

What divides, and what unites, right-node raising

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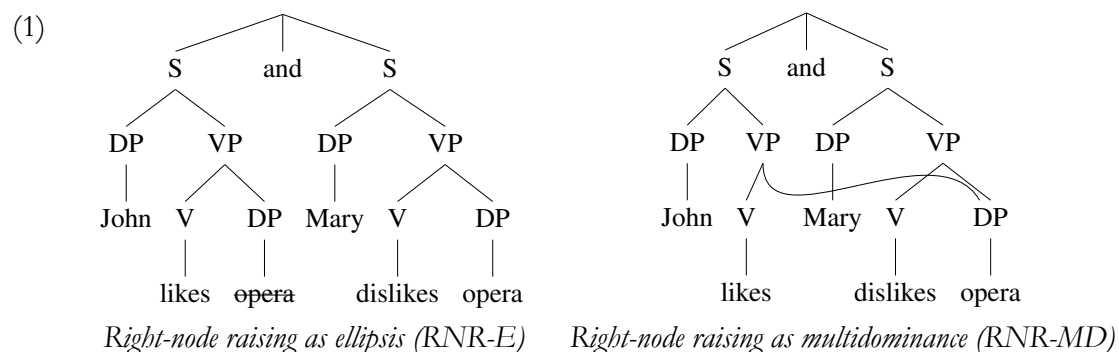
This paper argues, following Barros and Vicente (2011), that right-node raising is either the result of ellipsis or of multidominance. The analysis is supported by four considerations. (i) Right-node raising has properties indicative of ellipsis, as well as properties indicative of multidominance. (ii) These properties can be combined, but only in limited ways. A pivot created through ellipsis may contain a right-peripheral secondary pivot created through multidominance, but not vice versa. Hence, a linear asymmetry in mixed patterns is predicted that is indeed present in the data. (iii) The two derivations are not in free variation, due to a restriction that multirooted multidominance structures can only be closed under coordination. Therefore, right-node raising in non-coordinate contexts displays properties indicative of ellipsis, but not properties indicative of multidominance. (iv) Multidominance gives rise to a difficulty in linearization that can be solved through a pruning operation. We show that the same operation delivers right-node-raising-as-ellipsis. Thus, right-node raising is either multidominance plus pruning, or pruning only. This explains why the two derivations are subject to the same word order restrictions.

Keywords: right-node raising, multidominance, ellipsis, coordination.

1. Introduction

Right-node raising (RNR) is a construction that seems stranger the longer one considers its behavior. It displays a combination of syntactic properties that do not fit any known syntactic operation and is moreover subject to very strict word order constraints that seem *sui generis*. This paper aims to bring us closer to an understanding of the construction. While we may not be able to return RNR to normalcy, we will demonstrate that a coherent analysis is available – an analysis whose components are familiar from other phenomena in English syntax.

We argue, following Barros and Vicente (2011), that RNR can be the output of two distinct derivations. On one derivation, a category left unrealized in the mapping to PF is recovered through the pivot (the category that appears in the right periphery). On the other derivation, the pivot is a category dominated by two nodes. The two options are illustrated below for *John likes, and Mary dislikes, opera*.



A hybrid analysis of the type we advocate runs the risk of being rejected as unparsimonious if an empirically adequate unitary analysis is available. It must therefore be conceptually coherent and supported by strong evidence. This is a challenge given the intricacies of the construction. However, we believe that a convincing case for a hybrid analysis can be made. We proceed as follows.

In section 2, we review and extend part of Barros and Vicente’s argumentation. Barros and Vicente observe that the characteristics of RNR come in two sets. Characteristics in the first set

are typical of ellipsis; they include a tolerance of vehicle change and of morphological mismatches. Characteristics in the second set go beyond what is permitted under ellipsis; they include cumulative agreement and the ability to license internal readings of relational adjectives. We argue that no unitary account can capture both sets of characteristics.

We then consider, in sections 3 and 4, why multidominance should give rise to cumulative agreement and the exceptional wide scope required to license internal readings of relational adjectives. We argue that cumulative agreement is an instance of semantic agreement that is available because regular syntactic agreement is blocked in multidominance structures. We argue that (parts of) the pivot can be assigned exceptionally wide scope because multidominance makes it possible to construct a bijective movement chain where LF raising would otherwise create a forking chain. The discussion will lead to the conclusion that no hybrid analysis other than one that combines ellipsis and multidominance can capture the characteristics of RNR.

In section 5, we consider under what circumstances RNR may combine properties indicative of ellipsis and properties indicative of multidominance. Barros and Vicente argue that such circumstances do not exist (that is, the two sets of properties are mutually exclusive). As a consequence, their proposal is often considered to have been falsified by the evidence of ‘mixed’ pivots in Larson 2012. We demonstrate, however, that a hybrid multidominance-plus-ellipsis account is subtler in its predictions than Barros and Vicente (and Larson) assume. This is because it is possible for a constituent at the right periphery of a pivot created through ellipsis to undergo RNR-MD. Consequently, properties indicative of multidominance may precede properties indicative of ellipsis, but not the other way around. We show that this linear asymmetry in the distribution of the two types of characteristics indeed exists.

In section 6, we show that, outside coordinate structures, RNR-MD is unavailable. This observation provides support for a hybrid multidominance-plus-ellipsis account, as it demonstrates that it is possible to selectively disable one of the processes that gives rise to RNR. Of course, the observation also raises the question of *why* coordination should be a precondition for RNR-MD. We provide a speculative account, which is supported by the interpretation of so-called Horn amalgams (another construction often analyzed in terms of multidominance).

We conclude the main part of the paper in section 7 with a discussion of the issue of parsimony. Why should RNR, if it has two sources, give the impression of being a single phenomenon? Why should it be that two very different processes (ellipsis and multidominance) are subject to very similar word order restrictions? No answer to this question is proposed in other papers advocating hybrid accounts (Barros and Vicente 2011, Valmala 2013, Chaves 2014 and Hirsch and Wagner 2015). Our proposal consists of a PF mapping rule (based on insights in Wilder 1999) that reconciles RNR-MD with the no-tangling condition. This rule prunes a branch that would otherwise cross other branches. As it turns out, the very same rule will yield RNR-E when applied to an appropriate input structure without multidominance. Thus, one incarnation of RNR is generated through a combination of multidominance and pruning, while the other involves pruning only. It follows that the two derivations will share properties that bear on pruning, irrespective of their syntactic origin.

Section 8 summarizes our findings and considers some of their implications.

2. The duality of right-node raising

One question about RNR is whether the pivot remains in situ (as in (2a)) or is created through across-the-board (ATB) movement to a position outside the coordinate structure (as in (2b); see Ross 1967, Postal 1974, and Sabbagh 2007).¹

- (2) a. John likes and Mary [dislikes opera].
b. [John likes t_1 and Mary dislikes t_1] opera₁.

Various linguists have argued that the ex-situ analysis is unlikely to be correct, because RNR lacks core properties of movement (see Wexler and Culicover 1980, McCloskey 1986, Abels 2004, De Vos and Vicente 2005 and Citko 2011). First, as Abels (2004) notes, it is typical of overt movement operations that they lead to changes in word order. RNR, however, is obligatorily order-preserving. Given an input [XP₁ ... Y ...] and [XP₂ ... Y...], RNR can remove Y from XP₁ if Y is right-peripheral in XP₁ and XP₂ (see (3a)). However, it is unable to shift Y rightwards across modifiers in XP₁ and XP₂ (see (3b)). It is of course suspect that a movement operation must preserve order in this way.

- (3) a. Yesterday Mary found a solution to, and next year John will write a book about, one of the great unsolved problems of syntax.
b. *Mary found a solution to yesterday, and John will write a book about next year, one of the great unsolved problems of syntax.

Second, Wexler and Culicover (1980) and many others have noted that RNR – in opposition to other instances of movement – is island-insensitive. On a movement account, (4a) would violate the wh-island constraint, (4b) would violate the complex-NP constraint and (4c) would violate the adjunct island constraint. Yet, all three examples are grammatical.

- (4) a. John wonders when Bob Dylan wrote, and Mary wants to know when he recorded, his great song about the death of Emmett Till.
b. I know a man who buys, and you know a woman who sells, gold rings and raw diamonds from South Africa.
c. Josh got angry after he discovered, and Willow quit after she found out about, the company's pro-discriminatory policy.

A related point is made by Ross (1967), who observes that preposition stranding is impossible under extraposition, as shown in (5), but permissible under RNR, as shown in (3a) above (see also McCloskey 1986):

- (5) *]Jane talked [about t_{DP}] yesterday [_{DP} the achievements of the syntax students].

Third, RNR, if it were a string-vacuous movement operation, should result in rebracketing. It can be shown, however, that it does not, at least not for ellipsis. As is well known, VP ellipsis can affect VPs that contain a trace, as in (6), where e_{VP} represents an unrealized instance of [_{VP} read t_{wh}] (see Merchant 2013 and references mentioned there).

- (6) I know which book Mary read t_{wh} and which book Bill didn't e_{VP} .

If so, it should be possible to take the construction in (7a) and elide the rightmost VP, leaving the pivot intact. However, the example in (7b) is ungrammatical. As Abels (2004) points out, this

¹ All data reported reflect the judgments of three native speakers. We have worked with four additional speakers in constructing new data.

follows if the pivot is in fact contained in the rightmost VP – but that can only be the case if RNR does not in fact lead to rebracketing, unlike string-vacuous movement.

- (7) a. Jane talked about, but Frank didn't talk about, the achievements of the syntax students.
b. *Jane talked about, but Frank didn't e_{VP} , the achievements of the syntax students.

In addition, the phenomenon of right-node wrapping seems incompatible with a movement analysis. Right-node wrapping is found in structures such as (8), where a constituent belonging to the final conjunct (here *to Mary*) follows the pivot (here *a book about opera*). The phenomenon is discussed in Wilder 1999 and Whitman 2009; the latter provides a convincing empirical case for right-node wrapping. The order in (8) of course suggests that the pivot has not moved outside the coordinate structure. It is in essence a further illustration of order preservation.

- (8) John bought, and Bill gave, a book about opera to Mary.

Given these considerations, we do not pursue a movement analysis of RNR.²

There are two unitary analyses that capture the above data straightforwardly, namely the ellipsis analysis in (1a) (see Wilder 1997 and Hartmann 2000) and the multidominance analysis in (1b) (see McCawley 1982, Wilder 1999 and De Vries 2009, among many others). On both analyses the pivot remains in situ, so that RNR is expected to lack movement characteristics. Barros and Vicente (2011) demonstrate, however, that neither of these unitary analyses can be correct. They discuss four additional properties of RNR. Two of these are shared with regular forward ellipsis but are incompatible with a multidominance analysis. The other two are arguably compatible with multidominance but are not shared with regular forward ellipsis. Hence, neither of the two remaining unitary analyses covers the full set of data.

The first property familiar from forward ellipsis is that RNR tolerates morphological mismatches between the overt and the missing material (see also Bošković 2004, Ha 2008 and Shiraishi et al. 2019). One such mismatch involves the inflectional form of selected verbs. Consider the examples in (9). In (9a), the pivot is *waking up early*, which cannot appear following *fail to* when overt (see (9b)), but can act as an antecedent of *wake up early* in forward ellipsis (see (9c)).

- (9) a. I usually fail to, but Alice always succeeds in, waking up early.
b. *I usually fail to waking up early, but Alice always succeeds in waking up early.
c. Alice always succeeds in waking up early, but I usually fail to e_{VP} .

Mismatches can also involve sloppy readings of pronouns, as in (10a), where the elided material is most naturally interpreted as *pass my math exam*, rather than *pass her math exam*. Again, this type of mismatch is not tolerated when the structure is fully realized (see (10b)), but acceptable under forward ellipsis (see (10b)).³

² Sabbagh (2007) proposes a unitary movement analysis that addresses some of the problems summarized here. It is based on the assumption that string-vacuous rightward movement can span large distances. This captures many of the above data, but not the lack of rebracketing in (7) or the option of right-node wrapping illustrated in (8).

³ Chaves (2014) also argues that morphological mismatches result from ellipsis. However, he takes the relevant process to be a backward instance of regular VP (or N') ellipsis. This overlooks the fact that relevant examples are subject to linear constraints typical of RNR, rather than VP ellipsis, as shown in (i).

- (i) a. This year Mary will e_{VP} , and next year Sue may, publish a book.
b. *Mary will e_{VP} this year, and Sue may publish a book next year.
c. Mary will publish a book this year, and Sue may e_{VP} next year.

Chaves further claims that morphological mismatches are limited to cases that can be analyzed as VP/N' ellipsis, but this is not borne out by the data in Shiraishi et al. 2019

- (10) a. I know that I didn't, but I'm sure that Alice will, pass her math exam.
 b. *I know that I didn't pass her math exam, but I'm sure that Alice will pass her math exam.
 c. I'm sure that Alice will pass her math exam, but I know that I didn't e_{VP} .

RNR also resembles forward ellipsis in allowing vehicle change. The example in (11a) would violate principle C if the elided material were *fire Alice* (see (11b)). Apparently, a silent VP containing a pronoun (*fire her*) is recoverable in the presence of an overt VP containing a coreferent R-expression, a phenomenon known from regular VP ellipsis (see (11c); see Fiengo and May 1994 and subsequent literature).

- (11) a. She₁ hopes that he won't, but I fear that the boss will, fire Alice₁.
 b. *She₁ hopes that he won't fire Alice₁, but I fear that the boss will fire Alice₁.
 c. I fear that the boss will [_{VP} fire Alice₁], although she₁ hopes that he won't $e_{VP 1}$.

A unitary multidominance analysis cannot capture these data. While recoverability under ellipsis is relatively permissive, multidominance imposes an absolute identity requirement on the pivot and the 'gap': they are literally the same constituent. Hence, (9a), (10a) and (11a) are incorrectly predicted to be as bad as (9b), (10b) and (11b).

On the other hand, RNR is different from forward ellipsis in allowing cumulative plurals (see Postal 1998:173, Yatabe 2003, Chaves 2014 and Grosz 2015). Consider (12a), which we borrow from Grosz (2015:16). Although the subject in each of the conjuncts is singular, many speakers prefer it if the verb appears in the plural, apparently reflecting the total number of people that have traveled to Cameroon. In regular forward ellipsis, cumulative agreement is not an option, as (12b) illustrates.

- (12) a. Mary is proud that John, and Sue is glad that Bill, have traveled to Cameroon.
 b. John has/*have traveled to Cameroon, and Bill e_{TP} , too.

In addition, RNR permits an internal reading of relational adjectives like *same* and *different*, even though that reading is unavailable under regular ellipsis (see Jackendoff 1977 and Abels 2004). Take an example like *Alice and Beatrix performed different songs*. On the external reading of *different*, Alice and Beatrix performed songs different from an unmentioned, contextually salient song. On the internal reading, Alice did not perform the song that Beatrix performed. Crucially, (13a) permits an internal reading of *different*, so that Beatrix performed a song different from the one that Alice composed. The example in (13b), which involves regular ellipsis, does not permit such an interpretation (it cannot mean that Beatrix performed a song different from Alice's song).

- (13) a. Alice composed, and Beatrix performed, different_{INT} songs.
 b. *Alice performed different_{INT} songs, and Beatrix did e_{VP} , too.

While it is not a priori clear that movement and/or multidominance can explain why RNR gives rise to cumulative agreement or internal readings of relational adjectives, there can be little doubt that ellipsis is unable to do so. Hence, none of the unitary analyses under consideration provides a feasible account of RNR. As indicated in the first three columns in the table below, movement, ellipsis and multidominance all leave some core observations unexplained.

	Movement	Ellipsis	M-dominance	Movement + ellipsis	Movement + m-dominance	Ellipsis + m-dominance
a. Order preservation	✗	✓	✓	✗	✗	✓
b. Island insensitivity	✗	✓	✓	✓	✓	✓
c. Non-rebracketing	✗	✓	✓	✗	✗	✓
d. Mismatches	✗	✓	✗	✓	✗	✓
e. Vehicle change	✗	✓	✗	✓	✗	✓
f. Internal readings	?	✗	?	?	?	?
d. Cumulative Agr.	?	✗	?	?	?	?

Table I: Provisional overview of the empirical coverage of unitary and hybrid analyses

These conclusions give us a license to explore hybrid accounts of RNR. As things stand, the most promising hybrid analysis assumes that RNR is either the result of ellipsis or of multidominance, as advocated by Barros and Vicente. This account captures the observations in (Ia)-(Ie) and may be compatible with those in (If) and (Ig). Hybrid accounts that hypothesize that ATB movement is one source of RNR (see Valmala 2013 and Chaves 2014) cannot explain order preservation or lack of rebracketing. In addition, a movement-plus-multidominance account cannot capture the observed tolerance of mismatches or the option of vehicle change, as these are incompatible with either multidominance or movement. As already explained, the incompatibility with multidominance is a matter of logic. The incompatibility with movement has not been demonstrated yet. However, it is implied by the copy theory and supported by the data in (14).

- (14) a. *Waking up early, Alice always succeeds in t_{VP} , but I usually fail to t_{VP} .
b. *Passing her math exam, I'm sure that Alice will succeed in t_{VP} , but I know that I have failed at t_{VP} .
c. *Firing Alice₁, I fear that the boss is thinking of t_{VP} , but she₁ hopes that he won't consider t_{VP} .

The above encourages us to explore the ellipsis-plus-multidominance account of RNR. Whether this account stands up to closer scrutiny depends on various issues. To begin with, there are two properties of RNR that require further discussion: its ability to license cumulative agreement and internal readings of relational adjectives. Barros and Vicente suggest that these properties follow from multidominance, but it is not a priori clear why this should be so (hence the question marks in table I). We address these matters in the following two sections.

3. Multidominance and cumulative agreement

Why should RNR-MD give rise to cumulative agreement? Why should plural marking be licensed in examples such as (12a) (repeated here as (15)), even though each conjunct has a singular subject?

- (15) Mary is proud that John, and Sue is glad that Bill, have traveled to Cameroon.

We consider two hypotheses. The first, due to Grosz (2015), is that multidominance leads to a structure in which a verb agrees twice (see Yatabe 2003 for a similar analysis within HPSG). Thus, *have* in (15) agrees both with *John* and with *Bill*. These two singular agreement relations are added up (in a way to be made precise below) to yield a plural ending. The second hypothesis, which we will argue for, is that multidominance leads to a structure in which the verb cannot agree at all. This, then, leads to a situation in which the information on the verb must be interpreted, triggering a requirement of plurality if the verb is marked plural.

Grosz’s analysis of cumulative agreement under RNR can be summarized as follows. (i) A multidominated predicate agrees with multiple subjects. (ii) Plural DPs have multiple indices; singular DPs have a single index. (iii) Under agreement, all the indices of the agreeing subject(s) are copied into an agreement slot. (iv) An agreement slot is an unordered set of indices whose arity is reflected by morphological number.

Thus, in (15) the indices of *John* and *Bill* are copied into the predicate’s agreement slot. As these indices are distinct, the arity of the agreement slot is larger than one, and therefore the auxiliary assumes its plural form:

(16) Mary is proud that John_{j}, and Sue is glad that Bill_{b}, have_{j,b} traveled to Cameroon.

This analysis predicts correctly that if in a comparable structure the two subjects bear the same index, agreement will be singular. In (17), for example, the index of *John* is copied twice. These indices are not distinct, so the arity of the agreement slot is one ($\{j, j\} = \{j\}$). Consequently, insertion of a plural auxiliary is not warranted.

(17) Mary is PROUD that John_{j}, and Sue is GLAD that John_{j}, has_{j}/*have_{j} traveled to Cameroon.

While ingenious in its syntacticization of cumulative agreement, this analysis falls short in one crucial respect. To see this, consider (18). Here, the context makes clear that a single person has traveled to Cameroon, while the example sentence describes a disagreement over the question of who this person is. As it turns out, under these circumstances the auxiliary cannot carry plural morphology. This does not follow. *Bill* and *Carla* have different indices, and therefore the arity of the auxiliary’s agreement slot will be larger than one, which should trigger plural marking.

(18) [One of our neighbors has traveled to Cameroon, but we do not know who.]

John said that BILL, but Mary said that CARLA, has/*have traveled to Cameroon.

The effect is not limited to instances of RNR with *but* as coordinator. There is a clear contrast between (19a), where the assumption is that a single person has stolen a unique backdoor key, and (19b), where the assumption is that multiple persons have stolen copies of the backdoor key. Only the second scenario allows plural marking of the predicate, even though the structures are syntactically identical, and both have *and* as a coordinator.

(19) a. [Someone has stolen the backdoor key, but we do not know who.]

John said that BILL, and Bill said that JOHN, has/*have stolen the backdoor key.

b. [Several people have stolen backdoor keys, and we know who some of them are.]

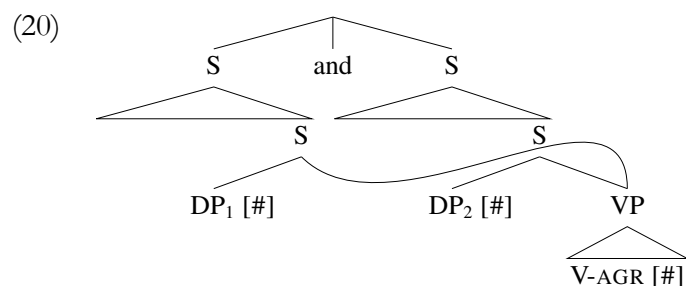
Mary discovered that Bill, and Carla discovered that John, have stolen backdoor keys/a backdoor key.

In conclusion, cumulative agreement is sensitive to whether the predicate is supposed to hold of a plural individual, a fact at odds with the index copying mechanism in Grosz (2015).

The alternative analysis we propose takes as its starting point the notion that multidominance blocks agreement altogether. This blocking effect can be modeled in various ways. For concreteness’ sake, we propose an account based on four assumptions. First, agreement is a relation of feature identification. This idea is familiar from Head-Driven Phrase Structure Grammar and Lexical-Functional Grammar (see, for instance, Gazdar et al. 1985, Shieber 1986, Barlow 1992, and Pollard and Sag 1994). In Minimalism, a similar line is adopted in Brody 1997 (see also Frampton and Gutmann 2000, Pesetsky and Torrego 2007, and Ackema and Neeleman 2018). Thus, in an example like *the boys have left*, the plural feature of the auxiliary is identified with the

plural feature of the DP, so that we end up with a single feature that has two locations. Second, features are interpreted in a unique location. Thus, in *the boys have left* the plural feature must be interpreted in the subject or in the auxiliary, but not in both. Third, φ -features in DPs must be interpreted. Thus, in *the boys have left*, the plural feature is interpreted in the DP and not in the auxiliary. Fourth, agreement is greedy: if a verbal head initiates agreement, it must agree with any category that meets the structural description of the rule.

Consider now what happens if the pivot in a multidominance structure contains a verbal head that initiates agreement, as in (20).



What is unusual about this situation is that there are multiple categories that V can and therefore must agree with (given our fourth assumption). In (20), these are the subjects DP₁ and DP₂. As a consequence, the number feature of V is identified with both the number feature of DP₁ and the number feature in DP₂. By transitivity, the number features of DP₁ and DP₂ are identified as well, so that we arrive at a representation in which a single feature has *three* locations. The problem is that it can only be interpreted in one of these locations (by our second assumption) but must be interpreted in both DPs (by our third assumption). Therefore, V cannot initiate agreement in (20).

We can now treat cumulative agreement not as a consequence of multiple agreement, but as a consequence of a *lack* of agreement. If there is no agreement in (20), we are dealing with three number features that each have a unique location and that each of must be interpreted. This is unproblematic for the number features in DP₁ and DP₂. As for the number feature in V, we propose that, in the absence of agreement, plural number marking on a verbal category triggers the rule in (21), where VP+ stands for the minimal verbal category that hosts plural number (the contribution of singular is analyzed below as an ‘elsewhere’ effect). Related proposals can be found in Beavers and Sag 2004 and Chaves 2014.

(21) If VP+ is marked as plural, then $[[VP+]]$ holds of a plural individual.

The rule in (21) captures the data discussed above. In (15), the plural marking on the auxiliary implies that *have traveled to Cameroon* holds of a plural individual. In the multidominance structure, this predicate takes two subjects, which yields the propositions that John has traveled to Cameroon and that Bill has traveled to Cameroon. If both are taken to be true, as is the case in (15), then John and Bill have traveled to Cameroon, which satisfies the rule in (21).

In (17), plural marking on the auxiliary again triggers the requirement that the predicate *have traveled to Cameroon* applies to a plural individual. However, in this case the two propositions generated under multidominance are not distinct, and so only a singular individual, *John*, has traveled to Cameroon. Thus, (17) is ill-formed with plural marking – such marking triggers (21) in a context where it is infelicitous.

In (18), two distinct propositions are generated, namely ‘Bill has traveled to Cameroon’ and ‘Carla has traveled to Cameroon.’ However, in the context given only one of these is assumed

to be true, and therefore it is not possible to conclude that Bill and Carla have both traveled to Cameroon. Plural marking on the auxiliary is consequently not warranted.

The same logic is relevant in (19a), where plural marking requires that *have stolen the backdoor key* applies to a plural individual (presumably John+Bill). But as the context makes clear, the issue at hand is which of them is the thief, and so plural marking is not appropriate. The example in (19b) comes with a similar interpretive demand, namely that *have stolen backdoor keys/a backdoor key* applies to a plural individual (again, John+Bill). However, here the context makes clear that multiple people are indeed assumed to have stolen backdoor keys, so no problem arises.

The account explains why cumulative agreement is incompatible with disjunction (see Beavers and Sag 2004 and Chaves 2014). The disjunction in (22) suggests that it is not the case that both the vicar and the major have committed murder, and hence the plural form of the auxiliary is not warranted.

(22) By ten PM, Poirot will prove that the vicar, or that the major, has/*have committed murder.

The set-up so far might seem to render syntactic agreement optional. This is not our intention, however. The rule in (21) is only supposed to apply where syntactic agreement is unavailable. This arrangement is familiar from binding theory. Syntactic binding is often claimed to block variable binding and coreference, which are relations taken to be established outside syntax proper (see Reinhart 1983, Grodzinsky and Reinhart 1993 and Reuland 2001, 2011). In the same vein, the primacy of agreement over the rule in (21) instantiates a preference for syntactic over other forms of licensing. As it is multidominance that blocks agreement in (20), this suffices to underpin the use of cumulative agreement as a test for RNR-MD.

The above explains why even where cumulative agreement is licensed, we find an anticollectivity effect: two singular subjects cannot act as a virtual plurality for collective predicates like intransitive *meet*, as shown in (21) (see Moltmann 1992). Why should this be, given that two singular subjects can act as a virtual plurality for the purposes of number marking?

(23) *Mary is happy that John, and Sue is delighted that Bill, have finally met.

The solution is straightforward. Application of (21) implies *have finally met* applies to a plural individual (which would have to be John+Bill). However, independently of this, the structure encodes that *have finally met* holds of *John* and *Bill* individually, as these DPs each stand in a predication relation with it. Thus, the raised predicate must be interpreted distributively: it must be true that *John and Bill have finally met* (by virtue of (21)), but also that *John has finally met* and that *Bill has finally met* (by virtue of the syntax). As a collective predicate is not defined when applied to a singular individual, the structure is ruled out.⁴

⁴ For reasons of space, this section gives only a partial account of agreement in RNR structures. In particular, quantified phrases behave differently from referential DPs. While indefinites display cumulative agreement under the same circumstances as referential DPs (see (ia)), universal and negative quantifiers resist cumulative agreement (see (ib,c)).

- (i) a. Susan reports that a doctor, and Carla reports that a nurse, have/??has traveled to Cameroon.
b. Susan reports that every doctor, and Carla reports that every nurse, has/??have traveled to Cameroon.
c. Susan reports that no doctor, and Carla reports that no nurse, has/*have traveled to Cameroon.

As quantifiers do not carry referential indices, agreement with quantifiers requires additional assumptions on Grosz's (2015) account. These assumptions involve the representation of number in QPs.

On our account, too, the data in (i) can be captured by appealing to the semantic contribution of number in quantified expressions. Consider a DP like *the boys*. Its interpretation requires, first of all, the construction of a semi-lattice through the mapping of a set of atoms to the set of its nonempty subsets. Let us assume, for concreteness' sake, that this is triggered by the attachment of a distributivity operator D (see Link 1983). Subsequently, the plural feature triggers selection of those subsets that have a cardinality larger than one. This procedure characterizes plural

There are two further outstanding matters. The first is whether ATB movement could give rise to cumulative agreement. The evidence suggests a negative answer. Consider the example in (24), where the auxiliary has undergone ATB movement. Even though it c-commands both subjects after movement, it cannot assume a plural form. Given that ellipsis does not license cumulative agreement either, the phenomenon is not just compatible with multidominance, but indicative of it (see footnote 8 for further discussion).

(24) When has/*have [Susan t_{aux} seen such chaos] and [Helga t_{aux} heard such cacophony]?

The final outstanding matter has to do with the fact that cumulative agreement is strongly preferred where licensed semantically. Thus, in a context in which multiple people have stolen copies of the backdoor key, the example in (19b) is acceptable, but the one in (25) is clearly degraded.

(25) [Several people have stolen backdoor keys, and we know who some of them are.]
 ??Mary discovered that BILL, and Carla discovered that JOHN, has stolen a backdoor key/backdoor keys.

This is expected if the structure is generated through multidominance. The logic of competition has the consequence that where (21) can apply, it must apply – non-application would entail that the predicate applies to a singular individual, or at the very least that the speaker cannot commit to it applying to a plural individual. (Note that the same logic underlies the notion that presupposition should be maximized, as argued in Heim 1991, Sauerland 2008 and much subsequent literature.) However, that is not enough to explain the awkwardness of (25). After all, if both conjuncts are realized, as in (26), the auxiliary appears in the singular.

(26) [Several people have stolen backdoor keys, and we know who some of them are.]
 Mary discovered that BILL has stolen a backdoor key, and Carla discovered that JOHN has stolen a backdoor key.

One would expect this singular agreement to survive under ellipsis. The observation that (25) is degraded therefore suggests that finite predicates resist elision under RNR. We have no explanation of this apparent fact (although it is to be expected that RNR-E and RNR-MD do not have exactly the same domain of application; see also section 6). Given that the restriction will play a role below, we state it here as an auxiliary hypothesis:

(27) A finite pivot cannot be created through RNR-E.

This hypothesis is not without precedents; a very similar constraint holds of forward verbal ellipsis; witness the ungrammaticality of the examples in (28).⁵

definite and indefinite DPs alike. It does not apply to plural universal and negative quantifiers, however. While these do have a restrictor interpreted as a set of sets (see Winter 2002), there is no selection of nonsingleton sets prior to merger of the quantifier (*no boys*, for instance, does not mean “no sets of boys with a cardinality larger than one”). In other words, D is attached, but [PL] is not interpreted. We assume it is present for purely morphosyntactic reasons: D can only appear in the context of [PL]. If the above is on the right track, then number in universal and negative quantifiers is not interpreted. This in turn implies that multiple agreement with such quantifiers will not lead to interpretive difficulties, blocking application of the rule in (21) and hence ruling out cumulative agreement.

Many empirical and analytical questions remain that we have to put to one side here. These involve language variation and speaker variation, in particular with regard to resolution of agreement where two controllers have contrasting features (see Kluck 2009 for pertinent discussion on Dutch).

⁵ We will mainly rely on (27) to rule out finite predicates that act as pivots in RNR-E. However, we think that the constraint extends to finite clauses (see footnotes 13 and 14).

Note that finite predicates can be elided in examples such as (ia,b), but this option disappears when the finite predicate is embedded, as in (ii).

- (28) a. *Mary wondered if Bill had stolen a backdoor key, and Carla wondered if JOHN e_{TP} .
 b. *Mary wondered if Bill had stolen a backdoor key, and Carla also wondered if e_{TP} .
 c. *Mary wondered if Bill had stolen a backdoor key, and Carla also wondered e_{CP} .

We will give two further arguments for (27), one based on prosody (see section 5) and one based on distributional evidence (see section 6).

4. Multidominance and scope

We now investigate why internal readings of relational adjectives should diagnose RNR-MD.

Carlson (1987) argues that the availability of an internal reading of *same* requires distribution over events. For example, *John and Bill read the same book* permits an internal reading if John and Bill each read a book, but not if there is a single event in which John and Bill collaboratively read a book. Similarly, an internal reading is possible in *John read the same book twice*, but not in *John read the same book once*. It seems, then, that *same* must take scope over multiple events in order to trigger an internal reading. This conclusion presumably extends to *different*.⁶

Now consider (29). If *same* is to take scope over multiple events, it must take scope over the coordinate structure. Therefore, the claim that internal readings of relational adjectives diagnose RNR-MD implies that multidominance is necessary to generate wide scope of the pivot (or a constituent contained in the pivot).⁷

- (29) Ann read, and Bill reviewed, the same_{INT} book.

There is a straightforward explanation for why this should be so. Let us assume that movement cannot create forking chains, that is, a moved category may not c-command two traces that do not themselves stand in a c-command relation:

- (30) Movement chains are bijective.

This hypothesis forces a multidominance analysis of ATB movement. The underlying representation in (31a) cannot be transformed into (31b), as (31b) violates the ban on forking chains. (In (31) and below, conjuncts are placed below one another.)

- (31) a. Did you [borrow which book from John]
 and [give which book to Mary]?
 b. *[Which book]₁ did you [borrow t_1 from John]
 and [give t_1 to Mary]?

However, if *which book* is a multidominated category, *wh*-movement creates a bijective chain, as required (in (32) and below, multidominated categories are placed between conjuncts):

-
- (i) a. John has stolen a backdoor key and Bill e_{TP} , too.
 b. [Who has stolen the backdoor key?] Bill e_{TP} .
 (ii) a. *John has stolen a backdoor key and I know that Bill e_{TP} , too.
 b. [Who has stolen the backdoor key?] *Mary said that Bill e_{TP} .

⁶ A reworking of Carlson's insights can be found in Barker 2007. Barker shows that Carlson's generalization is too strong, and that *same* in fact requires multiple situations (rather than events). This, however, does not affect the conclusion that scope over the coordination is required for internal readings of relational adjectives.

⁷ Unexpected wide scope in RNR structures has been argued to be a consequence of ATB extraposition (see Sabbagh 2007, Valmala 2013 and Chaves 2014). Note that the relevant extraposition rule is not independently motivated, not even in the hybrid accounts proposed by Valmala and Chaves. In (i), wide scope of the universal is available under (apparent) preposition stranding. Yet, preposition stranding is not found with regular extraposition.

(i) A student developed an analysis of, or a professor wrote an article about, every type of ellipsis.

- (32) a. Did you [borrow which book from John]
and [give to Mary]?
- b. [Which book]₁ did you [borrow _{t₁} from John]
and [give to Mary]?

This is not a new suggestion. It goes back to Williams (1978) and has been developed in varying ways by Goodall (1987), Citko (2005), Muadz (1991), Moltmann (1992) and De Vries (2009).⁸

The ban on forking chains also restricts covert movement from coordinate structures. In particular, it correctly rules out ATB quantifier raising. As pointed out in Bošković and Franks 2000, an example like (33) does not permit a reading in which there is a single universal that takes scope over both conjuncts. The sentence cannot mean that for every book on this shelf it is true that either a professor stole it or a student borrowed it. Rather, it means that either all the books were stolen by a professor, or all the books were borrowed by a student.

- (33) [A professor stole every book on this shelf],
or [a student borrowed every book on this shelf]. (* $\forall > \forall > \exists_P / \exists_S$)

This observation follows from (30). If *every book on this shelf* is to undergo ATB quantifier raising to a position outside the coordinate structure, it is inevitable that a forking chain is created:

- (34) [Every book on this shelf]₁ [a professor stole _{t₁}],
or [a student borrowed _{t₁}].

Ellipsis cannot be used to solve this problem. It is true that in (35) the number of overt occurrences of *every book on this shelf* has been reduced to one. However, on the assumption that ellipsis is a PF phenomenon, e_{VP} contains a second instance of the universal quantifier, so that ATB quantifier raising would still create a forking chain. It follows that (35) cannot mean that for every book on this shelf it is true that a professor or a student stole it.

- (35) A professor stole every book on this shelf, or a student did e_{VP} . (* $\forall > \forall > \exists_P / \exists_S$)

This does not mean that quantifiers can never escape coordinate structures. As Ruys (1992:31–39) demonstrates, a quantifier may raise out of the first of two VP conjuncts, as long as it binds a category that can act as a variable in the second conjunct (see also Rodman 1976, Reinhart 1987, Fox 2000 and Philip 2012). Thus, there is a sharp contrast between (36a,b) and (36c): only in the former two examples can the universal object take scope over the existential subject.

- (36) a. A soldier [found [every traitor]₁] and [shot him]₁. ($\exists > \forall ; \forall > \exists$)
b. A soldier [found [every traitor]₁] and [shot [the bastard]₁]. ($\exists > \forall ; \forall > \exists$)
c. A soldier [found every traitor] and [shot every traitor]. ($\exists > \forall ; * \forall > \exists$)

⁸ If ATB movement is facilitated by multidominance, one may wonder why it does not give rise to cumulative agreement after all. Note, however, that in (i) it is not only the case that the auxiliary's trace cannot enter into regular syntactic agreement (as explained in the previous section), but also that the rule in (21) cannot apply: the plural feature on the auxiliary does not find a predicate that can be marked as holding of a plural individual.

- (i) When has [Susan seen such chaos]
and [Helga _{t_{aux}} heard such cacophony]?

What is possible, at least in principle, is for the auxiliary to initiate syntactic agreement from its surface position. This may explain the data in (ii), which would fall into place as instantiating closest conjunct agreement:

- (ii) a. When has/*have [Susan _{t_{aux}} seen such chaos] and [the neighbors _{t_{aux}} heard such cacophony].
b. When have/*has [the neighbors _{t_{aux}} seen such chaos] and [Helga _{t_{aux}} heard such cacophony].

The contrast in (36) follows from (30). In (36a,b), quantifier raising creates a structure in which *every traitor* binds a single trace (see (37a)), but ATB quantifier raising in (36c) must result in a forking chain (see (37b)).⁹

- (37) a. [Every traitor]₁ a soldier [found t_1],
and [shot him₁ / [the bastard]₁].
b. *[Every traitor]₁ a soldier [found t_1],
and [shot t_1].

This brings us back to RNR. Sabbagh (2007) observes that a universal quantifier in examples such as (38) can take scope over the coordination (see also Bachrach and Katzir 2007, 2009). Thus, the example allows a reading in which for every book on this shelf it is true that either a professor stole it, or a student borrowed it, exactly the reading absent in (33) and (35).

- (38) A professor stole, or a student borrowed, every book on this shelf. ($\forall > \vee > \exists_P / \exists_S$)

It is easy to see why. On a multidominance analysis, (38) contains only a single instance of *every book on this shelf* (see (39a)). Hence, if this quantifier raises to a position outside the coordinate structure, the chain created is non-branching and therefore compatible with (30) (see (39b)).

- (39) a. [A professor stole every book on this shelf]
or [a student borrowed].
b. [[Every book on this shelf]₁ [a professor stole]
or [a student borrowed t_1]].

Note that our account predicts that not only the pivot, but also categories contained in the pivot, can take scope over the coordination. After all, in a multidominance structure material contained within the pivot is represented only once, so that it can move to a position outside the coordination without violating the ban on forking chains. By contrast, quantificational categories represented in multiple conjuncts should be unable to take scope over the coordination, even if part of them functions as the pivot in a multidominance structure. Thus, we correctly predict that the universal in (40a), unlike that in (40b), can scope over *or* (that is, only (40a) can express that for every theorem that Mary studied, she managed to prove that theorem or managed to disprove it).

- (40) a. Mary managed to prove, or she managed to disprove, every theorem that she studied.

⁹ The acceptability of (36a) raises questions about the coordinate structure constraint. To begin with, it is not possible to raise a quantifier out of an initial conjunct in the absence of categories that can act as variables in subsequent conjuncts. In fact, it was the contrast between (36a) and (i) that was of primary concern in Ruys 1992 and Fox 2000.

- (i) A soldier [found every traitor] and [left unseen]. ($\exists > \forall$; * $\forall > \exists$)

Ruys and Fox argue that the coordinate structure constraint does not insist on ATB movement, but rather requires that a category moved out of a coordinate structure binds a variable in each conjunct. This claim is strengthened by the acceptability of quantifier raising in (36b). While the pronoun in (36a) could perhaps be analyzed as the overt realization of a trace, this is implausible for an epithet like *the bastard*.

The proposed reformulation of the coordinate structure constraint must be supplemented by a restriction that rules out variable binding in examples such as (iib,c).

- (ii) a. [Which traitors]₁ has the soldier [found t_1]
and [shot t_1]?
b. *[Which traitors]₁ has the soldier [found t_1] and [shot them₁]?
c. *[Which traitors]₁ has the soldier [found t_1] and [shot [the bastards]₁]?

One possibility is to rely on a proposal in Reuland 2001 (see also Reuland 2011). The gist of Reuland's proposal is that a syntactic operation (such as ATB movement) takes priority over an LF operation (such as variable binding) unless the two deliver different interpretations.

- (V>V)
- b. Mary managed to prove every theorem, or she managed to disprove every theorem, that she studied. (*V>V)

The pattern found with universal quantifiers extends to other scope-taking items. For instance, plural DPs can receive a distributive reading in examples such as (41), presumably as a consequence of LF raising. On the relevant reading, Alice and Henry will study one Oceanic language each; on the in-situ reading, they will each study multiple Oceanic languages:

- (41) Alice and Henry are going to study Oceanic languages.
- i. Alice and Henry are each going to study more than one Oceanic language.
 - ii. Alice and Henry are going to study one Oceanic language each.

That the relevant reading is dependent on covert movement of the plural DP explains why it is absent in regular coordinate structures (see (42a)), even if the second instance of the DP remains unrealized as a consequence of VP ellipsis (see (42b)). Crucially, the distributive reading re-emerges under RNR (see (42c)).

- (42) a. Alice will soon study Oceanic languages and Henry is going to study Oceanic languages, too.
- i. Alice and Henry are each going to study more than one Oceanic language.
 - ii. *Alice and Henry are going to study one Oceanic language each.
- b. Alice will soon study Oceanic languages and Henry is going to e_{VP} , too.
- i. Alice and Henry are each going to study more than one Oceanic language.
 - ii. *Alice and Henry are going to study one Oceanic language each.
- c. Alice will soon, and Henry is going to, study Oceanic languages.
- i. Alice and Henry are each going to study more than one Oceanic language.
 - ii. Alice and Henry are going to study one Oceanic language each.

These data follow if RNR can be the result of multidominance. On a multidominance analysis, there is only one instance of *Oceanic languages*, and so covert movement can take place without creating a branching chain:

- (43) a. [Alice will soon study Oceanic languages]
and [Henry is going to]
- b. [[Oceanic languages]₁ [Alice will soon study t_1 .]]
and [Henry is going to]

The pattern extends straightforwardly to internal readings of relational adjectives. In *Ann read, and Bill reviewed, the same book*, the relational adjective can assume an internal reading only if the pivot is raised to a position outside the coordinate structure. Hence, by (30) there must be a single instantiation of *the same book* prior to movement. This is the case on a multidominance analysis (see (44)), but not under ellipsis. Thus, relational adjectives can be used to diagnose multidominance.

- (44) a. [Ann read the same book].
and [Bill reviewed]
- b. [[The same book]₁ [Ann read t_1].]
and [Bill reviewed]

While an ellipsis analysis of RNR cannot explain the scope data, it is less clear whether a movement analysis (without multidominance) can do so. If one adopts the ban on forking movement chains,

it follows that ATB movement out of coordinate structures is impossible. Hence, RNR cannot be analyzed as movement to begin with. If the ban on forking chains is rejected, RNR can be analyzed as ATB movement. Such movement would place the pivot in a position c-commanding the coordinate structure, so that the scopal properties of the construction follow.

However, with a rejection of the ban on forking chains it becomes unclear how ATB quantifier raising can be ruled out (and so the contrast between (36a,b) and (36c) remains mysterious). Of course, this issue can be tackled by reinstating the ban on forking chains and assuming that ATB movement requires multidominance. But if so, a movement account of RNR would have to start out from a multidominance structure, too. This implies that ATB movement can no longer be seen as an alternative for multidominance, but only as an addition. We conclude that a unitary movement analysis (i.e. an analysis that does not employ multidominance) cannot capture the scopal properties of RNR. In view of this and the conclusions of the previous section, we may complete table I as follows:¹⁰

	Movement	Ellipsis	M-dominance	Movement + ellipsis	Movement + m-dominance	Ellipsis + m-dominance
a. Order preservation	×	✓	✓	×	×	✓
b. Island insensitivity	×	✓	✓	✓	✓	✓
c. Non-rebracketing	×	✓	✓	×	×	✓
d. Mismatches	×	✓	×	✓	×	✓
e. Vehicle change	×	✓	×	✓	×	✓
f. Internal readings	×	×	✓	×	✓	✓
d. Cumulative Agr.	×	×	✓	×	✓	✓

Table II: Overview of the empirical coverage of unitary and hybrid analyses

On the hybrid analysis we advocate, RNR does not place the pivot outside the coordinate structure. The analysis merely says that RNR facilitates ATB quantifier raising out of a coordinate

¹⁰ There is some disagreement about the extent to which RNR can be used to circumvent restrictions on movement. Sabbagh (2007) and Bachrach and Katzir (2007) argue that RNR can facilitate exceptional wide-scope beyond the data discussed here. Careful empirical work by Hirsch and Wagner (2015), however, suggests that this assessment may not be correct (see also Abels 2004 and Chaves 2014; on long-distance quantifier raising, see Wurmbrand 2018).

Bachrach and Katzir (2009) argue that *wh*-movement can violate certain island constraints if fed by RNR. They give (ib) as an example ((ia) is the baseline.)

- (i) a. John met the man who wrote, and Mary met the woman who published, this book about Amsterdam.
 b. [[Which book]₁ did [John meet the man who wrote _{t₁}]]₁]₁]?[?]
 and [Mary meet the woman who published _{t₁}]]₁]?[?]

The observation is intriguing and does not follow from the account developed here. It is worth noting, though, that the English pattern is not universal. In Dutch, for example, structures equivalent to (ia) exist, but they do not facilitate island-violating extraction:

- (ii) a. Ik ken het boek dat Carla heeft gekocht, en het gedicht dat Piet heeft geschreven,
I know the book that Carla has bought, and the poem that Pete has written,
 [pp voor die vrouw uit Amsterdam].
for that woman from Amsterdam
 b. *[[pp Voor wie] ken jij [het boek dat Carla heeft gekocht]]₁]?[?]
for who know you the book that Carla has bought
 en [het gedicht dat Piet heeft geschreven _{t_{pp}}]]?[?]
and the poem that Pete has written

Thus, RNR cannot be used to circumvent island restrictions in general. The issue requires additional empirical research, an undertaking that goes beyond the scope of this paper.

structure. This leads to a further prediction. If the pivot is contained in an island, internal readings of relational adjectives should no longer be licensed. Abels (2004) argues that this is indeed the case. He shows that relational adjectives can scope quite high but are bounded by *wh*-questions (see (45a)). In line with this, an internal reading of *different* is excluded in the right-node-raising construction in (45b).

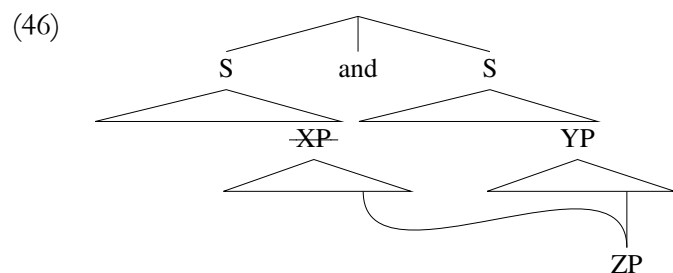
- (45) a. [My friend Konrad is wondering when Bob Dylan wrote his song Mister Tambourine Man and my friend Friederike would like to know when Bob Dylan wrote his song The Times They Are a-Changin'.]
 *?Konrad and Friederike are wondering when Bob Dylan wrote two quite different songs.
- b. [My friend Konrad has written a song called Revolution #10 and my friend Friederike has recorded a song called Revolution #11. Despite bearing similar titles, the two songs are quite different from each other. I would like to know when Konrad wrote his Revolution #10 and you would like to find out when Friederike recorded Revolution #11. Revolution #10 is the only song Konrad ever wrote and Revolution #11 the only song Friederike ever recorded.]
 *?I wonder when Konrad wrote, and you would like to know when Friederike recorded, two quite different songs.

This is further evidence that a unitary movement analysis cannot capture the scopal properties of RNR. Given that the example in (4a) is grammatical, ATB movement out of *wh*-questions would have to be permitted. But if it is permitted, the ungrammaticality of the examples in (45) is unexpected.

5. Possible and impossible interactions

We have argued that RNR has two instantiations: RNR-E and RNR-MD. In this section we consider possible and impossible interactions between these processes. At first sight, it seems that in any given structure RNR should be ellipsis or multidominance, but not both. Therefore, the tests that diagnose ellipsis (mismatches and vehicle change) and the tests that diagnose multidominance (wide scope and cumulative agreement) should not simultaneously give positive results.

This prediction seems firmly rooted in common sense and was argued by Barros and Vicente (2011) to follow from their proposal. Indeed, the data in Larson 2012 are taken to refute Barros and Vicente's account exactly because they show mixed patterns. Now, it is certainly true that within a pivot created through multidominance we would not expect to find indicators of ellipsis. The reverse, however, should be possible. A RNR structure created through ellipsis could conceivably have a pivot that contains a secondary pivot created through multidominance. This secondary pivot (ZP in (46)) would then simultaneously function as part of the elided constituent and as part of the primary pivot (YP in (46)):



In other words, (47) is one possible analysis of *Alice will, and Henry is going to, study the same Oceanic language*, with the two VPs corresponding to XP and YP in (46), and the DP corresponding to ZP.

(47) [Alice will $\left[\begin{array}{c} \text{VP study} \\ \text{and [Henry is going to } \left[\begin{array}{c} \text{VP study} \\ \text{[DP the same Oceanic language]} \end{array} \right] \end{array} \right]$]

There are two possible objections to (46). The first is that the multidominated category ZP in (46) is pronounced, yet part of XP, a category that is elided. (As shown in (7b), it is not possible to combine RNR with VP ellipsis in a similar way.) Whether this objection holds water depends on the way multidominance structures are linearized. For now, notice that the multidominated category is realized within the pivot, not within the elided category. This, presumably, is what saves the structure from ungrammaticality. We analyze the issue in more detail in section 7.

A second possible objection to (46) is that it requires more than one application of RNR: part of a pivot created through RNR-E is itself a pivot created through multidominance. But this does not disqualify (46), as there are other structures that can only be generated if RNR is applied more than once (see Grosu 1976 and Abbott 1976). A straightforward example is given in (48). Since *John* and *excessively* do not form a constituent, the only plausible analysis of (48) is as a case of repeated RNR. If this is necessary to generate (48), then one cannot object to (46) on the basis that it, too, requires multiple applications of RNR.

(48) Mary flattered, and Bill disparaged, John excessively.

From the above, a linear constraint on mixed patterns can be derived. It is uncontroversial that RNR is subject to a constraint that the raised category must be rightmost within the first conjunct. Suppose that this constraint extends to pivot-internal RNR (an assumption we return to in section 7, where we discuss matters of linearization). Then we may conclude that the secondary pivot must be rightmost within the primary pivot, as in (49a), where the primary pivot is YP (after elision of XP) and the secondary pivot is ZP (through multidominance). If some element β followed ZP in YP and a corresponding element α followed ZP in XP, as in (49b), then the structure would be ruled out: ZP would undergo RNR without being rightmost in the first conjunct.

(49) a. [S ... [XP ... α ZP]]
 and [S ... [YP ... β ZP]].
 b. *[S ... [XP ... ZP α]]
 and [S ... [YP ... ZP β]].

Properties indicative of multidominance may be found within ZP. For an element within YP to exhibit properties indicative of ellipsis, that element must be paired with a corresponding element in XP. As we have just shown, there can only be a pair $\langle \alpha, \beta \rangle$ of corresponding elements if α and β each precede ZP. Consequently, no category with properties indicative of ellipsis (PIE) can follow a category with properties indicative of multidominance (PIM):

(50) [PRIMARY PIVOT ... $\langle \text{PIE} \rangle$... [SECONDARY PIVOT ... PIM ...] ... $\langle * \text{PIE} \rangle$...]

Thus, the predicted pattern of interactions is more subtle than Barros and Vicente suggest. Within a pivot one may find both properties indicative of ellipsis and properties indicative of multidominance, but only if the constituent displaying the former precedes the constituent displaying the latter. The discussion below aims to demonstrate that the data bear out his prediction.

We first introduce the tests we will employ. Most of these are familiar, but there is one new test that can be used to check whether instances of the PIE–PIM order indeed involve more than one application of RNR). This test is prosodic. As it turns out, examples such as (48) can be

pronounced in (at least) two ways. The first is to have prosodic breaks of equal strength after each of the focused verbs, as in (51a). Alternatively, the first prosodic break may be strengthened and the second one shifted until after the first pivot, as in (51b). It is not possible to have prosodic breaks preceding each of the pivots (see (51c)).

- (51) a. Mary FLATTERED | and Bill DISPARAGED | John excessively.
 b. Mary FLATTERED | | and Bill DISPARAGED John | excessively.
 c. * Mary FLATTERED | (|) and Bill DISPARAGED | John | excessively.

We assume that the rightward shift of the prosodic break in (51b) is typical of structures derived through repeated RNR. It should therefore be available whenever we find the PIE–PIM order.

In order to diagnose ellipsis, we make use of morphological mismatches and vehicle change. In order to diagnose multidominance, we make use of interpretational effects related to the pivot or part of the pivot taking wide scope. We also rely on the auxiliary hypothesis in (27), according to which a finite predicate cannot act as a pivot created by ellipsis. This hypothesis was posited to explain why cumulative agreement is strongly preferred where semantically licensed. We can now provide further support for it, based on the prosodic test just described.

To begin with, consider (52). Here, the pivot is a non-finite predicate, which means that it can license elision in the left conjunct or be multidominated. On the ellipsis analysis, a second instance of RNR is necessary. This is because the pivot ends in a PP containing a relational adjective that has an internal reading. Hence, either the VP or the PP must be a multidominated category, which explains why the second prosodic break may be shifted from the onset of the pivot to right before the VP or right before the PP:

- (52) a. Mary is proud that she will, and Sue is glad that she could, [_{AuxP} have [_{VP} traveled [_{PP} to the same_{INT} country]]].
 b. Mary is proud that she WILL | and Sue is glad that she COULD | [_{AuxP} have [_{VP} traveled [_{PP} to the same country]]].
 c. Mary is proud that she WILL | | and Sue is glad that she COULD [_{AuxP} have | [_{VP} traveled [_{PP} to the same country]]].
 d. Mary is proud that she WILL | | and Sue is glad that she COULD [_{AuxP} have [_{VP} traveled | [_{PP} to the same country]]].

The data in (52) contrast with those in (53), where the pivot is a finite predicate. Given (27), we must hence be dealing with RNR–MD, something that makes it impossible for a second application of RNR to affect subparts of the pivot. As a result, it should be impossible for the second prosodic break in (53b) to shift rightward. Indeed, (53c,d) are not acceptable pronunciations of (53a).

- (53) a. Mary is proud that the girls, and Sue is glad that the boys, [_{TP} have [_{VP} traveled [_{PP} to the same_{INT} country]]].
 b. Mary is proud that the GIRLS | and Sue is glad that the BOYS | [_{TP} have [_{VP} traveled [_{PP} to the same country].
 c. *Mary is proud that the GIRLS | | and Sue is glad that the BOYS [_{TP} have | [_{VP} traveled [_{PP} to the same country].
 d. *Mary is proud that the GIRLS | | and Sue is glad that the BOYS [_{TP} have [_{VP} traveled | [_{PP} to the same country].

We now move to the main point of the section – the predicted contrast between PIE–PIM and PIM–PIE orders. Our first step is to establish that the primary pivot can exhibit properties indicative of

ellipsis, while a right-peripheral secondary pivot displays properties indicative of multidominance. We use the example in (54) as a baseline. As *will be* selects *studying* and *going to* selects *study*, the example contains a morphological mismatch typical of ellipsis.

(54) Henry is going to, and Alice will soon be, studying Eastern Fijian.

We have identified three interpretive effects that relied on (part of) the pivot raising out of the coordinate structure at LF, a movement that requires multidominance. The first was the distributive reading of plural DPs (see (42) above). If the structure in (43) exists, the example in (55) can be analyzed with VP a pivot created through RNR-E and the plural DP contained within it a pivot created through RNR-MD. It is therefore predicted that (55) has a reading on which Alice and Henry will study one Oceanic language each. That reading indeed exists.

(55) Henry is going to, and Alice will soon be, [VP studying [DP Oceanic languages]].
 i. Alice and Henry are going to study one Oceanic language each.
 ii. Alice and Henry are each going to study more than one Oceanic language.

If this mixing of properties is indeed a consequence of repeated RNR, as in (43), we predict that the prosodic break that precedes the pivot can shift rightward to immediately before the DP. This, too, is correct: both intonations in (56) are acceptable.

(56) a. Henry is GOING to | and Alice will SOON be | [VP studying [DP Oceanic languages]].
 b. Henry is GOING to || and Alice will SOON be [VP studying | [DP Oceanic languages]].

These observations extend to examples in which the property indicative of multidominance is a universal taking wide scope over the coordinate structure, as in (57), or a relational adjective with an internal reading, as in (58).¹¹ The relevant interpretations are available despite the pivot giving rise to a morphological mismatch. As expected, the second prosodic break may shift rightwards:

(57) a. A phonologist must, and a semanticist ought to be, [VP working [PP with every student]]. $(\exists_P, \exists_S > \forall; \forall > \exists_P, \exists_S)$
 b. A phonologist MUST | and a semanticist OUGHT to be | [VP working [PP with every student]].
 c. A phonologist MUST || and a semanticist OUGHT to be [VP working | [PP with every student]].
 (58) a. Henry is going to, and Alice will soon be, [VP studying [DP the same_{INT} Oceanic language]].
 b. Henry is GOING to | and Alice will SOON be | [VP studying [DP the same_{INT} Oceanic language]].
 c. Henry is GOING to || and Alice will SOON be [VP studying | [DP the same_{INT} Oceanic language]].

A further instantiation of PIE–PIM order is given in (59a). Here, the property indicative of ellipsis is vehicle change. *She* and *Alice* are to be read as coreferential, which implies that the constituent labeled VP must be a pivot in RNR-E (with *Alice's* in the left conjunct replaced by *her*). As a consequence of the availability of (46), it is still possible for the direct object to be a (right-peripheral) secondary pivot created through RNR-MD. This allows it to undergo LF raising, so that the

¹¹ Barros and Vicente (2011:7) mark the example in (ia) as ungrammatical. While it does seem degraded to us, its status is comparable with the baseline example in (ib), which does not involve a morphological mismatch.

(i) a. *Alice has, and Beatrix wants to, work on different_{INT} topics.
 b. ?? Alice did, and Beatrix wants to, work on different_{INT} topics.

relational adjective it contains can have an internal reading. As predicted, the second prosodic break can shift rightward to immediately before the direct object (see (59b,c)).

- (59) a. She₁ is going to, and Bill will soon, [VP show Alice₁'s supervisor [DP the same_{INT} paper on Niuean word order]].
 b. She₁ is GOING to | and Bill will SOON | [VP show Alice₁'s supervisor [DP the same_{INT} paper on Niuean word order]].
 c. She₁ is GOING to || and Bill will SOON [VP show Alice₁'s supervisor | [DP the same_{INT} paper on Niuean word order]].

The same pattern obtains when the property indicative of multidominance is the distributive interpretation of a plural DP. As (60a) shows, a right-peripheral plural direct object contained in the pivot can be interpreted distributively, even if the indirect object is involved in vehicle change. Again, a rightward shift of the second prosodic break is acceptable (see (60b,c)).

- (60) a. She₁ is going to, and Bill will soon, [VP show Alice₁'s supervisor [DP their papers on Niuean word order]].
 i. Alice and Bill are each going to show more than one paper.
 ii. Alice and Bill are going to show one paper each.
 b. She₁ is GOING to | and Bill will SOON | [VP show Alice₁'s supervisor [DP their papers on Niuean word order]].
 c. She₁ is GOING to || and Bill will SOON [VP show Alice₁'s supervisor | [DP their papers on Niuean word order]].

We conclude that there is an abundance of evidence for the acceptability of PIE–PIM orders and consequently for the reality of the representation in (46).

We now turn to PIM–PIE orders, which are predicted to be ungrammatical. It is not possible for material contained in a primary pivot created through RNR-E to follow a secondary pivot created through RNR-MD. Therefore, any element exhibiting properties indicative of ellipsis must precede any element exhibiting properties indicative of multidominance. One observation confirming this prediction is that a variant of (59) in which the R-expression and the relational adjective appear in reverse order does not permit an internal reading of the adjective. The example in (61) cannot mean that the person that Alice is going to show Alice's paper to is the same as the person that Bill is going to show Alice's paper to.

- (61) She₁ is going to, and Bill will soon, [VP show the same_{EXT/*?INT} person [DP Alice₁'s paper on Niuean word order]].

The example is grammatical if *she* and *Alice* are taken to be coreferential, but the adjective receives an external reading (so that the person that Alice is going to show Alice's paper to is the same as the person she showed her paper to before, and the person that Bill is going to show Alice's paper to is the same as the person *he* showed her paper to before). It is also grammatical on an internal reading of the adjective if *she* and *Alice* are not taken to be coreferential (so that an unidentified woman will show Alice's paper to the same person that Bill will show Alice's paper to).

The second prosodic break cannot shift rightward in (62). This is because the internal reading of the relational adjective implies that the indirect object and everything to its right must

be part of a pivot created through multidominance. Within pivots created through multidominance there cannot be secondary pivots, and so there is no trigger for a shift of the prosodic break.¹²

- (62) a. Mary is GOING to | and Bill will SOON | [_{VP} show the same_{INT} person [_{DP} Alice’s paper on Niuean word order]].
 b. *Mary is GOING to | | and Bill will SOON [_{VP} show the same_{INT} person | [_{DP} Alice’s paper on Niuean word order]].

The ungrammaticality of PIM–PIE order is confirmed by (63), where the plural indirect object cannot receive a distributive interpretation if *she* and *Alice* are taken to be coreferential (compare (60)). (Recall that a distributive reading of plural DPs is a property indicative of multidominance, while vehicle change is a property indicative of ellipsis.)

- (63) She_i is going to, and Bill will soon, [_{VP} show their supervisors [_{DP} Alice_i’s paper on Niuean word order]].
 i. Alice and Bill are each going to show Alice’s paper to more than one supervisor.
 ii. *?Alice and Bill are going to show Alice’s paper to one supervisor each.

As indicated, the example is grammatical if *their supervisors* does not receive a distributive interpretation. It is also grammatical if *their supervisors* receives a distributive interpretation, but *she* and *Alice* are not taken to be coreferential (so that Bill and some unidentified woman are going to show Alice’s paper to one supervisor each).

The prosody confirms that pivot-internal RNR of the direct object is impossible when the indirect object receives a distributive reading:

- (64) a. Mary is GOING to | and Bill will SOON | [_{VP} show [_{DP} their supervisors]_{DIST} [_{DP} Alice’s paper on Niuean word order]].
 b. *Mary is GOING to | | and Bill will SOON [_{VP} show [_{DP} their supervisors]_{DIST} | [_{DP} Alice’s paper on Niuean word order]].

Another way in which we can demonstrate that PIM–PIE order is ungrammatical is by using examples in which the pivot is a finite predicate. The auxiliary hypothesis in (27) requires that such pivots are created through RNR–MD. Hence, we predict that properties indicative of ellipsis cannot follow the finite verb or auxiliary, and are therefore excluded from finite pivots altogether.

This prediction is correct. To begin with, an example like (65) does not permit the vehicle change necessary to prevent a principle C violation.¹³

- (65) *?She_i fears that Alex, and I worry that Bob, have decided to nominate Claire_i’s brother.

This example can usefully be compared with those in (66a) and (66b). The former is predicted to be grammatical. It does require vehicle change, but this is unproblematic, given that the pivot is

¹² Larson (2012:148) gives the example in (ia) as fully grammatical. While we find it rather degraded, it is better than expected. Note, however, that the example is more complex than it needs to be to check whether a relational adjective on an internal reading can precede a DP involved in vehicle change. When we simplify it, as in (ib), the result is clearly ungrammatical.

- (i) a. She_i thinks that she absolutely must, and Bill fears that he won’t, present different_{INT} topics to Alice_i’s supervisor.
 b. *She_i absolutely must, and Bill won’t, present different_{INT} topics to Alice_i’s supervisor.

¹³ The restriction illustrated in (65) also holds of pivots that are finite clauses (see also Larson 2012:148):

- (i) *She_i fears, but Bob is not worried, that Alice_i might lose the election.

not a finite predicate. The example in (66b) is also predicted to be grammatical. Here, the pivot *is* is a finite predicate, but the potential principle C violation has been removed.

- (66) a. She₁ fears that Alex has, and I worry that Bob has, decided to nominate Claire₁'s brother.
 b. She₁ fears that Alex, and I worry that Bob, have decided to nominate her₁ brother.

Recall that we have already demonstrated that the second prosodic break cannot shift rightward into a finite predicate (see (53)).

It is also impossible to have material that gives rise to a morphological mismatch internally to a pivot that is a finite predicate. In (67), the mismatch is induced by the possessive pronoun *their*, which cannot appear in the first conjunct (cf. **We have given Daniel a piece of their mind*).¹⁴

- (67) *?Claire is delighted that we, and Alice is glad that his parents, have given Daniel a piece of their mind.

As expected, the example becomes grammatical when the morphology of the pronoun is compatible with the antecedent in the first conjunct (see (68a)), or when finiteness is removed from the predicate that acts as the pivot (see (68b)).

- (68) a. Claire is delighted that his teachers, and Alice is glad that his parents, have given Daniel a piece of their mind.
 b. Claire is delighted that we have, and Alice is glad that his parents have, given Daniel a piece of their mind.

In sum, PIM–PIE orders are consistently degraded while PIE–PIM orders are acceptable. Although this pattern of interactions is not what Barros and Vicente (2011) argue for, it is in fact predicted by a hybrid ellipsis-plus-multidominance account. Given standard linear constraints on RNR, a secondary pivot must be right-peripheral within the primary pivot. As the primary pivot is created through ellipsis and the secondary predicate through multidominance, elements exhibiting properties indicative of ellipsis must precede elements properties indicative of multidominance.

6. Coordinate closure only

There is one type of evidence for a hybrid account of RNR that we have not explored sufficiently. Circumstances may exist in which one of the analyses normally available is ruled out, so that RNR displays only properties compatible with the remaining analysis. We have already seen that when the pivot is a finite predicate, RNR must be multidominance, so that neither morphological mismatches nor vehicle change are tolerated. In this section, we argue that the opposite pattern is found with RNR in non-coordinate structures. As it turns out, RNR in non-coordinate structures must be ellipsis, with the consequence that evidence for multidominance disappears.

Our starting point is the observation in Hudson 1976 that RNR is not limited to coordinate structures. Thus, alongside (69a), we find examples such as (69b).

- (69) a. I met a man who likes, and a woman who dislikes, opera.
 b. A man who likes, met a woman who dislikes, opera.

Although the existence of RNR in non-coordinate structures is generally acknowledged, its properties are not widely discussed. We believe that it differs from RNR in coordinate structures in

¹⁴ The restriction illustrated in (67) extends to pivots that are finite clauses. The example in (i) can be used if Claire is convinced that John will finish his paper in time, but not if Claire is convinced that *she* will finish her paper in time. Thus, (i) does not tolerate a morphological mismatch.

(i) Claire is convinced, but Bill doubts, that he will finish his paper in time.

that it has properties indicative of ellipsis, but not properties indicative of multidominance. In particular, we do not find the exceptional wide-scope phenomena typical of pivots created by multidominance. Thus, the plural DP in (70) cannot receive a distributive reading. The example can only be interpreted such that the man and the woman will each study multiple languages.

- (70) A man who is going to, married a woman who will soon, study Oceanic languages.
- i. ‘The man and woman are each going to study more than one Oceanic language.’
 - ii. *‘The man and woman are going to study one Oceanic language each.’

This follows if the structure must involve ellipsis. On an ellipsis analysis, the subject and object each contain an instance of *Oceanic languages*. Consequently, LF raising cannot take place without creating a forking chain, contra (30). The same logic correctly rules out an internal reading of the relational adjective in (71a) and a construal of (71b) with the universal taking wide scope.

- (71) a. *A man who is going to, married a woman who will soon, study the same_{INT} Oceanic language.
- b. A phonologist who must, met a semanticist who ought to, work with every student.
- ($\exists_P/\exists_S > \forall$, $*\forall > \exists_P/\exists_S$)

A further piece of evidence that suggests that RNR-MD is unavailable outside coordinate structures comes from the distribution of finite pivots. The example in (72a) is clearly ungrammatical. One may attribute this to the fact that *have* carries cumulative agreement (which is indeed a property indicative of multidominance). However, if the auxiliary hypothesis in (27) is correct, we expect the effect to be more general, as that hypothesis asserts that ellipsis can never create a finite pivot. Indeed, (72) is decidedly odd (and gets worse the longer one contemplates its status).

- (72) a. *A man whose daughter, met a woman whose son, have traveled to Cameroon.
- b. ??A man whose daughter, met a woman whose son, has traveled to Cameroon.

Thus, RNR in non-coordinate structures lacks properties indicative of multidominance. It does, however, allow morphological mismatches and vehicle change. In (73a), *going to* selects an infinitive, while *be* selects a progressive. In (73b), *Alice’s* must be replaced by a possessive pronoun in the first relative clause. Mismatches and vehicle change are, of course, tell-tale signs of ellipsis.

- (73) a. A man who is going to, married a woman who will soon be, studying Niuean word order.
- b. A man who she₁ said is going to, met a woman who will soon, study Alice₂’s paper on Niuean word order.

The data so far suggest that, outside coordination, the pivot must be created through ellipsis. However, that leaves open whether the pivot may contain a secondary pivot created through multidominance. It is easy to show that this is in fact not possible. In the previous section we partly motivated the existence of the structure in (46) by pointing to the existence of pivots that mix properties of ellipsis and multidominance. Such mixing is, however, ungrammatical outside coordinate structures. In the examples below, the pivot gives rise to a morphological mismatch and also contains material that can diagnose multidominance. As before, the plural DP in (74a) cannot be interpreted distributively, the relational adjective in (74b) does not allow an internal reading, and the universal in (74c) cannot take wide scope. We must conclude, then, that in non-coordinate structures neither the pivot nor a constituent at its right periphery can have multiple mother nodes.

- (74) a. A man who is going to, married a woman who will soon be, studying Oceanic languages.
 i. ‘The man and woman are each going to study more than one Oceanic language.’
 ii. *‘The man and woman are going to study one Oceanic language each.’
 b. A man who is going to, married a woman who will soon be, studying the same_{EXT/*INT} Oceanic language.
 c. A phonologist who must, met a semanticist who ought to be, working with every student. $(\exists_P/\exists_S > \forall, * \forall > \exists_P/\exists_S)$

This conclusion is corroborated by the fact that none of the examples in (74) tolerates a rightward shift of the second prosodic break (recall that such a shift is characteristic of pivot-internal RNR):

- (75) a. A man who is GOING to | married a woman who will SOON be | studying Oceanic languages.
 b. *?A man who is GOING to || married a woman who will SOON be studying | Oceanic languages.
 (76) a. A man who is GOING to | married a woman who will SOON be | studying the same_{EXT} Oceanic language.
 b. *?A man who is GOING to || married a woman who will SOON be studying | the same_{EXT} Oceanic language.
 (77) a. A phonologist who MUST | met a semanticist who OUGHT to be | working with every student.
 b. *?A phonologist who MUST || met a semanticist who OUGHT to be working | with every student.

Why can RNR outside coordinate structures not be the result of multidominance? We speculate that the explanation lies in the way syntactic representations are interpreted. In particular, we assume that interpretation precedes in a bottom-up incremental fashion (incrementality means that semantic commitments once made cannot be retracted). One consequence of the bottom-up nature of interpretation is that the process must sometimes involve multiple partial representations. For instance, interpretation of *[[the man in the hat] [wants a pizza margherita]]* requires that separate representations are built up for the subject and the predicate, which are then combined when the predicate is applied to the subject. This is illustrated in (78), where semantic material appears in small capitals, (partial) representations are placed in boxes, and the ω -symbol is used to mark licit transitions (we use ‘ ∞ ’ to mark illicit transitions). In (78a), the semantics of the predicate and the subject are complete; (78b) is delivered through function application.

- (78) a. THE MAN IN THE HAT WANTS A PIZZA MARGHERITA
 b. ω THE MAN IN THE HAT WANTS A PIZZA MARGHERITA

With this in mind, we postulate the condition in (79).

- (79) No syntactic node can be mapped onto multiple unconnected semantic representations.

This condition expresses the intuition that syntactic connections trigger semantic connections. Its effect is that multidominance creates a difficulty for interpretation. Consider an example like *Father McKenzie married a man who likes, and a woman who dislikes, opera* on the assumption that *opera* is the object of both *likes* and of *dislikes*. Once *opera* has been interpreted, it must be integrated in two developing representations, exactly the situation that (79) excludes:

- (80) a. OPERA
 b. \circ LIKES OPERA DISLIKES OPERA

Therefore, if (79) is correct, a connection must be established between the developing representations hosting OPERA. They cannot be joined through function application (which requires syntactic subordination; see Neeleman, Philip, Tanaka and Van de Koot 2020). We propose that the interpretive system instead introduces a commitment to coordination, as expressed by the rule in (81) (where C represents coordination).

$$(81) \quad \boxed{X} \boxed{Y} \rightarrow \boxed{X} - C - \boxed{Y}$$

This rule permits the transition from (80a) to (82a). It is important to note that (82a) does not encode coordination of LIKES OPERA and DISLIKES OPERA, but rather a commitment that the interpretive relation between the developing representations, once complete, will be one of coordination. With those representations now connected, (82a) can further develop into (82b).

- (82) a. \circ LIKES OPERA - C - DISLIKES OPERA
 b. \circ A MAN WHO LIKES OPERA - C - A WOMAN WHO DISLIKES OPERA

The next element to be integrated is the coordinator *and*. At this point, the commitment made in (82a) is fulfilled (subsequent interpretation of the example is trivial and will be ignored here):

$$(83) \quad \circ \text{ A MAN WHO LIKES OPERA AND A WOMAN WHO DISLIKES OPERA }$$

An immediate implication of this procedure is that, in the absence of coordination, RNR cannot involve multidominance. Consider *A man who likes, married a woman who dislikes, opera*. On a multidominance analysis, the interpretation of this example would initially have to rely on the rule in (81) in order for *opera* to be interpreted as the object of both *likes* and *dislikes* (see (84a)). But once a commitment to coordination is introduced, integrating *married* is impossible. The transition from (84c) to (84d) is illicit, as the relation expressed by *married* is not an instance of coordination.

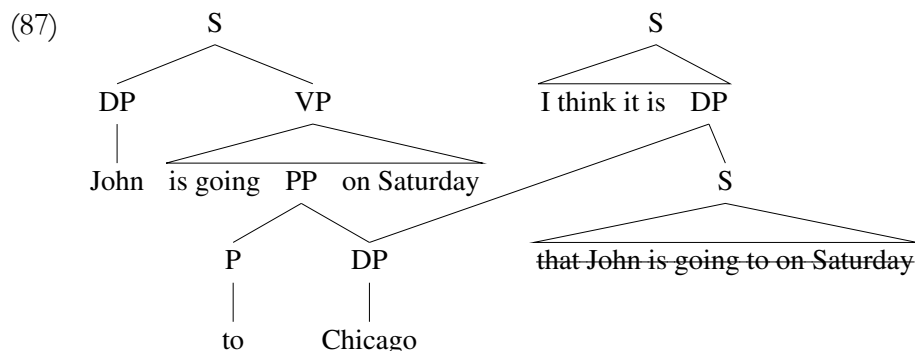
- (84) b. \circ LIKES OPERA - C - DISLIKES OPERA
 c. \circ A MAN WHO LIKES OPERA - C - MARRIED A WOMAN WHO DISLIKES OPERA
 d. \circ A MAN WHO LIKES OPERA MARRIED A WOMAN WHO DISLIKES OPERA

An ellipsis analysis of RNR does not require a connection between developing semantic representations and therefore does not rely on the rule in (81) for convergence. On an ellipsis analysis, the crucial part of *A man who likes, married a woman who dislikes, opera* is interpreted via the steps in (85).

- (85) a. LIKES ~~OPERA~~ DISLIKES OPERA
 b. \circ A MAN WHO LIKES ~~OPERA~~ MARRIED A WOMAN WHO DISLIKES OPERA
 c. \circ A MAN WHO LIKES ~~OPERA~~ MARRIED A WOMAN WHO DISLIKES OPERA

Independent support for the constraint in (79) and the rule in (81) comes from *Horn amalgams*. This construction was first discussed by Lakoff (1974) and attributed by him to Larry Horn. An example is given in (86). Van Riemsdijk (1998, 2006) argues that Horn amalgams consist of a host sentence and a qualifying sentence that share a constituent (which we call the pivot, on a par with the multidominated category in RNR). Subsequent work by Guimarães (2004) and Kluck (2008) shows that in many cases the qualifying sentence contains an *it* cleft reduced through sluicing. On this view, (86) is assigned the structure in (87)

(86) John is going to, I think it's Chicago on Saturday.



The multirooted multidominance analysis of Horn amalgams is well motivated. Van Riemsdijk shows, using morphological case in German, that the pivot must meet inflectional demands imposed on it by the host sentence, as well as by the qualifying sentence. The resulting obligatory match of inflectional requirements is predicted if the pivot is a multidominated category. Van Riemsdijk also demonstrates that the structure of the qualifying sentence is invisible for operations in the host sentence, as expected if there is no embedding. Kluck (2008) adds to this that the host and qualifying sentences behave like independent root domains. For instance, the qualifying sentence, with the exception of the pivot, is not in the scope of operators in the host sentence. These facts follow if the host and qualifying sentences have undominated root nodes.

We now consider the interpretation of Horn amalgams, and specifically the question of how the host and qualifying sentences are related. First, consider the example in (88). A speaker who utters (88) is committed to the truth of the host, as well as the qualifying sentence.

(88) John is going to, I'm sorry to say it's Chicago on Saturday.

This interpretation is trivially compatible with our claim that multidominance triggers the introduction of a coordinator. In the case at hand, the coordinator would have to be conjunctive:

(89) JOHN IS GOING TO CHICAGO ON SATURDAY AND
I AM SORRY TO SAY THAT IT IS CHICAGO THAT JOHN IS GOING TO.

The more interesting case involves Horn amalgams in which the qualifying sentence introduces a hedge. For example, (86) implies that if John is not going to Chicago, then at least he is going to a city that the speaker thinks is Chicago. This is also compatible with the claim that multidominance triggers a commitment to coordination, but here the coordinator must be disjunctive:

(90) JOHN IS GOING TO CHICAGO ON SATURDAY OR
I THINK THAT IT IS CHICAGO THAT JOHN IS GOING TO ON SATURDAY

If one honestly asserts that John is going to Chicago on Saturday, then one must think that the city that John is going to on Saturday is Chicago. However, if one merely *thinks* that the city that John is going to on Saturday is Chicago, then one is not able to assert that John is going to Chicago on Saturday. Therefore, for (90) to make sense, the speaker must commit to the assertion in the second conjunct, but not to the one in the first conjunct. This is possible if the relation between the two clauses is disjunctive. The hedging effect of Horn amalgams thus falls into place.

This account solves a problem identified in Kluck 2008. In standard multidominance analyses of Horn amalgams, the host sentence and the qualifying sentence are semantically independent assertions, which means that a speaker who utters (86) should commit to the truth of both.

But that implies that the speaker must commit to the claim that John is in fact going to Chicago – in other words, the hedging effect typical of Horn amalgams remains unexplained.

Horn amalgams do not permit non-coordinate interpretations. To see this, consider (91), which is acceptable as a hedged statement on the reading in (91a). Potentially, there are perfectly reasonable alternative interpretations of the example, however. For instance, it could be that John must leave for Chicago *because* Susan said he should go there (that is, Susan has ordered John to go to Chicago). Or it could be that Susan said that John must leave for Chicago *because* John must in fact leave for Chicago (that is, Susan reports that John must leave for Chicago). Both readings are clearly absent, which demonstrates that Horn amalgams cannot be interpreted causally.

- (91) John must leave for, Susan said it is Chicago.
- a. ‘John must leave for Chicago, or Susan said it is Chicago that he must leave for.’
 - b. *‘John must leave for Chicago, because Susan said it is Chicago that he must leave for.’
 - c. *‘John must leave for Chicago, so Susan said it is Chicago that he must leave for.’

Similarly, Horn amalgams do not allow a temporal relation between the main clause and the qualifying clause. The example in (92) can be interpreted as the hedged statement in (92a), but the two temporal interpretations in (92b) and (92c) are not available. (These interpretations may seem odd at first sight, but they are feasible if the speaker is planning a hoax involving John.)

- (92) John must leave for, I hear it is Chicago.
- a. ‘John must leave for Chicago, or I hear it is Chicago that he must leave for.’
 - b. *‘John must leave for Chicago, before I hear it is Chicago that he must leave for.’
 - c. *‘John must leave for Chicago, after I hear it is Chicago that he must leave for.’

Thus, like RNR structures created through multidominance, Horn amalgams are licit if the two structures in which the pivot appears are semantically connected through coordination. In the absence of such an interpretation, both structures are ruled out, as predicted.

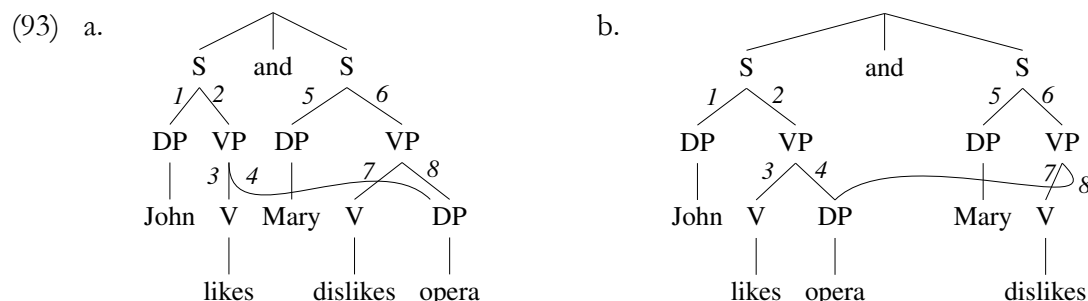
7. The unity of right-node raising

In the preceding sections we have made our case for a hybrid analysis of RNR, arguing that the construction results from either ellipsis or multidominance. The case was based on three types of evidence. First, RNR displays both properties indicative of ellipsis and properties indicative of multidominance. Second, our account correctly predicts a striking pattern of interaction between properties indicative of ellipsis and properties indicative of multidominance (PIE–PIM; *PIM–PIE). Third, there are specific circumstances under which either RNR-E or RNR-MD are ruled out, so that RNR behaves as pure multidominance or pure ellipsis. Pure multidominance is found when the pivot is finite. Pure ellipsis is found outside coordinate structures.

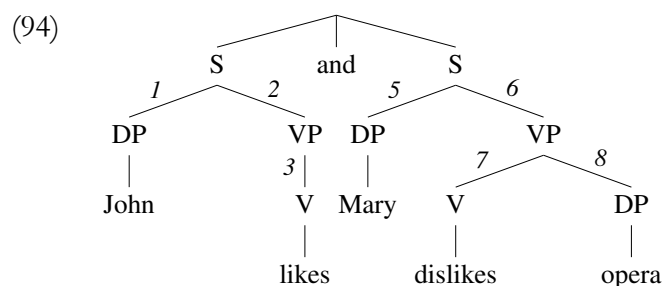
While these considerations provide evidence for a hybrid account of RNR, they also prompt an urgent question. If RNR is two things, why should it give the impression of being one? In particular, why should RNR-E and RNR-MD be subject to the same word order restrictions? While this question is pertinent to all hybrid accounts of RNR, it is not answered in Barros and Vicente 2011, Valmala 2013, Chaves 2014 or Hirsch and Wagner 2015. The aim of this section is to develop an explanation of the observed unitary behavior in terms of the PF interface. The proposal is based on insights already present in Wilder’s (1999) work on the linearization of multidominance structures (see also Bachrach and Katzir 2007, 2009).¹⁵

¹⁵ Wilder’s paper discusses linearization in the context of Kayne’s (1994) Linear Correspondence Axiom (see also Čitko 2005, 2011 and Gračanin-Yuksek 2013). We do not adopt the LCA, however. Instead, we treat linearization as

It is clear that multidominance creates a problem for linearization. The problem lies in what Partee et al. (1993:437) call the *no-tangling condition*: the ban on crossing branches in linearization. If *opera* in (93) is realized as part of the second conjunct, as in (93a), then the branch labelled 4 will cross branches 5 and 7. If it is realized as part of the first conjunct, as in (93b), then branches 5 and 7 will again be crossed, this time by branch 8. Thus, there is no grammatical linearization of the structure.



We propose that the grammar deals with this difficulty through a pruning operation which, in the case at hand, removes branch 4. It thus delivers (94) if given (93) as input.



It goes without saying that pruning cannot be unrestricted. If any structure that violates the no-tangling condition could be repaired, it would be impossible to capture the empirical profile of RNR. We therefore assume that the operation is conditioned as in (95).¹⁶

- (95) Let S_α and S_β be parallel structures. A branch α in S_α may be pruned if (i) α corresponds to a branch β in S_β , and (ii) β 's yield satisfies the ordering statements that hold of α 's yield in S_α .

The condition in (95i) relies on the traditional notion that conjunction reduction requires parallelism between the domain that – in descriptive terms – contains the gap (the ‘dependent domain’) and the domain that contains the antecedent (the ‘antecedent domain’) (see Williams 1978, Goodall 1987, Moltmann 1992 and Hartmann 2000). We adopt Hartmann’s (2000:117) definition of parallel clauses, which is given in (96). According to this definition, two clauses are parallel if the ordinary value of the first is an element of the focus value of the second, and vice versa. The implication is that parallel clauses must be (roughly) isomorphic in terms of their syntax and information-structure. This, in turn, makes it possible to identify corresponding branches.

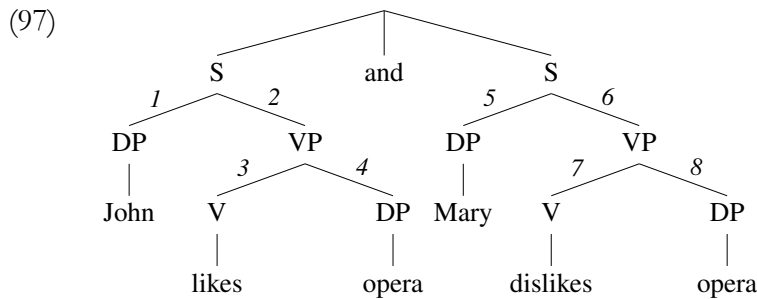
a process that orders sister nodes on a language-specific basis. Abels and Neeleman 2012 demonstrate that this does not lead to a less restrictive theory of word order – rather, movement parameters are replaced by an equal number of linearization parameters.

¹⁶ Our proposal preserves the insight in Citko 2005 that multidominance is unproblematic if the shared material has no phonological reflex, for instance in the case of overt ATB movement. Hence, such movement is less restricted than covert ATB movement, which must be fed by RNR. The irrelevance of empty categories to linearization also explains why there can be languages like Hausa, which have ATB movement, but lack RNR (see Davis 1992 and Beavers and Sag 2004). Overt ATB movement involves multidominance but does not give rise to problems in linearization; RNR, by contrast, will only be found in languages that have the rule in (95).

(96) A and B are parallel clauses iff $[[A]]_o \in [[B]]_f \wedge [[B]]_o \in [[A]]_f$.

The condition in (95ii) states that pruning is only possible if the pivot meets ordering statements associated with the pruned branch in the dependent domain (so that the branch pointing to the pivot is a proxy for the pruned branch). We show below that (95) captures various word order restrictions on RNR, but we first explain how the above bears on the issue of parsimony.

Although we proposed (95) as a solution to the difficulties that RNR-MD causes for linearization, it is – at least in principle – independent of it. After all, multidominance is a syntactic phenomenon, but pruning takes place in the mapping from syntax to phonology. It is therefore expected that (95) may apply to structures other than the one that necessitates it. Crucially, allowing pruning independently of multidominance permits a straightforward account of RNR-E! If (95) applies to the structure in (97), it can prune branch 4, yielding as its output (94), plus a free-floating DP (the instance of $[_{DP} \textit{opera}]$ originally attached via branch 4). Assuming that such structural orphans are left unrealized, pruning results in backward DP ellipsis.

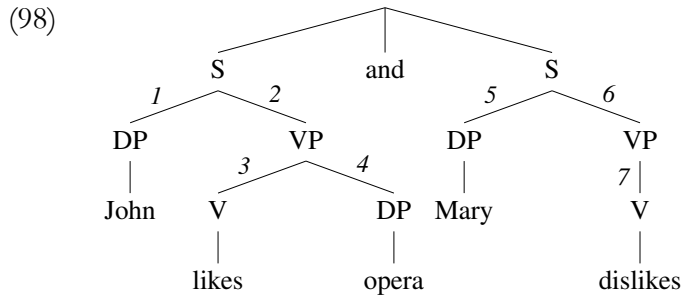


In other words, one version of RNR is the result of multidominance in conjunction with pruning, while the other is the result of pruning only. It is a straightforward consequence of this set-up that RNR-MD and RNR-E will share any properties that flow from (95). This, we argue, solves the problem of parsimony inherent in a hybrid analysis of RNR.

Let us now consider what empirical implications (95) has. In both (93) and (97), the two conjuncts count as parallel clauses if *John* and *Mary* and *likes* and *dislikes* are contrasted. On such a construal, each conjunct has a focus value consisting of alternative propositions that fit the scheme $[P(x, \textit{opera})]$. Given that each conjunct also instantiates this scheme, the two conjuncts satisfy the definition in (96). Hence, the restriction (95i) is met: 4 and 8 count as corresponding branches.

This is not enough to prune branch 4. In order for that to be possible, restriction (95ii) must be met as well. Thus, the ordering statements associated with branch 4 in the left conjunct must be satisfied by the substring that branch 8 yields. As English is an SVO language, the relevant ordering statements for both (93) and (97) are *John* > *likes* > *opera* (where the > symbol signifies precedence). Given that branch 8, the proxy for branch 4, is part of the right conjunct, its yield follows both *John* and *likes*. Therefore, it is possible to prune branch 4.

While (95) allows omission of *opera* in the left conjunct in both (93) and (97), it rules out examples such as **John likes opera and Mary dislikes*, where the gap is located in the right conjunct and the pivot in the left conjunct. This output would require pruning of branch 8 in (93) and (97), resulting in the representation in (98).

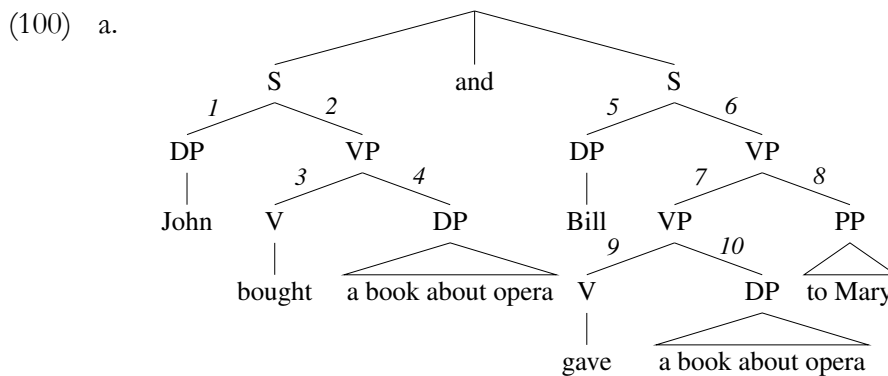


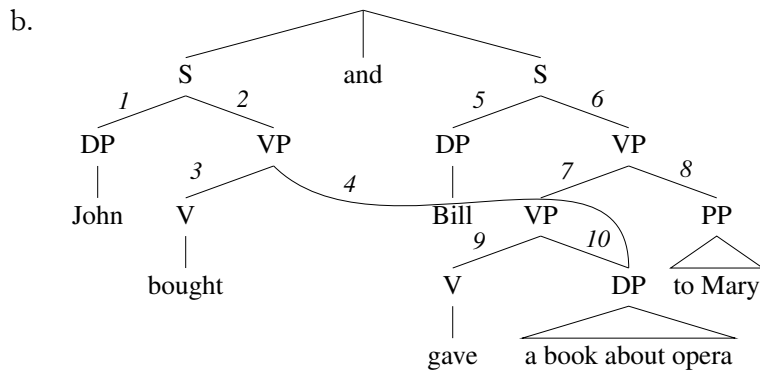
A derivation that transforms (93) or (97) into (98) would not violate the parallelism requirement in (95i) (given an appropriate information-structural construal of the example). It would, however, violate the restriction in (95ii). This is because *opera* in the left conjunct cannot satisfy the ordering statements generated in the dependent domain, which in this case is the right conjunct. In particular, branch 8 in the dependent domain points to a position following *Mary* and *dislikes*, giving rise to the order *Mary* > *dislikes* > *opera*. However, the pivot is located in the left conjunct and therefore precedes both *Mary* and *dislikes*. The implication is that pruning branch 8 is not permitted, so that neither ellipsis nor multidominance can give rise to (98).

The rule in (95) also captures the fact that there may be material in the right conjunct that follows the right-node-raised category, but no material in the left conjunct that follows the gap (see Wilder 1999 and Whitman 2009). The relevant contrast is illustrated in (99).

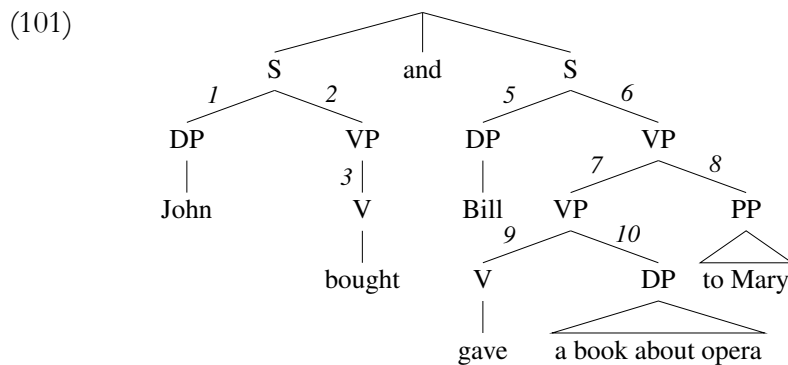
- (99) a. John bought, and Bill gave, a book about opera to Mary.
 b. *John bought, for Mary and Bill wrapped, a book about opera.

The example in (99a) has the structure in (100a) on the ellipsis analysis and the one in (100b) on the multidominance analysis. In both structures, pruning of branch 4 is permissible. The structures meet restriction (95i) if the predicate in the right conjunct is construed as $\lambda y\lambda x.give\text{-}to\text{-}Mary(x,y)$. Focus on *John* and *Bill* and on *buy* and *give-to-Mary* then generates for each conjunct a set of alternative propositions of the shape $P(x, a\text{ book about opera})$. Thus, the conjuncts count as parallel. Restriction (95ii) is met as well. The ordering statements associated with left conjuncts in (100a,b) are *John* > *bought* > *a book about opera*. In both representations, branch 10 is the proxy for branch 4. It is part of the right conjunct, and so its yield does follow *John* and *bought*, as required.

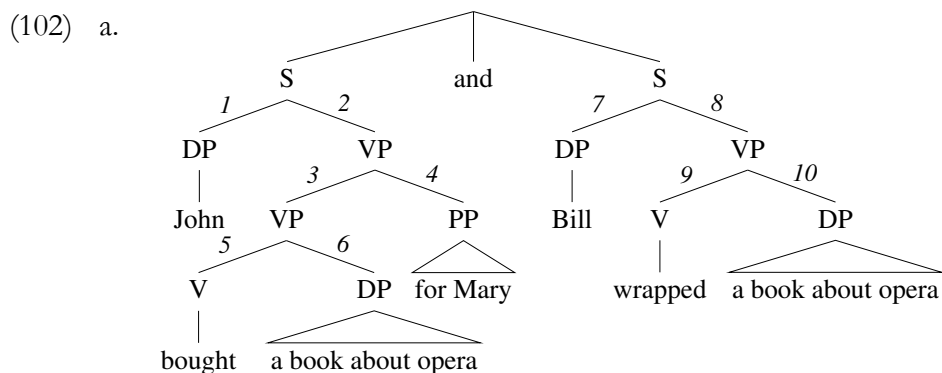


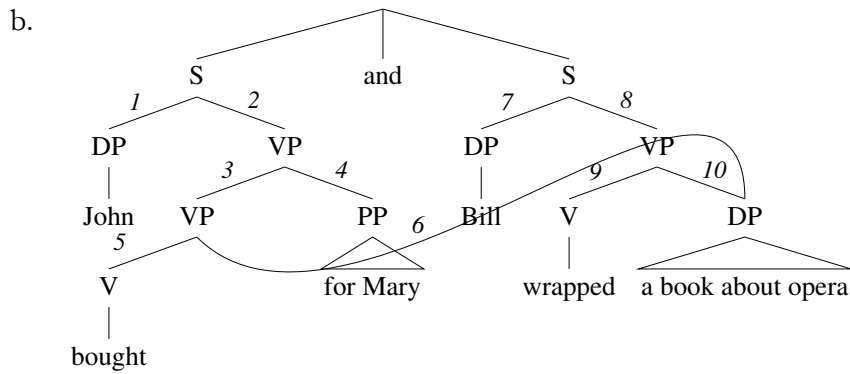


Pruning of branch 4 leads to ellipsis if applied to (100a) and prevents a violation of the no-tangling condition if applied to (100b). In both cases, the output is the representation in (101).

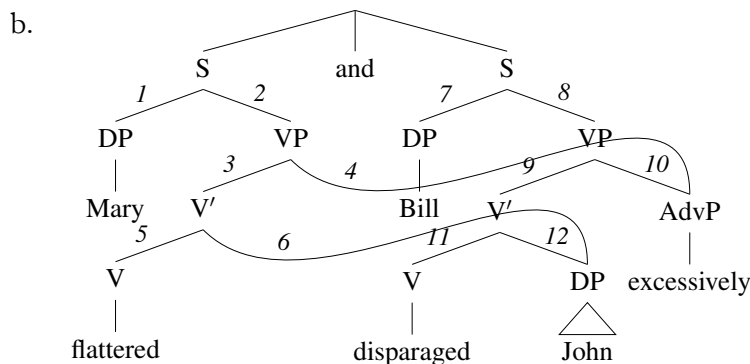
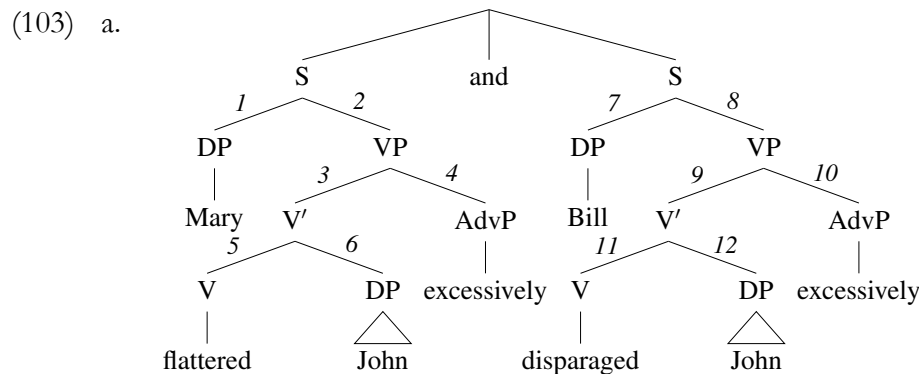


The example in (99b) is structured as in either (102a) or (102b). The rule in (95) does not permit pruning in either structure. The reason for this does not lie in restriction (95i) – the two conjuncts are parallel conjuncts under an appropriate assignment of focus as long as the predicate in the first conjunct is construed as $\lambda y \lambda x. buy\text{-}for\text{-}Mary(x,y)$. The problem is rather that restriction (95ii) cannot be met. The ordering statements associated with the left conjunct are $John > bought > a\ book\ about\ opera > for\ Mary$. Pruning of branch 6 requires that its proxy, branch 10, satisfies these ordering statements. However, it cannot, as branch 10 is part of the second conjunct and its yield therefore follows rather than precedes *for Mary*. As a consequence, ellipsis is not possible in (102a), and (102b) violates the no-tangling condition.

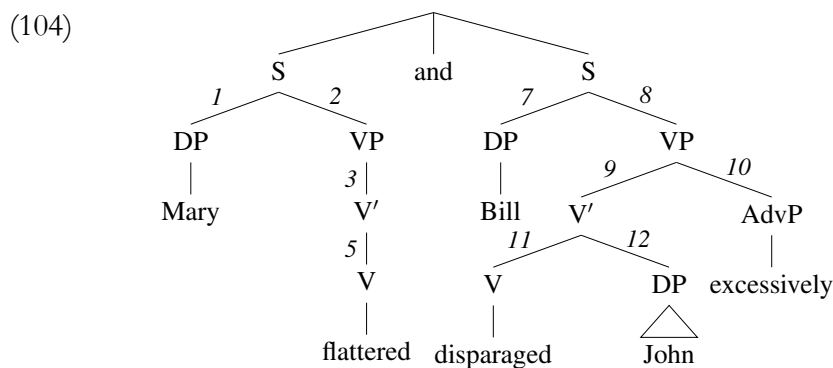




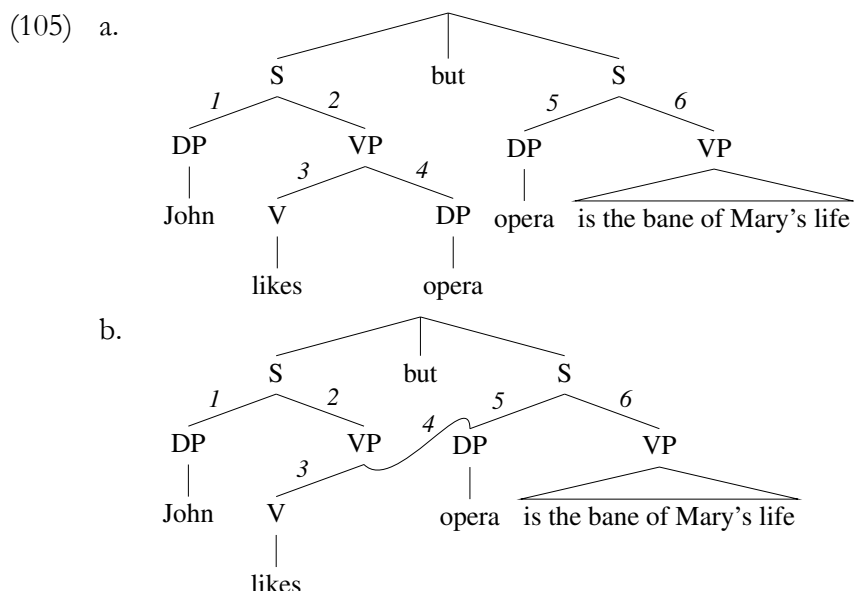
The rule in (95) allows RNR of multiple constituents, as in *Mary flattered, and Bill disparaged, John excessively*. This example can be represented as in (103a) or (103b).



Restriction (95i) is satisfied if *Mary* and *Bill*, and *flattered* and *disparaged* are contrasted. Restriction (95ii) is satisfied as well. The ordering statements associated with the left conjuncts in (103a,b) are $Mary > flattered > John > excessively$. As branches 6 and 4 are paired with branches 12 and 10, the yield of the latter must follow *Mary* and *flattered*, which is the case. In addition, the yield of 10 (branch 4's proxy) must follow the yield of 12 (branch 6's proxy). Again, this is the case: *excessively* follows *John*. As a consequence, (103a) and (103b) can be pruned to yield (104) (by first removing branch 4 and then branch 6). This gives rise to ellipsis in the case of (103a) and circumvents a violation of the no-tangling condition in the case of (103b).



So far, parallelism has only been used to determine which branches are paired in the input structures for pruning. However, given the way the proposal is set up, one would expect certain instances of RNR to be ruled out because the antecedent and dependent domains are not parallel. Such cases exist (see also Yatabe 2003). Consider an example like **John likes, but opera is the bane of Mary's life*, which is structured as in (105a) or (105b).



In neither of these representations is pruning possible. This is not because of restriction (95ii). Pruning of branch 4 would be possible if it could be paired with branch 5. The ordering statements associated with left conjuncts in (105a,b) are *John > likes > opera*. As branch 5 is part of the right conjunct, its yield does indeed follow *John* and *likes*. The problem is rather that branch 5 cannot be treated as a proxy for branch 4, because the conjuncts in (105a,b) do not meet the definition of parallel structures in (96). Suppose that *John* and *Mary* are contrasted, as are *like* and *be-the-bane-of*. Then the left conjunct generates a set of alternatives of the shape $P(x, opera)$, while the right conjunct generates alternatives of the shape $P(opera, y)$. But this implies that the ordinary value of neither conjunct is contained in the focus value of the other. This lack of parallelism blocks pruning. Hence, (105a) does not permit ellipsis, and (105b) violates the no-tangling condition.

We next consider RNR in non-coordinate contexts:

(106) A man who likes, married a woman who dislikes, opera.

Like other instances of RNR, examples such as (106) require pruning: this is what gives rise to ellipsis. Hence, both (95i) and (95ii) must be met, which will only be the case if the subject and object in (106) can be construed as parallel structures. As parallelism is defined in terms of focus

semantics and focus semantics has to do with propositions rather than arguments, the definition in (96) is not sufficient. We propose the additional definition of parallel arguments in (107).

(107) A and B are parallel arguments iff $[\Phi[[A]]]_o \in [\Phi[[B]]]_f \wedge [\Phi[[B]]]_o \in [\Phi[[A]]]_f$.

This definition states that in order to check whether two DPs are parallel arguments, one must consider what happens when they appear in otherwise identical clauses. If the ordinary value associated with the first clause is part of the focus value associated with the second clause, and vice versa, then the DPs count as parallel. This has the consequence that parallel DPs must be (roughly) isomorphic in terms of syntax and information structure, much like parallel clauses. In the case at hand, *a man who likes opera* and *a woman who dislikes opera* count as parallel if *man* and *woman* and *likes* and *dislikes* are contrasted.

If the subject and object in (106) are indeed parallel structures, the restriction in (95ii) poses no particular problems. The ordering statements that hold of the dependent domain (that is, the subject) are *a man > who > likes > opera*. Given that the object follows the subject, the branch pointing to *opera* in the object can function as a proxy for the branch pointing to *opera* in the subject. Therefore, the conditions for pruning (and hence ellipsis) are met.

It follows that RNR in non-coordinate structures is conditioned in much the same way as RNR in coordinate structures: (i) the dependent domain cannot follow the antecedent domain (see (108a)); (ii) the gap must be located at the right edge of the dependent domain (see (108b)); (iii) the pivot need not be located at the right edge of the antecedent domain (see (108c)).

- (108) a. *A man who likes opera, married a woman who dislikes.
 b. *A man who likes a lot, married a woman who dislikes, opera.
 c. A man who likes, married a woman who dislikes, opera immensely.

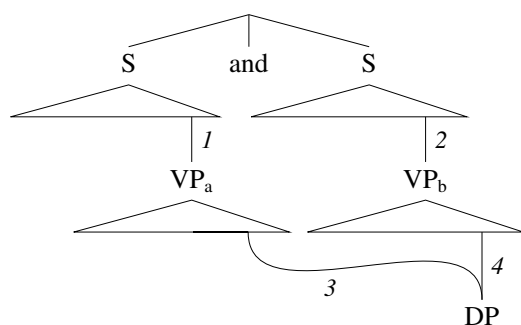
We finally turn to structures in which a primary pivot created through ellipsis contains a secondary pivot created through multidominance. Such structures were instrumental in explaining the interaction between RNR-E and RNR-MD, as they captured the contrast between the PIE–PIM and PIM–PIE orders. Pivot-internal RNR gives rise to two questions that can be answered by assuming a specific order of operations. In particular, the data fall into place if forced pruning (pruning required to satisfy the no-tangling condition) precedes free pruning (pruning that leads to ellipsis).

The first question was already raised in section 5. A possible objection against the structure we propose for (109a) is that the secondary pivot *the same language* is simultaneously pronounced and contained in a category that is elided. It is not self-evident that this should be allowed, especially not in view of the example in (109b), which shows (much like (7b)) that a RNR pivot cannot survive forward ellipsis of VP.

- (109) a. Alice will soon be, and Henry is going to, study the same_{INT} language
 b. *Alice will soon be studying, and Henry is going to e_{VP} , the same_{INT} language.

What distinguishes (109a) and (109b)? Both have the syntactic structure in (110). The order in (109a) is derived by two applications of (95): first branch 3 is pruned (as an instance of forced pruning) and then branch 1 is pruned (as an instance of free pruning). Pruning of branch 3 in effect removes the DP from VP_a . Subsequent pruning of branch 1 leads to ellipsis of VP_a . This does not imply that the DP cannot be pronounced, however, as it is no longer contained VP_a .

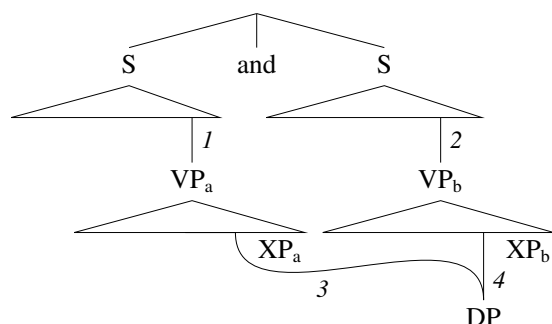
(110)



The order in (109b) is derived by forced pruning of branch 3, followed by ellipsis of VP_b (which we may model as free pruning of branch 2). The second operation removes VP_b, including the DP, from the structure. However, if VP_b is removed, then none of its parts can be realized, which explains why (109b) is ungrammatical. (Note that the DP cannot be left unrealized altogether, as that would render it unrecoverable.) Thus, the contrast between (109a) and (109b) is explained.

The second question we must address has to do with the assumption that a secondary pivot must be rightmost within the first conjunct, even though the constituent that contains it is elided (see (49)). On this assumption, ellipsis of VP_a in (111) does not ameliorate the ungrammaticality of the DP undergoing non-order-preserving RNR and so PIM–PIE orders are ruled out.

(111)



Why should this be? After all, silent material is irrelevant to linear constraints. The answer to this question again lies in the order of operations at PF. Forced pruning of branch 3 in (111) must take place before free pruning of branch 1 (ellipsis of VP_a). However, pruning of branch 3 is not permitted in the presence of XP_a, and – crucially – removal of XP_a relies on pruning of branch 1. Hence, there is no coherent derivation that can delete branches 1 and 3 – as required.

In conclusion, we have shown that a simple rule of pruning suffices to explain why RNR-E and RNR-MD behave alike. Pruning is necessary to reconcile RNR-MD with the no-tangling condition. When it is applied elsewhere, it gives rise to RNR-E. In other words, the issue of parsimony, which any hybrid analysis of RNR must face, dissolves: the shared properties follow from a shared rule.

8. Concluding Remarks

Let us take stock. We have reached the following main conclusions. (i) In coordinate structures, RNR is ambiguous between ellipsis and multidominance; elsewhere, it must be ellipsis. (ii) Cumulative agreement in RNR structures is semantic and is a consequence of the impossibility of regular syntactic agreement under multidominance. (iii) A ban on branching movement chains explains why multidominance is required for ATB movement. This in turn explains why RNR-MD is exceptional in allowing the pivot (or material in it) to scope over a coordinate structure. (iv) The parallel behavior of RNR-E and RNR-MD follows from the fact that both rely on pruning at the PF interface. RNR is either multidominance and pruning or pruning only.

We now consider the implications of our account for the use of multidominance as an analytical tool. Over the past two decades or so, multidominance has been used to account for a bewildering set of phenomena, ranging from movement (see Starke 2001 and Gärtner 2002) to serial verb constructions (see Hiraiwa and Bodomo 2008), from gapping (see Kasai 2007 and Citko 2011) to free relatives (see Van Riemsdijk 1998, 2000, 2006), and from parentheticals (see De Vries 2005) to parasitic gaps (see Kasai 2007). If these proposals are all correct, multidominance is ubiquitous. While this may be so, it is disconcerting that the phenomena analyzed in terms of multidominance do not have all that much in common.

Our conclusions suggest that multidominance is less widespread than the literature has it. If we take the distribution of RNR-MD as a guide, multidominance structures either are multi-rooted (as in the case of Horn amalgams) or they are single-rooted coordinations. The link with coordination of course goes back to an earlier tradition that treats multidominance as a general property of coordinate structures (see Williams 1978, Goodall 1987, Muadz 1991, and Moltmann 1992). We do not embrace this tradition wholesale, as we follow Citko (2011) and many others in limiting multidominance to shared material. However, our conclusions do point to coordination being a prerequisite for single-rooted multidominance.

Such a prerequisite implies that a number of phenomena accounted for through multidominance can no longer be analyzed in this way. Chief among these is movement. If movement were a single rooted multidominance structure, it would have to be a coordination, which is clearly incorrect.

It is striking that a theory permitting multidominance should rule out a multidominance account of movement. After all, the resurgence of multidominance in recent syntactic analysis began with the development of multidominance theories of movement (see Starke 2001 and Gärtner 2002). However, note that the multidominance theory of movement already faced certain difficulties, for instance in accounting for Barss's Generalization or for the c-command requirement on chain formation (see Neeleman and Van de Koot 2010). It may well be, then, that the proposed link between coordination and multidominance makes the right cut.

23 January 2021

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