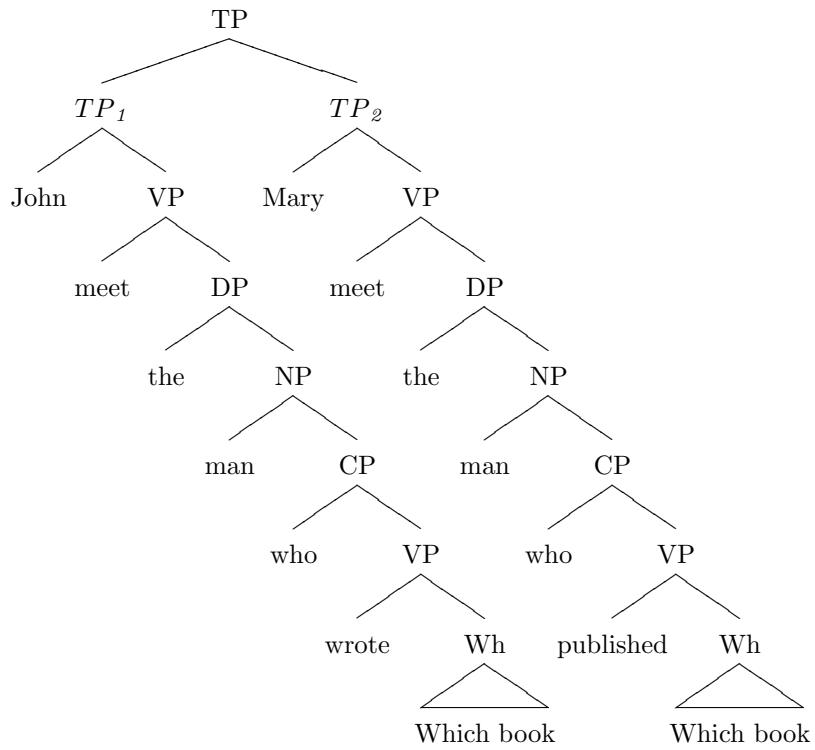
### 3.3.4 Putting it all together

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

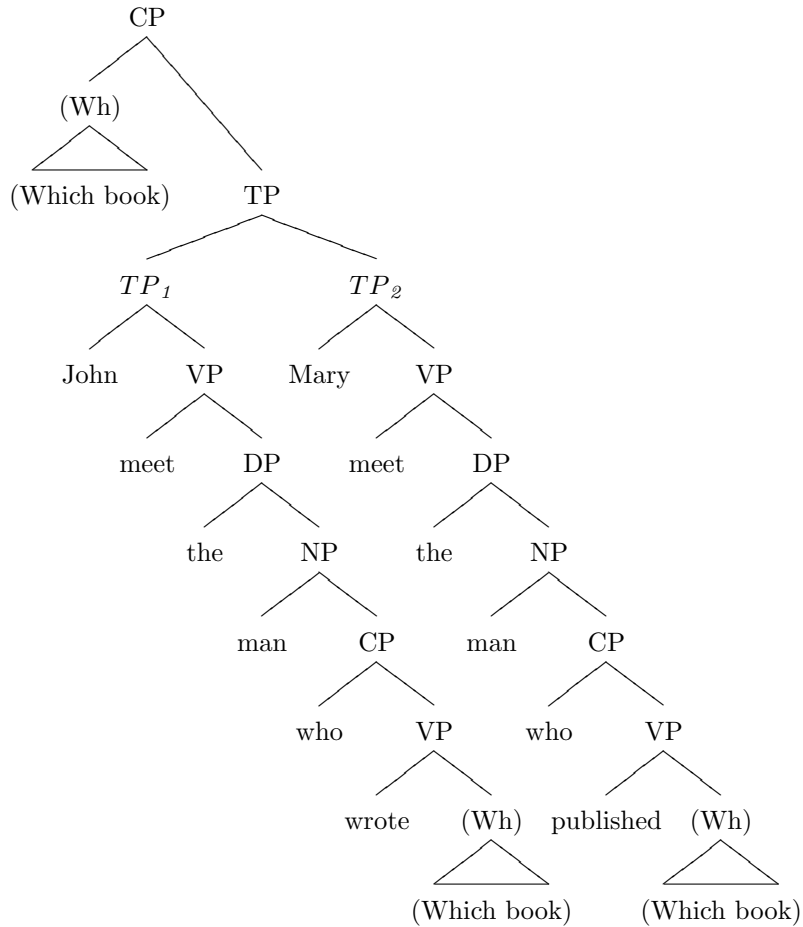
(54)  $TP_1$   $\langle$ John, meet, the man who wrote, (which book) $\rangle$  ,  
 $TP_2$   $\langle$ Mary, meet, the man who published,(which book) $\rangle$



- (55)  $TP_1 \bullet TP_2 \Rightarrow$   
 TP <John,meet, the man who wrote, Mary, meet, the man who  
 published, which book>



- (56) *Wh* • *TP* ⇒  
 CP <(which book), John,meet, the man who wrote, Mary, meet, the  
 man who published, (which book)>



## A Further evidence against movement

- The shared material can be two verbs from two separate clauses (Wilder, 1999):

- (57) [Er hat einen Mann, der drei Hunde —, —] und [sie hat eine  
 He has a man who three dogs and she has a  
 Frau, die drei Katzen —, —] **besitzt, gekannt.**  
 woman who three cats owns known

‘He knew a man who owns three dogs, and she knew a woman who owns three cats.’

- RNR is incompatible with VP-ellipsis (Abels, 2004):

- (58) a. [Jane talked about  $\_$ ] and/but [Frank didn’t talk about  $\_$ ]  
**The achievements of the first year students.**
- b. Jane talked about the achievements of the first year students and/but Frank didn’t ~~<talk about the achievements of the first year students>~~.
- c. \* [Jane talked about  $\_$ ] and/but [Frank didn’t ~~<talk about>~~  $\_$ ]  
**The achievements of the first year students.**

- RNR does not license Lebeaux effects for the shared material:

- (59) a. [Sue promised him<sub>i</sub>  $\_$ ] and [Mary gave him<sub>i</sub>  $\_$ ] **a book that John<sub>i</sub> liked.**
- b. \* [Mary showed every mother  $\_$ ] and [he<sub>i</sub> showed every daughter  $\_$ ]  
**a picture that John<sub>i</sub> bought in the market yesterday**

## B Fragment

- $AtomicType := D \mid N \mid V \mid T \mid W$   
 $Type := AtomicType \mid Type/Type \mid Type \setminus Type$
- $\leq \subseteq AtomicType \times AtomicType$  – a partial order
- $TreeNode := \langle Address, Type, Daughters \rangle$ , where  $Address$  expands to the natural numbers and  $Daughters$  expands to a list of  $Address$ .  
 $TN := \mathbb{N} \times Type \times \mathbb{N}^*$  the set of possible tree nodes
- Workspace:  $WS = \langle Items, Phases \rangle$ , where  $Items \subseteq TN$ ,  $Phases \subseteq Items$ .  $WS$  will be said to be *well-formed* if the following hold:
  1. If  $\alpha, \beta \in items(WS)$  and  $address(\alpha) = address(\beta)$  then  $\alpha = \beta$
  2. If  $\alpha \in items(WS)$  and  $daughters(\alpha) \neq \emptyset$  then  $\alpha$  is licensed by MERGE.
  3. There exists a linearly well-formed mapping  $\mathbb{F}$  on  $WS$ .
- $\langle k, X, \langle i, j \rangle \rangle \in items(WS)$  is licensed by MERGE if there are  $\alpha, \beta \in items(WS)$  and  $i, j < k$  such that either of the two holds:

1.  $\alpha = \langle i, X/Y, z_1 \rangle, \beta = \langle j, V, z_2 \rangle$  ( $V \leq Y$ )
  2.  $\alpha = \langle j, X \setminus Y, z_1 \rangle, \beta = \langle i, V, z_2 \rangle$  ( $V \leq Y$ )
- For any  $z \in \text{items}(WS)$ , the *reachable nodes* from  $z$  are  $\text{Reach}(z) := \{z\} \cup \{x : \exists y \in \text{Reach}(z). x \in \text{daughters}(y)\}$
  - For  $z \in WS$ , the *Complete Dominance Domain* of  $z$  with respect to a set  $S$  is  $\text{CDD}_S(z) := \{x \in S : \forall y \in S. x \in \text{daughters}(y) \rightarrow y = z \vee \forall y \in S. x \in \text{daughters}(y) \rightarrow y \in \text{CDD}_S(z)\}$
  - Let  $L$  be a linear order over a finite set  $D$ . A function  $\sigma : D \rightarrow S$  will be called an *L-list over S*.
  - Let  $\mathbb{F}$  be a function that maps  $WS$  into lists over  $WS$ . For any  $\alpha \in \text{items}(WS)$  define  $R_{\mathbb{F}}(\alpha) = \mathbb{F}|_{\mathbb{F}^{-1}(\text{CDD}_{\alpha}(\alpha))}$ .  $\mathbb{F}$  is *locally linearly well-formed* if the following hold:
    1. For any  $\alpha \in WS$ ,  $\text{Range}(\mathbb{F}(\alpha)) = \text{Reach}(\alpha)$
    2. For any  $\alpha \in WS$ ,  $R_{\mathbb{F}}(\alpha)$  is injective.
  - A locally linearly well-formed  $\mathbb{F}$  on  $WS$  is *linearly well-formed* if:
    1. For any  $\alpha \in WS$  with daughters  $\beta_1, \dots, \beta_n$ ,  $\mathbb{F}$  is order-preserving w.r.t.  $\{\mathbb{F}(\beta_i)\}_{i \in [1, \dots, n]}$ ,  $<$ , and  $\mathbb{F}(\alpha)$ .
    2. For any  $\alpha, \beta \in \text{phases}(WS)$ , if  $\text{CDD}(\alpha) \cap \text{CDD}(\beta) \neq \emptyset$  then either  $R_{\mathbb{F}}(\alpha) \subseteq R_{\mathbb{F}}(\beta)$  or  $R_{\mathbb{F}}(\beta) \subseteq R_{\mathbb{F}}(\alpha)$
    3. For some  $\alpha \in \text{phases}(WS)$ ,  $\text{CDD}_{WS}(\alpha) = \text{items}(WS)$
  - Let  $I$  be a finite set,  $L$  a linear order on  $I$ , and  $S$  a set. Define  $I' = I \cup \{\mu\}$ , where  $\mu \notin I$ . For each  $i \in I'$  let  $D_i$  be a finite set,  $L_i$  a linear order on  $D_i$ , and  $\sigma_i$  an  $L_i$ -list over  $S$ . Define  $A := \{(i, x) : i \in I, x \in D_i\}$ . A function  $f : A \rightarrow D_{\mu}$  will be called *order preserving* w.r.t.  $\{\sigma_i\}_{i \in I}$ ,  $L$ , and  $\sigma_{\mu}$  if:
    1. ONTO:  $f(A) = D_{\mu}$
    2. CONSERV:  $\forall i \in I. \forall x, y \in D_i. (x, y) \in L_i \rightarrow (f(i, x), f(i, y)) \in L_{\mu}$
    3. ALIGN:  $\forall i, j \in I. i < j \rightarrow (f(i, \min(L_i)), f(j, \min(L_j))) \in L_{\mu}$   
 and  $\forall i, j \in I. (i, j) \in L \rightarrow (f(i, \max(L_i)), f(j, \max(L_j))) \in L_{\mu}$
    4. FAITHFULNESS:  $\forall i \in I. \forall x \in D_i. \sigma_{\mu}(f(x)) = \sigma_i(x)$

- Sample Lexicon:

Category	Entries
$D$	John, Mary, we
$W$	who, what, $\phi_{y/n}$
$D/N$	the, a, some
$W/N$	which
$D \setminus W/T$	that
$D/T$	that
$N$	banana, headmaster
$V \setminus D$	walk
$V/D$	fall
$V \setminus D/D$	eat, say
$T \setminus D/D$	will, -s, -d
$X/X$	yesterday, new

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