Cumulative Rightward Processes

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Abstract. Extraposition and right node raising (RNR) can interact in two ways: from a descriptive point of view, the result of each can be used as input for the other. Embedding of the former process or configuration inside the latter explains apparent violations of the right periphery condition associated with RNR. The reverse leads to right-peripheral material that is distributively linked to conjoined or insubordinated parts within the relevant clause. We argue for a multidominance approach to RNR, and a specifying coordination approach to extraposition, and we show that these theories can be combined in the way empirically required. We also indicate what this amounts to in a bottom-up derivation. Data are drawn from Dutch primarily, with some confirmation from English and German.

Keywords: coordination, ellipsis, extraposition, multidominance, right node raising

1 Introduction

A number of phenomena target the right periphery of a clause. We will discuss two of these: optional extraposition, and backward conjunction reduction, also known as right node raising (RNR). In (1a), the extraposed phrase *with red hair* modifies the subject *a woman*. In (1b), *a house* functions as the direct object of both *sold* and *bought*, but it is pronounced only in the rightmost position.

(1) a. A woman came into the room *with red hair*. (extraposition)
b. John sold and Mary bought *a house*. (RNR)

In Dutch, extraposition across the so-called right sentence bracket is very productive. The right bracket corresponds to the position of verbs, verbal particles and verb clusters; the left bracket is the verb second position [V2] of the finite verb in a main clause. An example of extraposition is (2), where the neutral position of *over lepidopterologie* 'on lepidopterology' is indicated with an underscore. The right sentence bracket is *gekocht* 'bought'.

(2) Joop heeft een boek _ gekocht *over* *lepidopterologie*.
Joop has a book bought about lepidopterology
'Joop bought a book about lepidopterology.'

In (3), we illustrate right node raising of a participle in Dutch. Here, *gelezen* 'read' is interpreted in both coordinated clauses. Its normal surface position in the first clause is indicated with an underscore. Henceforth, we will also indicate the most prominent contrastive foci by capitalizing the stressed syllable.

(3) Joop heeft een BOEK _, en Jaap heeft een TIJDschrift *gelezen*.
Joop has a book and Jaap has a magazine read
'Joop read a book, and Jaap read a magazine.'

It is worth noting that backward reduction can be combined with forward reduction, more specifically, RNR with gapping. This is called *ambi-ellipsis* in Grootveld (1994), who is concerned with the challenges it raises for parsing. In (3), for instance, it is possible, even preferable, to elide the auxiliary *heeft* 'has' in the second clause in addition to the participle *gelezen* 'read' in the first clause. It is remarkable that it sounds quite natural to do so. However, in order not to unnecessarily complicate the discussion, we will mostly avoid cases of ambi-ellipsis in this article.

Importantly, RNR constructions come with a particular intonation. On the first focus (here, *boek* 'book'), which directly precedes the gap, the pitch rises but does not go down; this creates a sense of expectation. Then the conjunction and the second clause start out on a lower level, usually after a short pause or slowdown. The contrastive focus in the second clause – *tijdschrift* 'magazine' in (3) – has a regular rise-fall contour. The intonation contour can be depicted as / _ ... /\. A (simplified) Pierrehumbert-notation is provided in (3´); see Féry & Hartmann (2005) for similar observations regarding the pitch accents and the intonational phrase boundary after the first conjunct:

(3´) Joop heeft een boek, en Jaap heeft een tijdschrift gelezen.
| | | | |
%L H*H% %L H*L L%

RNR of a noun phrase is possible as well in Dutch; see (4). This is comparable to the situation in (1b).

(4) Joop KOCHT _, maar Jaap LEENde *een boek*.
Joop bought but Jaap borrowed a book
'Joop bought a book, but Jaap borrowed a book.'

In fact, any word string can be input for RNR, provided that it is rightmost in each conjunct.

Backward center gapping is prohibited, as is illustrated in (5b), which contrasts with forward gapping in (5a):

(5) a. Joop *kocht* een BOEK en Jaap _ een CD.
Joop bought a book and Jaap a CD
'Joop bought a book and Jaap bought a CD.'
b. * Joop _ een BOEK en Jaap *kocht* een CD.
Joop a book and Jaap bought a CD
Intended: 'Joop bought a book and Jaap bought a CD.'

Thus, right node raising is subject to a right periphery condition, hence the name.

In this article, we investigate the interaction of RNR and extraposition. We show that the result of each can be used as input for the other, at least descriptively. The relevant data are presented in section 2. Section 3 discusses the theories of RNR and extraposition separately. Section 4 then shows that the proposed analyses can be combined to explain the effects of cumulative rightward processes. Section 5 is the conclusion.

2 Mutual feeding of rightward processes[1]

2.1 Extraposition feeds right node raising

In English, a prosodically heavy noun phrase can optionally be extraposed; this is called Heavy NP Shift (HNPS). *Books* in (6a) does not count as heavy, but *the complete works of Charles Dickens* in (6b) does.

(6) a. John bought (books) yesterday (*books).
b. John bought (the complete works of Charles Dickens) yesterday (the complete works of Charles Dickens).

As has been noticed before in Wilder (1997), right node raising can be facilitated by HNPS. Consider the examples in (7).

(7) a. * John bought _ YESterday, and Mary sold _ toDAY *books.*
b. John bought _ YESterday _, and Mary sold _ toDAY *the complete works of Charles Dickens*.

Sentence (7a) is unacceptable because the right periphery condition on RNR is violated: the shared string *books* is not rightmost in each conjunct, as it would normally precede time adverbials like *yesterday*. By contrast, in (7b) *the complete works of Charles Dickens* could have been shifted to the right within each conjunct <u>before</u> RNR takes place. The steps in the derivation are as follows (pretheoretically):

(8) a. John bought *the complete works of Charles Dickens* yesterday and Mary sold *the complete works of Charles Dickens* today. → HNPS →
b. John bought _ yesterday *the complete works of Charles Dickens* and Mary sold _ today *the complete works of Charles Dickens*. → RNR →
c. John bought _ yesterday _ and Mary sold _ today *the complete works of Charles Dickens*.

We conclude that HNPS can feed right node raising in English. We will now shift our attention to Dutch, and briefly return to other Germanic languages in section 2.3.

In Dutch, HNPS with regular noun phrases is very marginal. However, we can show a similar pattern using free relative clauses, which constitute a special class of heavy NPs. In (9a), the simple NP *dat schilderij* 'that painting' cannot be shifted rightwards; in (9b) *wat Mieke maandag geschilderd had* 'what Mieke had painted on Monday' can.

(9) a. Joop heeft (dat schilderij) bewonderd (*dat schilderij).
Joop has that painting admired that painting
'Joop admired that painting.'

b. Joop heeft (wat Mieke maandag geschilderd had) bewonderd (wat
Joop has what Mieke Monday painted had admired what
Mieke maandag geschilderd had).
Mieke Monday painted had
'Joop admired what Mieke had painted on Monday.'

We then observe that HNPS facilitates RNR, witness the contrast in (10):

(10) a. * Joop heeft _ beWONderd, maar Jaap heeft _ verGUISD *dat schilderij*.
Joop has admired but Jaap has maligned that painting
Intended: 'Joop admired that painting, but Jaap maligned that painting.'

b. Joop heeft _ beWONderd _, maar Jaap heeft _ verGUISD *wat Mieke*
Joop has admired but Jaap has maligned what Mieke
maandag geschilderd had.
Monday painted had
'Joop admired what Mieke had painted on Monday, but Jaap maligned what Mieke had painted on Monday. '

In (10a) the right periphery condition on RNR is violated, but in (10b) this can be circumvented by first applying HNPS. The process in deriving sentences like (10b) can be sketched as follows:

(11) a. $[S_1\ Aux_1\ O\ V_1]\ Co\ [S_2\ Aux_2\ O\ V_2]$ → HNPS (in both clauses) →
b. $[S_1\ Aux_1\ \_\ V_1\ O]\ Co\ [S_2\ Aux_2\ \_\ V_2\ O]$ → RNR →
c. $[S_1\ Aux_1\ \_\ V_1\ \_\ ]\ Co\ [S_2\ Aux_2\ \_\ V_2\ O]$

There is, however, a possible alternative explanation for (10b), more in line with an antisymmetric grammar (Kayne 1994). We may assume that Dutch is underlyingly VO (Zwart 1994). Regular objects are obligatorily moved to the middle field (say, for Case licensing). Free relatives, like complement clauses, are exempt from this requirement. If they stay *in situ*, RNR could apply directly – without the necessity of extraposition –, since the objects are already right-peripheral in their clauses.

This alternative explanation of (10b), although it may be correct in itself, does not undermine the idea that extraposition can feed RNR. First note that it is of no help in explaining the English facts in (7). More importantly, it turns out that not only HNPS can feed RNR, but optional extraposition in general, including extraposition of modifiers. We illustrate this in Dutch.

Example (12) shows optional extraposition of a relative clause across the right sentence bracket (here, the participle *bewonderd* 'admired').

(12) a. Joop heeft iemand *die meer dan twee ton verdiend had* bewonderd. →
Joop has someone who more than 200,000 earned had admired
'Joop admired someone who had earned more than 200,000.'
b. Joop heeft iemand _ bewonderd *die meer dan twee ton verdiend had.*

The extraposed order can then be used as input for RNR if we coordinate two such clauses:

(13) Joop heeft iemand _ beWONderd _, maar Jaap heeft iemand _ verGUISD die
Joop has someone admired but Jaap has someone maligned who
meer dan twee ton verdiend had.
more than 200,000 earned had
'Joop admired someone who had earned more than 200,000, but Jaap maligned someone who had earned more than 200,000.'

Similar examples can be construed with comparative clauses and PP modifiers; see (14) and (15), respectively:

(14) Joop heeft minder _ geKOCHT _, maar meer _ geHUURD *dan hij*
Joop has less bought but more rented than he
aanvankelijk wilde.
initially wanted
'Joop bought less than he initially wanted, but rented more than he initially wanted.'

(15) Joop heeft een ketting _ geKOCHT _, maar Jaap heeft een ketting _
Joop has a necklace bought but Jaap has a necklace
geSTOlen *met een dure edelsteen eraan*.
stolen with an expensive gemstone there.on
'Joop bought a necklace with an expensive gemstone, but Jaap stole a necklace with an expensive gemstone.'

In each case, the process is as sketched in (16), where β is the relevant modifier, and α_1 and α_2 are the anchors it relates to.

(16) a. [... [α_1 β]... V_1] Co [... [α_2 β]... V_2] → extraposition (2x) →
b. [... [α_1 _]... V_1 β] Co [...[α_2 _]... V_2 β] → RNR →
c. [... [α_1 _]... V_1 _] Co [... [α_2 _]... V_2 β]

The coordination does not need to be clause-level. In (14) we already encountered an example of coordination below the auxiliary. Another illustration is (17):

(17) De manager heeft een jonge man _ AANgenomen _, en tegelijk
the manager has a young man hired and at.the.same.time
een oude man _ ontSLAgen *die heel goed is*.
an old man fired who very good is
'The manager hired a young man who is very good, and at the same time fired an old man who is very good.'

Notice that the special RNR intonation is important here. Without that, the interpretation changes to one in which the relative clause relates only to the object in the second conjunct: 'The manager hired a young man; and at the same time fired an old man who is very good'.

Furthermore, although extraposition from a direct object is the most common, this is not the only possibility. In (18) and (19) we illustrate extraposition plus RNR of a modifier from a subject, and in (20) from an indirect object.

(18) Er is zowel een man _ gearriVEERD _, als een vrouw _ verTROKken
there is both a man arrived and a woman left
die een rode hoed droeg.
who a red hat wore
'Not only did a man arrive who wore a red hat, but also a woman left who wore a red hat.'

(19) Er heeft niet alleen een vrouw _ in de huiskamer geLACHen _, maar
there has not only a woman in the living.room laughed but
ook een man _ in de slaapkamer geHUILD *die een hoed heeft verloren*.
also a man in the bedroom cried who a hat has lost
'Not only did a woman who lost a hat laugh in the living room, but also a man who lost a hat cried in the bedroom.'

(20) Sinterklaas gaf meer kinderen _ een comPUterspel _, en minder ouders _
St. Nicholas gave more children a computer.game and fewer parents
een BOEK *dan verwacht*.
a book than expected
'St. Nicholas gave more children than expected a computer game, and fewer parents than expected a book.'

Finally, it is worth pointing out that if extraposition is blocked in the two conjuncts that are input for RNR, the potential resulting configuration of backward conjunction reduction is unacceptable. This may seem obvious, but notice that RNR itself is an unbounded process. In (21), the ellipsis site is inside an embedded clause:

(21) [Jaap zei [dat Mieke een HOND _]], maar [Joop beweerde [dat ze een KAT
Jaap said that Mieke a dog but Joop claimed that she a cat
had geaaid]].
had petted
'Jaap said that Mieke had petted a dog, but Joop claimed that she had petted a cat.'

By contrast, extraposition is subject to the *Right Roof Constraint* (Ross' 1967 Upward Boundedness Constraint; see especially Koster 2000 for discussion), which means that rightward processes cannot cross clause boundaries. For instance, in (22b) extraposition to the right of the embedded clause is fine, but extraposition out of the embedded clause to the right of the matrix is unacceptable (22c).

(22) a. [Dat Joop een boer *die alles over landbouw weet* kent] is vreemd.
that Joop a farmer who all about agriculture knows knows is strange
'It is strange that Joop knows a farmer who knows all about agriculture.'
b. [$_S$ [$_S$ Dat Joop een boer _ kent] *die alles over landbouw weet*] is vreemd.
c. * [$_S$ [$_S$ Dat Joop een boer _ kent] is vreemd] *die alles over landbouw weet.*

As expected, we can now coordinate two embedded clauses of the type in (22b) and apply RNR:

(23) [Dat Joop een boer _ ontVING _, maar Jaap een boerin _ WEGstuurde *die*
that Joop a farmer received but Jaap a farmer.F away.sent who
alles over landbouw wist] is heel vreemd.
all about agriculture knew is very strange
'It is very strange that Joop received a farmer who knew all about agriculture but that Jaap sent away a woman farmer who knew all about agriculture.'

But what we cannot do is coordinate full sentences of the type in (22) and apply RNR:

(24) * Dat Joop een boer _ ontving is DUIdelijk _, maar of Jaap een boerin _
that Joop a farmer received is clear but if Jaap a farmer.F
wegstuurde is de VRAAG *die alles over landbouw weet.*
away.sent is the question who all about agriculture knows
Intended: 'It is clear that Joop knows a farmer who knows all about agriculture, but it is the question if Jaap knows a woman farmer who knows all about agriculture.'

Such contrasts confirm the ideas expressed above. RNR is unbounded, but subject to a right edge constraint. Apparently, this constraint can be lifted, but only as the result of feeding by extraposition. If extraposition is blocked for whatever reason (for instance by the Right Roof Constraint, or by limitations on NP shift), RNR of originally non-peripheral material becomes impossible.

2.2 Right node raising feeds extraposition

In the previous section we showed that extrapositon can feed RNR. Here, we argue that the reverse is also possible. In order to do so, we must first illustrate the fact that RNR is a process that can be applied to coordinate structures of categories other than clauses. In particular, noun phrases are of interest for our purposes. The sentences in (25) show that the righthand part of two coordinated NPs or DPs can be shared.

(25) a. Het lezen VAN _, en citeren UIT *goede artikelen* is belangrijk.
the reading of and citing from good articles is important
'Reading good articles and citing from good articles are important.'

b. De immigratie vanUIT _, en het toerisme NAAR *Marokko* zijn
the immigration from andthe tourism to Marocco are
gerelateerd.
related
'The immigration from Marocco and the tourism to Marocco are related.'

Even in (26), the modifier *van tien euro* 'of ten euros' can be related to both *boek* 'book' and *DVD*, pending the correct RNR intonation.

(26) een BOEK _, en een DVD *van tien euro*
a book and a DVD of ten euro
'a book of €10 and a DVD of €10'

The required intonation for this reading is facilitated by the use of a distributive focus marker as in *both... and*, *either... or*, *not only... but also*. An example sentence is (27):

(27) Ik kocht niet alleen een BOEK _, maar ook een DVD van tien euro.
I bought not only a book but also a DVD of ten euro
'I bought not only a book of €10, but also a DVD of €10.'

Now consider (28), where again the pertinent modifier is related to both coordinated object DPs. What is relevant is that it is no longer adjacent to the second noun, but instead surfaces in an extraposed position to the right of the participle.

(28) Ik heb zowel een BOEK _ als een DVD _ gekocht *van tien euro*.
I have both a book and a DVD bought of ten euro
'I bought both a book of €10 and a DVD of €10.'

It seems, then, that the PP *van tien euro* 'of ten euros' has first been right node raised within the coordinated object, and then extraposed across the verb *gekocht* 'bought'. In other words, RNR feeds extraposition. Schematically, this is indicated in (29):

(29) a. S Aux [[N_1 PP] Co [N_2 PP]] V → RNR (constituent level) →
b. S Aux [[N_1 _] Co [N_2 PP]] V → extraposition →
c. S Aux [[N_1 _] Co [N_2 _]] V PP

Normally, the *Coordinate Structure Constraint* would prohibit extraction, but notice that (29) can be subsumed under the well-known *across-the-board* (ATB) exception, because the relevant modifier leaves a gap in each conjunct.

Of course one could call (29c) rightward ATB, at least descriptively, but note that this term has also been used for simple cases of RNR like (1b) in Ross (1967) and Sabbagh

(2007), for instance. What is important is that 'rightward ATB' as in (29) can be decomposed into two steps: RNR at the constituent level, which explains that only one of the two modifiers is pronounced (see further section 3.1), and extraposition, which explains that the remaining modifier does not surface at the right edge of the coordination phrase – as in (25) or (27) –, but to the right of the participle (see further section 3.2).

As in RNR at the clausal level, the gap must be right-peripheral in each conjunct. If we try to extract a medial modifier, the result is bad, as is shown in (30):

(30) * Ik heb niet alleen een VRIEND _ die aardig is maar ook een VIJAND _
I have not only a friend who kind is but also an enemy
die aardig is ontmoet *van Obama*.
who kind is met of Obama
Intended: 'I met not only a friend of Obama who is kind, but also an enemy of Obama who is kind.'

This restriction follows from the right periphery condition on RNR (but, as it happens, it can also be explained by independent restrictions on extraposition). Another restriction is caused by the Right Roof Constraint, which we already encountered before; consider (31):

(31) [Dat Joop zowel een BOEK _ als een DVD _ gekocht heeft *(van tien euro)*]
that Joop both a book and a DVD bought has of ten euro
is vreemd *(*van tien euro)*.
is strange of ten euro
'It is strange that Joop bought both a book of €10 and a DVD of €10.'

Here, the modifier can be right node raised and extraposed within the subject clause, comparable to (28), but it cannot be extraposed across the embedded clause boundary to the right edge of the main clause.

Let us turn to what *can* be done. The pattern in (29) is not restricted to extraction from objects. In (32) and (33) the PP modifier relates to the coordinated subject NPs.

(32) Er werd niet alleen een BOEK _ maar ook een DVD _ verkocht *van*
there was not only a book but also a DVD sold of
tien euro.
ten euro
'Not only a book of €10 was sold, but also a DVD of €10 was sold.'

(33) Zowel een MAN _ als een VROUW _ werd gesignaleerd *met een paarse hoed*.
both a man anda woman was observed with a purple hat
'Both a man with a purple hat and a woman with a purple hat were spotted.'

Furthermore, example (34) illustrates extraction of a relative clause instead of a PP:

(34) Het verbaast me dat Mieke niet alleen de lelijke MAN _, maar ook de
it surprises me that Mieke not only the ugly man but also the
knappe JONGen _ verafschuwt *die nog geen vriendin heeft/*hebben*
handsome boy detests who yet no girlfriend has/*have
'It surprises me that Mieke detests not only the ugly man who does not have a girlfriend, but also the handsome boy who does not have a girlfriend.'

The embedded finite verb is obligatorily singular. This implies that there are originally two similar relative clauses, one related to each of the two contrasted nominals, as is indicated by the underscores. The RNR intonation and the distributive character of (34) rule out an analysis in terms of a complex antecedent, since this would lead to plural agreement, as is shown in (35):

(35) [[de man]$_i$ en [de jongen]$_j$] die$_{i+j}$ geen vriendin hebben/*heeft
the man and the boy who no girlfriend have/*has
'the man and the boy who do not have a girlfriend'

In this example, there is only one relative clause that is associated to the coordinated noun phrase as a whole.

There is another potential alternative analysis, however, that we cannot immediately rule out for examples such as (28) and (32) - (34). This analysis involves the possibility of non-constituent RNR. A sound example of non-constituent RNR is (36), for instance.

(36) Joop heeft [[DRIE _] _] en Jaap heeft [[VIER *boeken*] *gelezen*].
Joop has three and Jaap has four books read
'Joop has read three books and Jaap has read four books.'

We could now reanalyze (34) and the other examples in the following way. First, we assume that there are two coordinated clauses (or at least extended predicates) that contain a noun-modifier combination each, as in (37a). Then, extraposition of the modifier takes place within each clause separately (37b). Finally, the right-peripheral sequence verb-modifier (which is not a constituent) is right node raised, resulting in the surface-structure (37c).

(37) a. [... N_1 Mod ... V] Co [... N_2 Mod ... V] → extraposition (2x) →
b. [... N_1 _ ... V Mod] Co [... N_2 _ ... V Mod] → non-constituent RNR →
c. [... N_1 _ ... _ _] Co [... N_2 _ ... *V Mod*]

But this is a variant of what we already discussed in section 2.1, namely extraposition feeding RNR (and not the reverse). Given that the examples under discussion are indeed interpreted distributively, there is nothing wrong in principle with the alternative analysis in (37). It is fair to note, though, that the original proposal in (29) is less complicated. Thereby, we are presupposing that non-constituent RNR is more complex than simple RNR: we believe that the former is obtained by applying simple RNR iteratively (see also De Vries 2005a). Thus, the alternative analysis involves double extraposition followed by

double RNR, whereas our initial proposal involves single RNR followed by single extraposition, with the same end result.

Are there examples for which (37) is excluded? This would be the case if RNR can be combined with collective predicates, which are incompatible with a biclausal analysis. Normally, we do not expect this to be possible, since the RNR intonation triggers a distributive interpretation. Therefore, examples such as (38a), like (38b), are unacceptable, contrary to (38c). Similarly, (39) is unacceptable. Evidently, the results can be fortified by the use of a distributed focus marker in the coordinated phrase (as in *both...and*).

(38) a. * The MAN _, and the WOman *from Germany* were married to each other.
b. * The man from Germany was married to each other, and the woman from Germany was married to each other.
c. The man and the woman were married to each other.

(39) * De uitgever heeft een kort PAper _ en een lang esSAY gebundeld *dat*
the publisher has a short paper and a long essay bundled which
over right node raising gaat.
about right node raising goes
Intended: 'The publisher bundled a short paper that is about RNR and a long essay that is about RNR.'

We can, however, circumvent this restriction by looking at instances of RNR outside of syntactic coordination contexts (for more discussion of coordination-like reduction processes in phrasal comparatives, and, more generally, 'insubordination' constructions, we refer to Van der Heijden 1999 and Lechner 2001). In (40a), NP_1 and NP_2 are semantically on a par, but NP_2 is not coordinated to NP_1: it is in a prepositional phrase subordinated to some projection of the predicate. In (40b) we observe that RNR with respect to the two NPs is possible.

(40) a. It can be hard to distinguish NP_1 from NP_2.
b. It can be hard to distinguish synTACtic _ from seMANtic *factors*.

The same can be done with a modifier of NP. We illustrate this in Dutch:

(41) Mieke wil een artikel van JOOP _ met een artikel van JAAP (*over*
Mieke wants a paper of Joop with a paper of Jaap about
right node raising) vergelijken (*over right node raising*).
right node raising compare about right node raising
'Mieke want to compare a paper by Joop about RNR with a paper by Jaap about RNR.'

Crucially, the modifier can also surface to the right of the final verb, which means that it is extraposed. Thus, (41) can only be explained if RNR can feed extraposition. A biclausal analysis is out of the question, since *compare X to Y* is a collective predicate. A similar example is (42):

(42) Joop heeft het ENE (boek) _ na het ANdere (boek) _ gekocht *dat slechts tien*
Joop has the one book after the other book bought that only ten
euro kostte.
euro cost
'Joop bought one book after the other that only cost €10.'

Here, what is relevant is that the relative clause is both right node raised and extraposed.

In brief, we have presented data giving rise to the conclusion that constituent RNR can be used as input for extraposition, which is the reverse of what we found in the previous section.

2.3 Additional evidence from English and German

Although the data that are central to this article are primarily drawn from Dutch, the mutual feeding of extraposition and RNR can be witnessed in other Germanic languages as well. In this section we briefly discuss some English and German examples.

As was shown in (6) above, prosodically heavy NPs can shift to the right in English. Furthermore, English allows for relative clauses and PPs to be extraposed; see (43), for example:

(43) John saw a man (who was wearing a red hat) in the pub (who was wearing a red hat).

We have seen in (7) that heavy NP shift in English can feed RNR that would otherwise violate the right periphery condition (see section 3.1 for more discussion concerning this condition). Similarly, example (44) shows that RNR can target a relative clause, provided that it can be extraposed within both conjoined clauses:

(44) John saw a girl _ in TOWN _, and Joey saw a boy _ in the LIbrary *who was playing cello.*

Thus, as we would expect, extraposition can generally feed RNR in English. Example (45) suggests that the reverse also holds:

(45) a. John gave not only a BOOK _, but also a DVD *about the life of whales* to Joey.
b. John gave not only a BOOK _, but also a DVD _ to Joey *about the life of whales*.

Here, the PP *about the life of whales* is the target of RNR within the coordinated object in (45a), prior to being (optionally) extraposed across the indirect object in (45b). Note that the RNR intonation is crucial: in the absence of contrastive focus on *book* and *DVD*, (45) allows for an alternative reading in which the relevant PP is associated with *DVD* only. According to our informants, the correct RNR intonation is relevant for (44) as well. Without the pitch accent on *town* that is followed by a break, the extraposed relative clause

is likely to be associated with *a boy* in the second conjunct only, but not simultaneously with *a girl* in the first conjunct.

We conclude that in both Dutch and English, RNR and extraposition may interact. Let us see if German behaves similarly in this respect. The following is an example of RNR targeting a comparative clause (in italics), analogous to (14) for Dutch:

(46) Der Hans hat weniger _ geKAUFT _, aber mehr _ geMIEtet *als er*
DEF Hans has less bought but more rented than he
ursprünglich behauptet hat.
initially stated has
'Hans bought less than he initially stated, but rented more than he initially stated.'

Here, the comparative clause is extraposed across the participle within each conjunct. Consequently, it is right-peripheral, and can be subject to RNR, resulting in (46). In addition to this example, the majority of the German speakers we consulted accepted sentences in which relative clauses are extraposed and then right node raised.[2]

Finally, let us see if there are examples in German in which RNR presumably takes place prior to extraposition. This is indeed the case; see (47):

(47) Es überrascht mich, dass die Michi nicht nur einen hässlichen MANN _,
it surprises me that DEF Michi not only an ugly man
sondern auch einen hübschen JUNGen _ hasst *der noch keine Freundin hat.*
but also a handsome boy hates who yet no girlfriend have:3SG
'It surprises me that Michi not only hates an ugly man who doesn't have a girlfriend yet, but also a handsome boy who doesn't have a girlfriend yet.'

Here, a relative clause, associated with both conjuncts of the conjoined object, has been extraposed across the main verb *hasst* 'hates' after right node raising. Again, it must be emphasized that the RNR intonation is crucial for the intended distributive reading. Let us briefly expand on this by a comparison with a collective reading. Consider the contrast in (48), without extraposition.

(48) a. Michi hasst [einen hässlichen $Mann_i$ und einen hübschen $Jungen_j$] die_{i+j}
Michi hates an ugly man and a handsome boy who
noch kein Freundin haben.
yet no girlfriend have:PL
'Michi hates an ugly man and a handsome boy who don't have a girlfriend yet.'

b. * Michi hasst einen hässlichen $MANN_i$ _, und einen hübschen $JUNGen_j$ die_{i+j}
Michi hates an ugly man and a handsome boy who
noch keine Freundin haben.
yet no girlfriend have:PL
'Michi hates an ugly MAN, and a handsome BOY who don't have a girlfriend yet.'

As (48a) shows, it is possible for a relative clause to take a coordinated object as a whole as its antecedent. Such a relative clause could also be extraposed. In (48b), however, a collective interpretation is impossible because of the RNR intonation (which includes contrastive focus on *Mann* and *Jungen*). Thus, RNR forces distribution. For this reason, (48b), which contains a plural relative pronoun and plural agreement on the verb, is ungrammatical. The judgments are the same for Dutch relative clauses in such configurations.

In sum, the bidirectional interaction between RNR and extraposition originally found in Dutch, can be confirmed by similar data from English and German. The remainder of this article is an attempt to explain these findings from a formal syntactic perspective.

3 How to analyze right node raising and extraposition in isolation

Since there is no generally accepted theory for either RNR or extraposition, we first discuss them independently in the next two subsections, and return to the combination of both in section 4.

3.1 Right node raising as multidominance

As is clear from the data discussed so far, RNR constructions are subject to the right periphery condition. Along with this condition, this section discusses the properties of RNR constructions. Based on those, we argue in favor of a multidominance approach to RNR.

The data in (49) demonstrate that RNR is not sensitive to island conditions. Example (49a) shows RNR out of a complex NP, and (49b) out of an adverbial phrase.

(49) a. John admired a girl who BAKED _, and offended a boy who ATE *chocolate chip cookies*.
b. John kissed a girl on a RAIny _, and Joanna a boy on a SUNny *day in October*.
c. John thinks that his brother LOves _, and Joanna thinks that her sister HAtes *chocolate chip cookies*.

Importantly, (49c) shows that RNR does not obey the Right Roof Constraint, as it crosses clause boundaries (in this example, the target of reduction is embedded in each conjunct). This differs from the situation in extraposition constructions; recall (22) and (31) above.

Looking carefully at example (49b), we note that it is possible for RNR to apply to non-constituents. Namely, *rainy* and *sunny* are contrasted, and RNR applies to the noun *day* and the adjunct that modifies the noun phrase in each conjunct. The Dutch example in (50) provides a more pregnant case of non-constituent RNR. Here, the string *een baard gegroet* 'a beard greeted' is evidently not a constituent.

(50) Joop heeft eerst een man MET _, en later een man ZONder *een baard*
Joop has first a man with andlater a man without a beard
gegroet.
greeted
'Joop first greeted a man with a beard and later greeted a man without a beard.'

Furthermore, the examples in (51) show that RNR can also apply below the word level (see also Hartmann 2000 and Ha 2008):

(51) a. Deze theorie heeft zowel VOOR- als NAdelen.
this theory has both for- as disadvantages
'This theory has pros and cons.'
b. ? Joop bedacht een theorie met veel VOOR- , en Mieke een theorie
Joop thought.of a theory with many for- and Mieke a theory
met veel NA*delen*.
with many disadvantages
'Joop came up with a theory with many advantages and Mieke came up with a theory with many disadvantages.'

The more complicated example in (51b) is marked for some speakers. Examples like these are even more degraded when the contrasted elements are bound morphemes, such as *<u>be</u>-*en* *<u>ont</u>kennen* 'admit and deny' in Dutch.

The insensitivity to island constraints (including the Right Roof Constraint), together with the possibility to target non-constituents constitute a problem for theories that analyze RNR in terms of rightward across-the-board movement (see Ross 1967, Postal 1998, and more recently Sabbagh 2007). Notably, leftward ATB movement *is* sensitive to islands, witness (52):

(52) * Which movie$_i$ did a girl that loves t_i laugh and a boy who hates t_i cry?

Sabbagh (2007) attempts to circumvent the issue of islandhood, proposing that rightward movement is in principle unbounded as long as it does not cross overt material in the same cyclic node.[3, 4] This leaves open the issue of moving non-constituents – by some iterative process –, which would then require tuck-in operations at the adjunction site in order to derive the correct word order. The movement approach is also complicated in simple cases of RNR, in the sense that *two* constituents are moved out of *two* conjuncts, whereas only *one* of them surfaces (in the *one* available landing site?). But this is a more general problem for the derivation of ATB movement.

It seems more plausible that the target of RNR is not moved, but stays *in situ*. This idea can be worked out in different ways. It has been suggested in the literature that RNR is backward deletion (Hartmann 2000 and Ha 2008, among others). However, such an analysis is not without problems. For instance, *forward* deletion phenomena are known to be sensitive to the so-called *Head Condition* (Fiengo 1974, G. de Vries 1992). This condition prohibits the deletion of material that is c-commanded by an overt head (see also

Wilder 1994). This means that we cannot delete arguments if their selecting head is not deleted as well, which is illustrated by the contrast in (53):

(53) a. John ate a chocolate chip cookie and Joanna ~~ate~~ an ice cream.
b. John ate a chocolate chip cookie and Joanna did ~~eat a chocolate chip cookie~~ too.
c. * John loves chocolate chip cookies and Joanna hates ~~chocolate chip cookies~~.

That this condition does not hold for RNR is shown in (54), where the arguments of the overt finite verb are missing:

(54) John LOVes _, and Joanna HAtes *chocolate chip cookies*.

Furthermore, contrary to forward deletion, RNR is sensitive to some condition on identity. Whereas forward deletion is acceptable regardless of the morpho-phonological form of what is deleted, RNR that targets material that is not identical in the respective conjuncts is marginal to bad. The following examples of gapping (55a) and RNR (55b) show this asymmetry in Dutch (for more discussion, see Kluck 2009):

(55) a. Mieke *gaat* naar India, en haar ouders ~~*gaan*~~ naar Griekenland.
Mieke goes to India, and her parents go to Greece
'Mieke is going to India, and her parents are going to Greece.'
b. * Ik denk dat MIEke ~~op vakantie *is*~~, maar jij dat haar OUders op vakantie *zijn*.
I think that Mieke on holiday is but you that her parents on holiday are
'I think that Mieke is on holiday, but you think that her parents are on holiday.'

Finally, RNR shows Condition C effects (56a) that are unexpected if RNR would be backward ellipsis or, for that matter, rightward movement – considering that comparable instances of *forward* deletion (56b) and *leftward* movement (56c) are unproblematic; see also Johnson (2007).

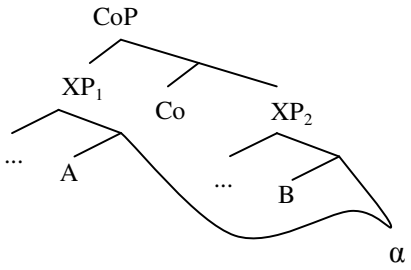
(56) a. * He_i adMIRed _, and she ofFENded the woman $John_i$ loved.
b. She offended the woman $John_i$ loved, and he_i did ~~offend the woman $John_i$ loved~~, too.
c. Which woman that $John_i$ loved did he_i offend?

We conclude that RNR is fundamentally different from both leftward ATB movement and forward ellipsis, and is therefore not be analyzed as the mirror image of these. The data suggest that the target of RNR is *in situ*; even more so, it behaves as if it is syntactically present in *both* conjuncts. In the spirit of earlier proposals by McCawley (1982, 1987), Wilder (2008), Bachrach & Katzir (2009) and Johnson (2007), we propose that RNR is a *multidominance* configuration.[5] Under this assumption, the target of RNR is shared between the respective conjuncts, that is, the 'reduced' material is simultaneously part of the first and the second conjunct. Crucially, this approach abandons the old 'Single Mother

Condition' on syntactic structures, allowing nodes to have more than one mother. In derivational terms, a node α that is to be shared has to be merged more than once (i.e., *remerged*). We do not consider this a disadvantage. Recently, there have been several proposals to analyze even regular movement as remerging of some α with a second (third, ...) sister β, which is part of the same root (see in particular Starke 2001 and Zhang 2004). Multidominance in RNR is then slightly different in that β is *not* part of the same root – in other words, it involves *external remerge* (see De Vries 2009b for extensive discussion, also concerning the linearization of such constructions).

In a RNR configuration where a given α is the target of reduction in a coordination of XP_1 and XP_2, α is initially merged with one sister (say, A), and then remerged with the other sister (B) – or the other way around. After this, both conjuncts can be completed and united at the top. A schematic structure is given in (57):

(57)



Note, however, that a detailed derivational perspective is largely irrelevant for our purposes in this article. Therefore, we will ignore it until the end of section 4, and focus on the resulting structures.

From the multidominance approach to RNR constructions it does not independently follow why the target of RNR must be right-peripheral in the respective conjuncts. Wilder (2008), Bachrach & Katzir (2009), and Johnson (2007) try to derive this restriction syntactically (more precisely, on the basis of linearization conditions that make use of configurational notions such as dominance and c-command). Wilder (2008) alters the linear correspondence axiom (LCA, see Kayne 1994) in order to make it compatible with multidominance structures, and argues that violations of the right periphery condition are symmetry violations: in a configuration where A and B share α, and where α is followed by *x* in A, the proposed ordering mechanism will produce both $\alpha < x$ and $x < \alpha$, which is impossible to spell out.[6] Similarly, Bachrach & Katzir (2009) argue for a linearization mapping condition from which it follows that RNR leads to a violation of the 'edge alignment condition' in case it targets an α that is multidominated by A and B, and followed by some *x* in A. Crucially, both Wilder (2008) and Bachrach & Katzir (2009) predict that the shared α has to be right-peripheral only in the *first* conjunct in RNR constructions. Wilder (2008:244) considers this a welcome consequence, as cases like (58) are acceptable in English (the underscore indicates the supposed ellipsis site):

(58) John should fetch _ and give *the book* to Mary.

We believe, however, that there are reasons to assume that the example in (58) does not involve RNR at all. First, (58) becomes rather odd when we assign it a true RNR intonation, that is, if we add an intonation break after the first conjunct, and put contrastive focus on *fetch* and *give*, as indicated in (59).

(59) * John should FETCH _, and GIVE *the book* to Mary.

If the (contrasted) verbs have different subjects, the example is similarly unacceptable; see (60a). Finally, the possibility of (58) is restricted to *fetch and...* and a small set of comparable phrases; other combinations of a transitive with a ditransitive verb are ruled out, as is illustrated in (60b):

(60) a. * John should FETCH _, and Joey should GIVE *the book* to Mary.
b. * John BOUGHT _, and Joey GAVE *the book* to Mary.

Bachrach & Katzir (2009), following Fox & Pesetsky's 2005 theory of cyclic spell-out, argue that such cases are ungrammatical because they require the reordering of material that has already been spelled out in a previous phase. An undesirable consequence of this approach, it seems to us, is that violations of the right periphery condition in the first conjunct are ruled out by a different mechanism than those in the second conjunct. Finally, we should mention that the above examples are straightforwardly ruled out in the approach by Johnson (2007), according to which *the book* in (58) through (60) would not c-command anything, and consequently violate the proposed alignment constraints. However, as is pointed out by Johnson himself, cases in which RNR targets material that is *embedded* in non-final material of the right conjunct are not excluded, contrary to fact.

It can be concluded that it is extremely hard to derive the right periphery condition by means of syntax-based linearization demands. All of the cited attempts make use of certain theoretical stipulations, and the empirical results are not completely correct. This suggests that the condition is perhaps not rooted in syntax. We have come to believe that it is an interface phenomenon. What is not considered in any of the syntactic accounts is the obligatory presence of contrastive focus in both conjuncts in RNR constructions, and the demand that the shared material immediately follows the foci. In line with observations by Hartmann (2000), Selkirk (2002), and Ha (2008), we think that the right periphery condition is closely related to the alignment of contrastive focus. First, it can be observed that in a RNR construction, it is not possible to have material that is not the target of RNR follow the contrastively focused elements in the respective conjuncts:

(61) a. * John BOUGHT yesterday _, and Joanne SOLD yesterday *the complete works of Charles Dickens.*
b. * John BOUGHT the book _, and Joanne SOLD the book *that was required for algebra.*

When we modify (61a) and shift the contrastive focus to the constituent directly preceding the shared material, the sentence becomes acceptable:

(62) John bóught YESterday _, and Joanne sóld toDAY *the complete works of Charles Dickens.*

Notice that there are two contrasted pairs in (62), but the rightmost pair (*yesterday–today*) gets the most prominent accent. Here, the distinction is indicated with capitals for prominent pitch accent, and accents (´) for secondary stress.

Example (63) shows that contrastive focus cannot be applied to just any pair. We will follow Rooth (1992) in that a contrastively focused X triggers a set of alternatives. For a contrastively focused pair X and Y, X and Y must have identical sets of alternatives. This explains the unacceptability of examples such as (63): there is no possible world in which *yesterday* and *on the market* have identical sets of alternatives:[7]

(63) * John bóught YESterday _, and Joanne sóld on the MARket *the complete works of Charles Dickens.*

This suggests that the periphery condition is an interface constraint on what can be the target in a RNR configuration. Based on the prosodic rule saying that focused constituents must align to the (right or left) edge of their prosodic domain (see also Hartmann 2000), the periphery effect can be described as follows:

(64) *Right periphery effect in right node raising*
In a right node raising configuration $[[_{XP1} (\dots F_1)_{\phi 1} \alpha]$ Co $[_{XP2} (\dots F_2)_{\phi 2} \alpha]]$, where α is the target:
(i) a primary focus element F must be aligned with the right edge of its prosodic domain ϕ;
(ii) the foci in the respective conjuncts must have identical sets of alternatives;
(iii) α must immediately follow F in the word strings of the respective conjuncts.

Note that we do not claim that periphery effects hold for multidominance configurations in general.

Summing up, we propose that RNR involves syntactic sharing (multidominance), which – in this configuration – is restricted to material that directly follows the contrasted material in the respective conjuncts.

3.2 Extraposition as specifying coordination plus ellipsis

This section briefly argues for a 'specifying coordination' approach to extraposition, which is discussed in more detail in De Vries (2002, 2009a).

A common example of extraposition of a relative clause in Dutch is (65). A more complicated case is (66), where the relative clause is extracted from an embedded position:

(65) Ik heb de man _ gezien *die een zwarte koffer droeg*.
I have the man seen who a black suitcase carried
'I saw the man who carried a black suitcase.'

(66) De politieagent heeft [de papieren van [de man _]] gecontroleerd *die een zwarte koffer droeg*.
the police.officer has the papers of the man checked who a black suitcase carried
'The police officer checked the papers of the man who carried a black suitcase.'

Such examples constitute stark evidence against both a stranding analysis of extraposition (Kayne 1994) and a rightward movement analysis (Reinhart 1980, Baltin 1983, Büring & Hartmann 1997, among others). The latter requires movement from a strong island, which is otherwise ungrammatical.[8] The former requires (leftward) movement of a non-constituent – in (66), the underlined part of V [D [N [P [D [N modifier]]]]] – which is fundamentally impossible.

Unfortunately, a simple base-generation analysis in terms of right-hand adjunction (see Culicover & Rochemont 1990, for instance) is also problematic. One serious difficulty concerns topicalization of remnant VPs. In (67), the indirect object is scrambled out of the verb phrase, which is consequently preposed, dragging along the direct object:

(67) [t_i Een hand gegeven]$_j$ heb ik hem$_i$ niet t_j.
a hand given have I him not
'I did not shake hands with him.' (*lit.* 'Given a hand, I have him not.')

In the light of this possibility, consider (68):

(68) a. Ik heb de man gezien die een zwarte koffer droeg.
I have the man seen who a black suitcase carried
'I saw the man who carried a black suitcase.'
b. [De man gezien die een zwarte koffer droeg] heb ik (niet).
c. * [Gezien die een zwarte koffer droeg] heb ik (niet) de man (niet).

Example (68a) shows extraposition of a relative clause, which, supposedly, is right-adjoined to the verb phrase. In (68b), the complete phrase containing the antecedent, the participle, and the extraposed relative clause is topicalized; this is fine. However, (68c) shows that topicalization of the verb phrase without the antecedent is unacceptable. Given that (67) is fine, this is entirely unexpected. Importantly, the pattern in (68) can be replicated with modifiers other than relative clauses, such as prepositional phrases, result clauses, and complement clauses of nouns and adjectives. Therefore, a construction-specific rule such as "a relative clause must be preceded by its antecedent" is of no use.[9] The general pattern is that remnant VPs containing extraposed material are inert (see Kaan 1993). None of the theories of extraposition mentioned so far is able to explain this pattern.

Therefore, let us turn to Koster's (2000) proposal, which states that extraposed constituents are coordinated with the spine of the clause (at the lowest possible level). For instance, (68a) would be analyzed roughly as (69):

(69) Ik heb [$_{:P}$ [de man gezien] [$_{:'}$ **:** [die een zwarte koffer droeg]]].

Here, the **:**P is a so-called 'colon phrase', whose head – the colon – is described as a specifying coordinator.

It is immediately clear that Kaan's generalization illustrated in (68) follows from this theory. Starting from (69), we could prepose the entire **:**P, resulting in (68b), but we cannot move *de man gezien* 'the man seen' stranding the relative clause as in (68c), since movement of a first conjunct would be a violation of the well-known Coordinate Structure Constraint. Similarly, we explain that the extraposed material itself, being a second conjunct, is an island for extraction (the so-called *freezing* effect), as is illustrated in (70):

(70) a. Hij is altijd gek (op kaas) geweest (op kaas).
he is always fond on cheese been on cheese
'He has always been fond of cheese.'
b. Waar is hij altijd gek (op _) geweest (* op _) ?
where is he always fond on been on
'What has he always been fond of?'

Another advantage is that we can easily represent the possibility of extraposition from embedded positions and positions higher in the clause than the regular direct object position. An example of extraposition from a (preposed) *wh*-phrase is (71):

(71) [$_{:P}$ [Hoeveel boeken heb je weggegeven] [**:** [die je nog niet hebt
How.many books have you away.given which you not yet have
gelezen]]]?
read
'How many books did you give away that you haven't read yet?'

Since coordination is a general phenomenon, independent of the category of the conjuncts, we expect the 'size' of the first conjunct of the **:**P to be variable.

There is also a clear *dis*advantage of Koster's coordination approach to extraposition. Namely, the modifier in the second conjunct is not functionally equivalent to the part of the spine that is in the first conjunct, whereas functional equivalence of conjuncts is a general demand for regular coordination. However, this problem can be solved. Suppose that the second conjunct involves more than what can be overtly detected, and in fact repeats the first conjunct, but with one addition: the relevant modifier in its canonical position. Phonologically repeated material is then deleted. See (72):

(72) Ik heb [$_{\&:P}$ [de man gezien] [&: [~~de man~~ *die een zwarte koffer droeg* ~~gezien~~]]].

Note that we changed the notation of the colon phrase to &:P, a specifying coordination phrase, in order to distinguish between the present analysis and Koster's original one. Both conjuncts are now (extended) verb phrases. The second conjunct contains more information than the first, so it can be interpreted as a *specification*. The deletion involved can be compared to gapping/stripping; this will be discussed below. Notice right away that we reject a 'scattered deletion' approach, in which the entire phrase, including the modifier, would be copied. This implies backward deletion of the modifier in the first conjunct, in addition to the proposed forward deletion, which seems unnecessarily complicated. Moreover, backward deletion generally has different properties than forward deletion,[10] so the forced marriage between those in a scattered deletion approach is undesirable.

As a second preliminary, we should note that we cannot insert and pronounce a different verb in the second conjunct. Changing, for instance, (72) to (lit.) *I have the man seen &: ~~the man~~ who a black suitcase carried heard* would be completely infelicitous for the simple reason that 'hearing someone' is not a possible specification of 'seeing someone'.[11]

Before we go on with a comparison to gapping, we would like to point out that the representation in (72) has a number of additional advantages over Koster's analysis in (69), and in fact over any other analysis of extraposition in terms of base-generation. The basic reason is that (72) incorporates some traits of the rightward movement analysis without taking over its drawbacks. Most importantly, the extraposed modifier is generated in its canonical position next to its anchor (here, *man*). Therefore, the required (restrictive) interpretation is directly represented in the structure. No additional mechanism is necessary in order to link the extraposed constituent to its associated position in the matrix.

Furthermore, consider the example in (73a) and the analyses in (73b/c), slightly more detailed than hitherto. Here, (73b) would be Koster's original analysis, and (73c) is the present view.

(73) a. Ik heb alleen die man beleefd gegroet die een zwarte koffer droeg.
I have only that man politely greeted who a black suitcase carried
'I politely greeted only that man that carried a black suitcase.'

b. $[_{CP}$ S Aux $[_{:P}$ $[_{XP}$ DO (X) $[_{vP}$ Adv $[_{vP}$ **t**$_{S}$ V $t_{DO}]]]$ [**:** RC]]]

c. $[_{CP}$ S Aux $[_{\&:P}$ $[_{XP1}$ [*only that man*]$_{DO}$ (X) $[_{vP}$ Adv $[_{vP}$ **t**$_{S}$ V $t_{DO}]]]$
[&: $[_{XP2}$ $[_{DO}$ ~~*only that man*~~ RC] ~~(X)~~ $[_{vP}$ ~~Adv~~ $[_{vP}$ **t**$_{S}$ ~~V~~ $t_{DO}]]]$]]]

There is a relative clause (RC) related to the direct object (DO) of the matrix clause. This object has been scrambled to some middle field projection XP across an adverb (Adv), which we take to be adjoined to the vP for ease of representation. Crucially, the vP contains a trace of the subject (S) as well. In the **:**P analysis (73b), the subject must be moved from the vP inside the first conjunct to the first sentence position. However, this would constitute a clear violation of the Coordinate Structure Constraint. In the &:P analysis, this problem does not arise, since there is a representation of the thematic subject position inside the second conjunct as well. Therefore, the subject is moved in an across-the-board fashion, which is generally fine (as was first noticed in Ross 1967).

Finally, let us mention briefly that the scope of an extraposed constituent is determined by the associated position in the matrix, as is stressed by Büring & Hartmann

(1997), and which we confirmed with Dutch data in earlier work (see especially De Vries 2002: Ch.7). Such empirical findings are consistent with the specifying coordination approach, where the extraposed constituent is *in situ* in a way.

Before we end this section, let us add some comments on the required deletion in representations such as (72). It seems to us that what is happening here can be compared to the situation in gapping (or 'stripping') constructions. Gapping involves forward deletion of repeated material in a second conjunct. Crucially, this type of deletion may involve non-constituents and discontinuous material. An example that shows it all at once is (74):

(74) HIJ heeft Marie een BOEK gegeven en ZIJ ~~heeft Marie~~ een CD ~~gegeven~~.
he has Marie a book given and she has Marie a CD given
'He gave Marie a book, and she (gave Marie) a CD.'

An important condition is that remnants *must* provide contrastive information. Consequently, everything that is syntactically repeated is phonologically deleted; see (75):

(75) Joop heeft Mieke vanochtend een boek gegeven en Jaap/*Joop ~~heeft~~
Joop has Mieke this.morning a book given and Jaap/Joop has
Monique/*Mieke gisteren/*vanochtend een CD/*boek ~~gegeven~~.
Monique/Mieke yesterday/this.morning a CD/book given
'Joop gave Mieke a book this morning, and Jaap/*Joop (gave) Monique/*Mieke a CD/*book yesterday/*this morning.'

Similarly, all repeated elements in our analysis of extraposition (72) are deleted.[12]

What is also remarkable is that gapping is clause-bound, as is shown in English in the following examples:

(76) a. Joop bought a book and Jaap ~~bought~~ a CD.
b. * Joop said [$_{CP}$ that Mieke bought a book], and Jaap ~~said~~ [$_{CP}$ ~~that~~ Monique ~~bought~~ a CD].

It is likely that deletion across sentence boundaries leads to recoverability problems (see also G. de Vries 1992 for discussion). This has an interesting consequence. From the present perspective, it means that we can reduce the Right Roof Constraint for extraposition to a more general constraint on deletion in coordination constructions. Consider (77a), which illustrates a violation of the Right Roof Constraint (see also (22) and (31)), and the analysis sketched in (77b).

(77) a. * [That John bought *a book* _] is strange *of €10*.
b. [$_{\&:P}$ [[$_{CP}$ That John bought a book] is strange]
[&: [[$_{CP}$ ~~that John bought a book~~ of €10] ~~is strange~~]]]

In (77b), what needs to be deleted in the specifying conjunct involves material from the higher clause (*is strange*) as well as from the lower clause (*that John bought a book*). This

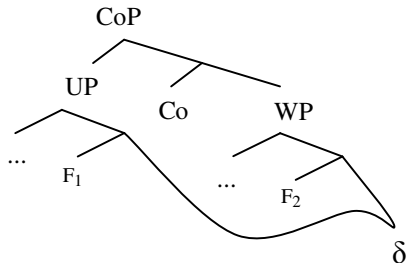
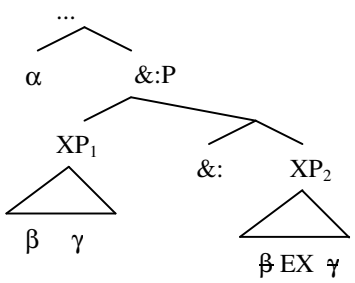
is comparable to the situation in (76b). Therefore, we can now generalize over two seemingly unrelated phenomena: a constraint on gapping and a constraint on extraposition.

To sum up, we argued that extraposition involves coordination as well as deletion. In this way, we combine some positive properties of the more traditional rightward movement accounts and certain base-generation accounts, whilst avoiding the problems associated with each. The deletion involved, although it perhaps looks strange at first sight, turns out to reflect important characteristics of the gapping construction.

4 A syntax of cumulative rightward processes

We now show that the analyses independently developed for RNR and extraposition separately, can be combined to yield the empirical results from section 2. Abstractly, the two structural configurations are represented in (78), which contains the respective tree structure (T), bracketed structure (B), and the output of linearization (L):

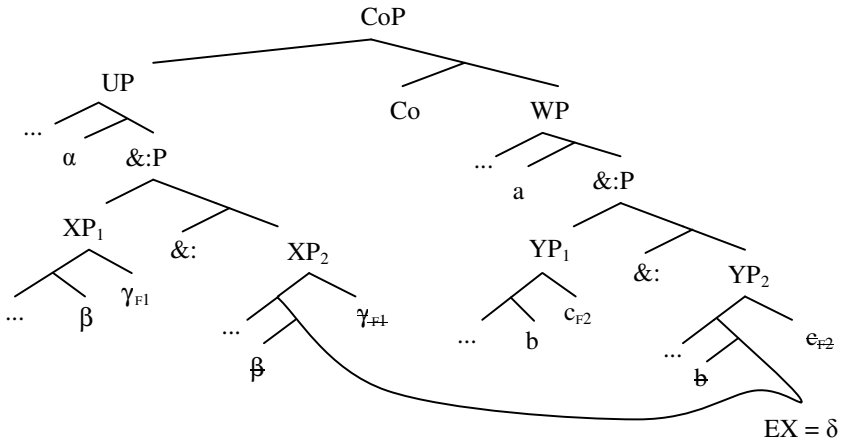
(78)

	Right node raising:	*Extraposition:*
T:		
B:	$[_{CoP}\ [_{UP} \ldots F_1\ (\delta)]\ Co\ [_{WP} \ldots F_2\ \delta]]$	$[\ldots\ \alpha\ [_{\&:P}\ [_{XP1}\ \beta\ \gamma\ ]\ \&:\ [_{XP2}\ \beta\ EX\ \gamma\ ]]\ ]$
L:	$[\ldots F_1\ Co \ldots F_2\ \delta]$	$[\ldots\ \alpha\ \beta\ \gamma\ \&:\ \beta\ EX\ \gamma]$ $=\ [\ldots\ \alpha\ \beta\ \gamma\ EX]$

In the first configuration (RNR), there is (usually) coordination of some UP and WP (which can be clauses, verb phrases, noun phrases, and so on). Within these, there is a shared right node δ (of any size and category) following the foci F_1 and F_2. In the second configuration (extraposition), some node of the main projection line (XP), normally the sister of α, is repeated by means of an abstract specifying coordination phrase, such that the second instance is more specific than the first in that it contains the phrase EX (a modifier, for instance) *in situ*. All repeated material (here, β and γ surrounding EX) is elided; in effect, then, EX appears to be extraposed across γ.

The two structures can be combined as follows. First, let us discuss extraposition as input for RNR. From a representational point of view, this means that the configuration for extraposition is embedded in a larger RNR configuration (we will briefly discuss the issue of derivation at the end of this section). In order to do so, extraposition must take place in both coordinated phrases (here, UP and WP) separately; see (79):

(79) *Extraposition → RNR*



Linearization: [...α...β γ_{F1} &: ~~...β~~ (EX) ~~γ_{F1}~~ Co...a...b c_{F2} &: ~~...b~~ EX ~~c_{F2}~~]
= [...α...β γ_{F1} Co...a...b c_{F2} EX]

Here, EX (possibly a modifier relating to both β and b) is extraposed across γ in UP, and across c in WP. As a result it is phonologically rightmost in both conjuncts (notice that phonologically null elements can still intervene between the target of RNR and the foci), and RNR of EX can be licensed, provided that γ and c are the relevant contrasted foci. A concrete example (13) is repeated in (80), where RC stands for a relative clause:

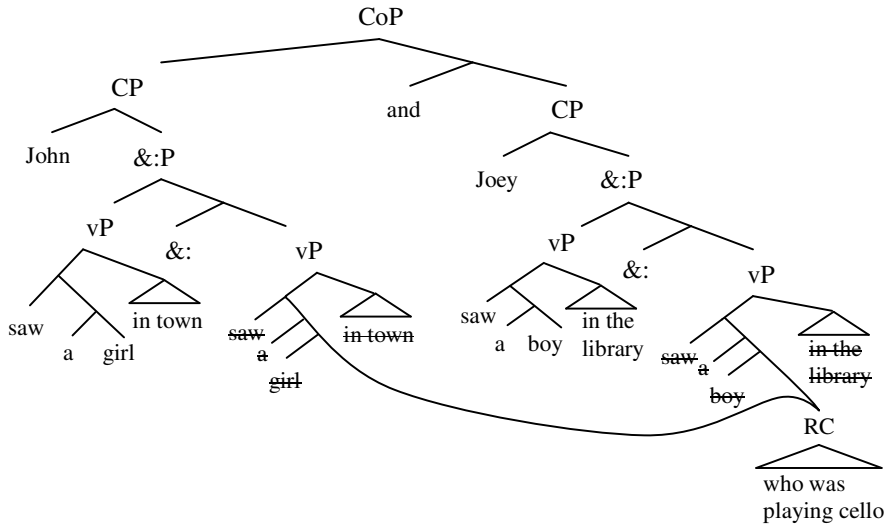
(80) Joop heeft iemand _ beWONderd _, maar Jaap heeft iemand _ verGUISD [$_{RC}$ die...]
Joop has someone admired but Jaap has someone maligned who...
'Joop admired someone who..., but Jaap maligned someone who...'

We can assign this sentence a structure as in (79), such that ...α = *Joop heeft*, β = *iemand*, γ = *bewonderd*, Co = *maar*, ...a = *Jaap heeft*, b = *iemand*, c = *verguisd*, and EX = *[$_{RC}$ die...]*. A relevant illustration in English is repeated in (81):

(81) John saw a girl _ in TOWN _, and Joey saw a boy _ in the LIbrary *who was playing cello*.

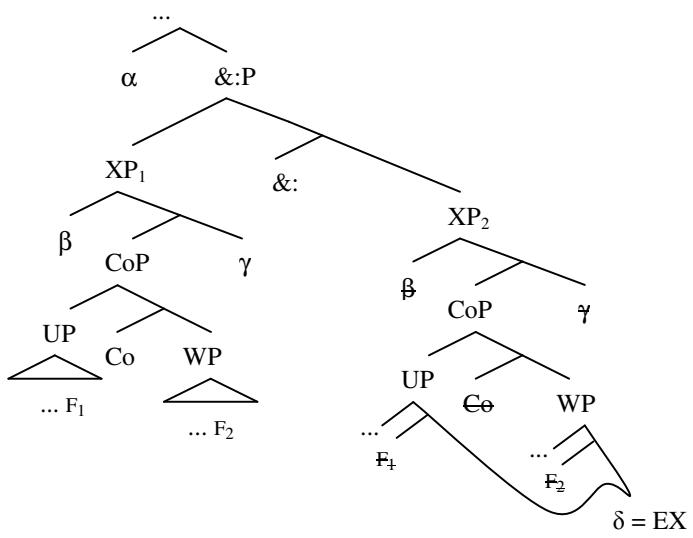
In this case, α = *John*, ...β = *saw a girl*, γ = *in town*, Co = *and*, a = *Joey*, ...b = *saw a boy*, c = *in the library*, and EX = *who was playing cello*. Notice that EX is attached right-peripherally within the complex [... β/b]. In some more detail, we have [$_{XP2=vP}$ [saw [$_{DP}$ a [girl [$_{EX=RC}$ who was playing cello]]]] [$_{PP}$ in town]], for instance. See (82), where CP is a clause and vP an (extended) predicate:

(82)



Next, consider how RNR within a complex major constituent can be used as input for extraposition. This configuration is sketched in (83), where the structure proposed for RNR – see (78) – is part of a larger structure for extraposition. Again, XP_2 specifies XP_1 because of the presence of the additional modifier in EX.

(83) *RNR → extraposition*



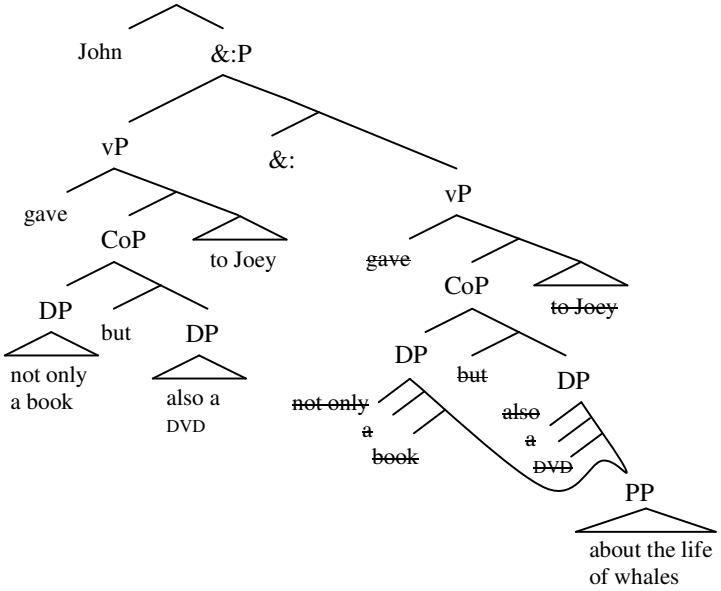
Linearization: [...α β ...F_1 Co ...F_2 γ &: ~~β ...F_1 (EX) Co ...F_2~~ EX ~~γ~~]
= [...α β ...F_1 Co ...F_2 γ EX]

A relevant example is repeated in (84):

(84) Ik heb zowel een BOEK _ als een DVD _ gekocht *van tien euro*.
I have both a book and a DVD bought of ten euro
'I bought both a book of €10 and a DVD of €10.'

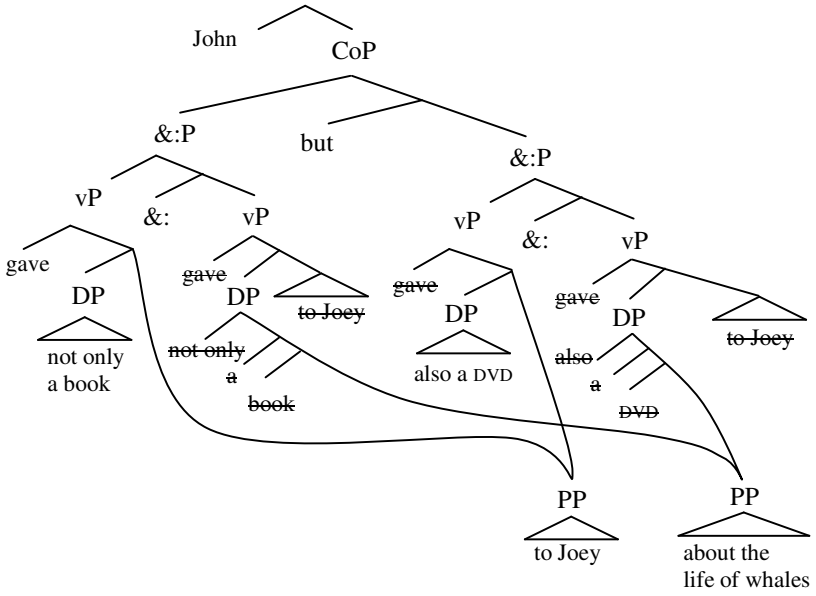
Here, ...α = *ik heb*, ...F_1 = *een boek*, Co = *als*, ...F_2 = *een dvd*, γ = *gekocht*, and EX = *van tien euro*. There happens to be no β in this case. The focus particle *zowel* 'both' is related to the CoP level (see De Vries 2005b for a detailed discussion of distributivity and coordination). The structure for (45b) is sketched in (85):

(85) John gave not only a BOOK _, but also a DVD _ to Joey *about the life of whales*.



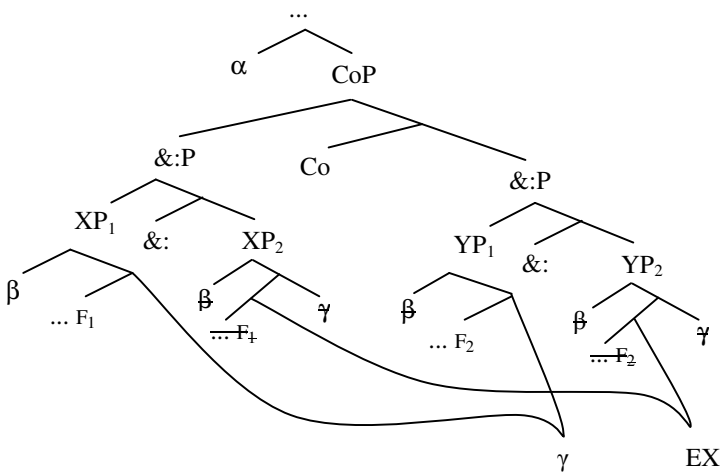
In section 2.2 we mentioned that there is a potential alternative analysis of such examples (which we dispreferred). It is perhaps insightful to spell out in some detail what it would amount to (making use of the same ingredients in (78) for a fair comparison). Recall that this analysis involves a double predicational (or clausal) structure. Apart from the foci, the predicates or clauses are the same: *John gave not only a book about the life of whales to Joey but (John gave) also a DVD about the life of whales to Joey*. Furthermore, there is extraposition within both predicate phrases, resulting in *John gave not only a book to Joey about the life of whales but (John gave) also a DVD to Joey about the life of whales*. On a larger scale, there can be non-constituent RNR of the then conjunct-final modifier PP plus the preceding prepositional phrase *to Joey*. This would imply that both PPs are shared. The resulting structure is (86):

(86) *Alternative analysis*



In more abstract terms, the idea is as in (87):

(87) *Alternative analysis*



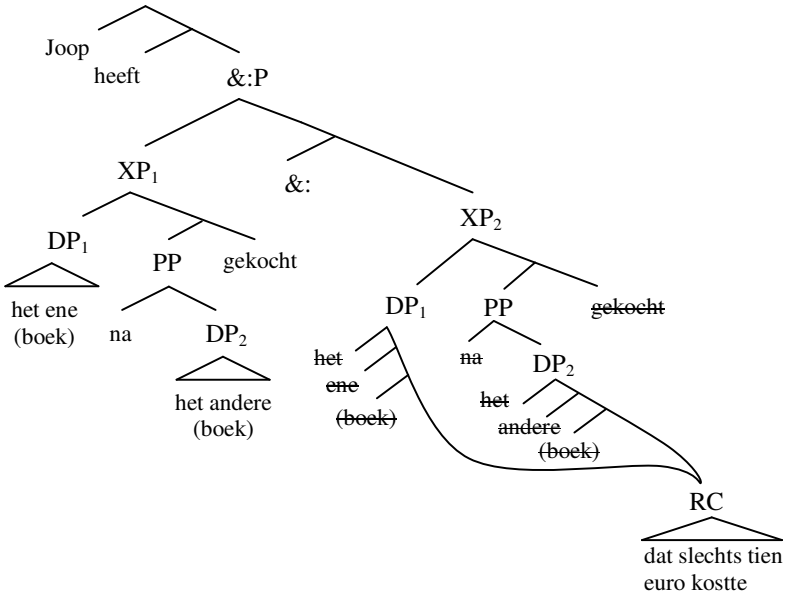
Linearization: [...α β ...F_1 (γ) &: ~~β ...F_1~~ (EX) ~~γ~~ Co ~~β~~ ...F_2 γ &: ~~β ...F_2~~ EX ~~γ~~]
= [...α β ...F_1 Co β ...F_2 γ EX]

The reader will notice that this is a complex variant of (79), which involves extraposition as input for RNR, rather than the inverse. However, we do not regard (86)/(87) as more attractive than (83)/(85). Moreover, as we noticed in section 2.2, there are examples of RNR outside of syntactic coordination contexts that cannot be explained along such lines.

Thus, using the ideas behind (83), the structure of the repeated example in (88) must be like (89):

(88) Joop heeft het ENE (boek) _ na het ANdere (boek) _ gekocht *dat slechts tien*
Joop has the one book after the other book bought that only ten
euro kostte.
euro cost
'Joop bought one book after the other that only cost €10.'

(89)



As in (83), the modifier is right node raised at the constituent level, and then surfaces in an extraposed position. We abstract away from the details of Dutch clause structure. In this example, DP_1 has probably been scrambled to a high position within the middle field.

We conclude that the analyses independently proposed for both RNR and extraposition can straightforwardly be combined to produce the data discussed in section 2. The resulting structures are rather complex; we take it that this corresponds to the fact that the examples under discussion are hard to process.

Finally, we want to add a few remarks on the issue of derivation. We do not doubt that representations must be derived (by Merge), but there are some non-trivial matters, here and more generally. First consider extraposition in isolation, which we analyzed as a construction involving specifying coordination. In a bottom-up derivation, both conjuncts are generated independently by a series of mergers. The relevant modifier is generated as a restrictive part of what is to become the second conjunct. Only after the two conjuncts have been combined, at the &:P level, we can recognize the whole as an extraposition configuration. In fact, since deletion is involved as well, we have to say that extraposition is an interface phenomenon. More generally, even though each individual step of Merge must be licit in itself, determining construction types, and possibly imposing higher-order requirements on them, can only be done at some representational level. As for right node

raising, we showed in section 3.1 that it is subject to several non-syntactic conditions. Therefore, even though an instance of external remerge is crucial to generate the necessary sharing configuration, it does not make sense to speak of RNR during the derivational process of core syntax. Also, recall that external remerge is used for more construction types than just RNR.

Do these considerations affect our claim that extraposition can *feed* RNR and vice versa? Yes and no. From a derivational perspective, RNR and extraposition are simply independent in the sense that the sequences of Merge needed to eventually arrive at the configurations corresponding to those can be performed independently.[13] However, once we realize that RNR and extraposition are only properly defined (and licensed) at a representational level, we can maintain the original story. The configurations in (79) and (83) are clear hierarchical mirror images in the sense that the structure essential for extraposition (&:P) is embedded in the one for RNR (CoP with sharing between the two conjuncts), and the other way around, respectively, with by now obvious consequences for the construction-licensing requirements at the interface.

5 Conclusion

We discussed data indicating that there can be interaction between the two phenomena known as extraposition and right node raising (RNR). Both relate to the right periphery of some relevant domain (a clause or a coordinated phrase). It turns out that optional extraposition can be used as input for RNR. This is the case for extraposable modifiers, and for heavy NPs, including free relatives. We showed this on the basis of Dutch examples primarily, with some confirmation from English and German. The reverse pattern also seems to be possible: if there is RNR of a modifier at the (major) constituent level, it can be extraposed as well. Even though some of these data can also be explained differently with reference to either complex antecedent phenomena or non-constituent RNR, this is certainly not the case for all of them. Therefore, we conclude that there is a mutual syntactic feeding relationship between RNR and extraposition, at least from a representational point of view.

Both processes are subject to a number of constraints. Extraposition from embedded positions is possible (which is an argument against a rightward movement account), but a clause boundary functions as a barrier (the Right Roof Constraint). For RNR there are phonological and semantic requirements. First, the reduction must take place at the right edge of both conjuncts (or insubordinated phrases). This is the right periphery condition, which is active at the phonological interface, and pertains to the audible surface structure. Second, the material immediately preceding the RNR site must be assigned a contrastive focus accent. Semantically, they must have identical sets of alternatives. It can be shown that all these constraints are operative in sentences involving cumulative rightward processes.

Following a strong current in the literature, we analyze RNR in terms of multidominance. This means that the relevant phrase is simultaneously part of both conjoined phrases or clauses. We argue that neither RNR nor extraposition involves rightward movement. For the latter, we want to avoid the problems of a simple base-generation account as well. Therefore, we use a theory based on specifying coordination in

combination with forward deletion (gapping), proposed in earlier work by one of the authors. Thereby, the last part of the predicate is repeated as the second conjunct of a CoP which specifies the first in that it contains the relevant 'extraposed' phrase *in situ*. All repeated material is elliptical.

We showed that these independently developed analyses can be combined to explain the cumulative rightward processes discussed in section 2. Frankly, it is not entirely clear to which extent the data presented actually support these particular approaches to RNR and extraposition, but we can safely conclude they are fully compatible with them. We illustrated this by analyzing a number of examples in detail.

Notes

[1] On a precautionary note, we may have to re-evaluate the term *feeding* in this context once we try to derive the relevant structures in a bottom-up fashion using Merge.

[2] We should note that first attempts with PPs in German were less successful, so we cannot claim full generality at this point.

[3] A problem for this type of approach may be Sabel's (2002) Constraint on Adjunction Movement, which states that successive cyclic movement may not proceed via intermediate adjunction.

[4] Interestingly, Bachrach & Katzir (2009) observe that RNR can feed *wh*-ATB movement, allowing constituents to move out of islands as long as they are right-peripheral in the respective conjuncts:

(i) Which book$_i$ did [John meet the man who wrote _] and [Mary the man who published _] t$_i$

These data in particular complicate the proposal of Sabbagh (2007), because the target of RNR cannot move leftward if the first cycle is over. However, the relevant Dutch examples in which extraposed material is ATB-moved out of a relative clause are reported to be ungrammatical:

(ii) * Over welke oorlog ontmoette Joop een vrouw die een boek SCHREEF en
about which war met Joop a woman who a book wrote and
Mieke een man die een boek LAS?
Mieke a man who a book read
'About which war did Joop meet a woman who wrote a book, and Mieke meet a man who read a book?'

[5] Similar proposals can be found in the literature for ATB *wh*-movement (Citko 2003, 2005), multiple *wh*-questions (Gracanin-Yuksek 2006), transparent free relatives and other amalgamated structures (Van Riemsdijk 2006); see De Vries (2009b) for an overview. Note that the multidominance approach to ATB solves the problem of multiple constituents moving to a single position, which we briefly touched upon in the discussion concerning the possibility of rightward ATB movement.

[6] Any multidominance structure creates a direct problem for the LCA as originally proposed by Kayne (1994). Namely, an α that is shared by A and B will give rise to the ordering $\alpha < \alpha$, constituting a reflexivity violation. Wilder (2008) circumvents this by proposing that the image of X consists of those terminals that are *fully* dominated by X. If a shared α dominated by X also has a mother that is not dominated by X, then X does not fully dominate α.

[7] Examples in which the secondary pair is not properly contrasted are a little less bad, but still very marginal:

(i) ?* ... dat Joop in het bós een HEle _ , en dat Mieke gísteren een HALve *marathon*
that Joop in the forest a whole and that Mieke yesterday a half marathon
gelopen heeft.
run has
'... that Joop has run a complete marathon in the forest and that Mieke has run half a marathon yesterday.'

[8] Another asymmetry between leftward and rightward movement would be that leftward movement is unbounded (that is, can be applied successive-cyclically), whereas extraposition to the right is subject to the Right Roof Constraint, as was illustrated in section 2.1, example (22).

[9] Preposing of a relative clause alone is also unacceptable: * *[Die een zwarte koffer] droeg heb ik de man _ gezien* 'who a black suitcase carried have I the man seen'. This can be attributed to other factors, such as the island status of (complex) noun phrases.

[10] Differences concern the presence or absence of locality effects, the edge effect, and morphological matching; see Wilder (1997), De Vries (2005a) and Kluck (2009) for discussion.

[11] Matters are different, however, if we (exceptionally) use a verb that can be interpreted as a specialization of the verb in the first conjunct. Configurations similar to the following example in English are possible: *I saw the man, that is/specifically, examined the man who carried a black suitcase*. Why do we have to repeat *the man* here? That follows from the independent *head condition* on forward deletion already illustrated in (53) above: if the verb is present, its arguments must be present as well. The resulting sentence, then, involves specification but not extraposition. See also endnote 12.

[12] Example (i) may give the illusion that repetition of the noun is possible. However, the sharp contrast with (ii) shows that (i) is in fact an afterthought (which does not involve extraposition-related deletion). It has a clear comma intonation, there may be an overt appositive linker such as *namely*, and there are two pitch accents. By contrast, examples (ii) and (iii) have the single intonation contour associated with extraposition of restrictive material: there is no 'comma', and the sentence accent shifts to the right. Clearly, deletion is obligatory here, which is in accordance with the predictions in the main text.

(i)	Ik	heb	de	MAN	gezien,	de	man	die	een	zwarte	KOFfer droeg.
	I	have	the	man	seen	the	man	who	a	black	suitcase carried

(ii) * Ik heb de man gezien de man die een zwarte KOFfer droeg.

(iii) Ik heb de man gezien die een zwarte KOFfer droeg.

[13] It is worth noting that external remerge of the shared EX/δ in (79), for instance, is usually an early step in the derivation of the complex as a whole, because remerge (including regular movement) is always subject to locality restrictions: a node that is buried too deep inside its present root is no longer accessible as input for Merge. Thus, a temporary doubly-rooted structure is created, and then both substructures can be made as complicated as required, culminating in UP and WP. Only after combining these in a CoP, the RNR configuration is completed. Thereby, sharing at the bottom of the structure constitutes a bypass between two sentence positions that possibly appear to be distantly apart when viewed from the top. See De Vries (2009b) for detailed discussion.

References

Bachrach, Asaf & Katzir, Roni. 2009. Right node raising and delayed spell-out. In *InterPhases: Phase-Theoretic Investigations of Linguistic Interfaces*, Kleanthes Grohmann (ed), 283-316. Oxford: Oxford University Press.

Baltin, Mark. 1983. Extraposition: Bounding versus Government-Binding. *Linguistic Inquiry* 14, 155-162.

Büring, Daniel & Hartmann, Katharina. 1997. Doing the right thing. *The Linguistic Review* 14, 1-42.

Citko, Barbara. 2003. ATB Wh-Questions and the Nature of Merge. *Proceedings of the 33rd North East Linguistics Society*. Amherst, MA: GLSA Publications.

Citko, Barbara. 2005. On the nature of merge: external merge, internal merge, and parallel merge. *Linguistic Inquiry* 36, 475-497.

Culicover, Peter & Rochemont, Michael. 1990. Extraposition and the complement principle. *Linguistic Inquiry* 21, 23-47.

Féry, Caroline & Katharina Hartmann. 2005. The focus and prosodic structure of German Right Node Raising and Gapping. *The Linguistic Review* 22, 69-116.
Fiengo, Robert. 1974. Semantic conditions on surface structure. PhD dissertation, MIT.
Fox, Danny & David Pesetsky. 2005. Cyclic linearization and syntactic structure. *Theoretical Linguistics* 31, 1-45.
Gracanin-Yuksek, Martina. 2006. *On Sharing*. PhD dissertation, MIT.
Grootveld, Marjan. 1994. Parsing coordination generatively. PhD dissertation, Leiden University.
Ha, Seungwan. 2008. On ellipsis features and right node raising. *Proceedings of ConSOLE XV*, 67-90.
Hartmann, Katharina. 2000. *Right node raising and gapping: Interface conditions on prosodic deletion*. Amsterdam: John Benjamins.
van der Heijden, Emmeke. 1999. *Tussen nevenschikking en onderschikking*. Utrecht: LOT.
Johnson, Kyle. 2007. LCA+alignment=RNR. Manuscript, University of Massachusetts Amherst.
Kaan, Edith. 1993. Extraposition from NP in Dutch: consequences of Minimalism. *Groninger Arbeiten zur germanistischen Linguistik* 36, 144-151.
Kayne, Richard. 1994. *The Antisymmetry of Syntax.* Cambridge, MA: MIT Press.
Kluck, Marlies. 2009. Good neighbors or far friends: Matching and proximity effects in Dutch Right Node Raising. *Groninger Arbeiten zur Germanistischen Linguistik* 48, 115-158.
Koster, Jan. 2000. Extraposition as parallel construal. Manuscript, Rijksuniversiteit Groningen.
Lechner, Winfried. 2001. Reduced and phrasal comparatives. *Natural Language and Linguistic Theory* 19, 683-735.
McCawley, James. 1982. Parentheticals and discontinuous constituent structure. *Linguistic Inquiry* 13, 91-106.
McCawley James. 1987. Some additional evidence for discontinuity. In *Syntax & semantics, Vol. 20, Discontinuous constituency*, Geoffrey Huck & Almerindo Ojeda (eds), 185-200. New York: Academic Press.
Postal, Paul. 1998. *Three Investigations of Extraction.* Cambridge, MA: MIT Press.
Reinhart, Tanya. 1980. On the position of extraposed clauses. *Linguistic Inquiry* 11, 621-624.
van Riemsdijk, Henk. 2006. Grafts follow from Merge. In *Phases of Interpretation*, Mara Frascarelli (ed), 17-44.The Hague: Mouton de Gruyter.
Rooth, Mats. 1992. A theory of focus interpretation. *Natural Language Semantics* 1, 75-116.
Ross, John. 1967. Constraints on variables in syntax. PhD dissertation, MIT. Published as *Infinite syntax!* 1986. Norwood, New Jersey: ABLEX.
Sabbagh, Joseph. 2007. Ordering and linearizing rightward movement. *Natural Language and Linguistic Theory* 25, 349-401.
Sabel, Joachim. 2002. Intermediate traces, reconstruction, and locality effects. In *Theoretical Approaches to Universals*, Artemis Alexiadou (ed), 259-313. Amsterdam: John Benjamins.
Selkirk, Elisabeth. 2002. Contrastive FOCUS vs. presentational focus: Prosodic Evidence from Right Node Raising in English. In *Speech Prosody 2002: Proceedings of the 1st International Conference on Speech Prosody*, Aix-en-Provence, 643-646.
Starke, Michal. 2001. *Move dissolves into Merge.* PhD dissertation, University of Geneva.
de Vries, Gertrud. 1992. On Coordination and Ellipsis. PhD dissertation, Tilburg University.
de Vries, Mark. 2002. *The Syntax of Relativization*. PhD dissertation, University of Amsterdam. LOT dissertations 53.
de Vries, Mark. 2005a. Ellipsis in nevenschikking: voorwaarts deleren maar achterwaarts delen. *Tabu* 34, 13-46.
de Vries, Mark. 2005b. Coordination and syntactic hierarchy. *Studia Linguistica* 59, 83-105.

de Vries, Mark. 2009a. Specifying coordination: an investigation into the syntax of dislocation, extraposition and parenthesis. *Language and Linguistics: Emerging Trends*, Cynthia R. Dryer (ed), 37-98. New York: Nova.
de Vries, Mark. 2009b. On Multidominance and Linearization. *Biolinguistics* 3, 344-403.
Wilder, Chris. 1994. Coordination, ATB and ellipsis. *Groninger Arbeiten zur Germanistischen Linguistik* 37, 291-329.
Wilder, Chris. 1997. Some properties of ellipsis in coordination. In *Studies on universal grammar and typological variation*, Artemis Alexiadou & T. Alan Hall (eds), 59-107. Amsterdam: John Benjamins.
Wilder, Chris. 2008. Shared constituents and linearization. In: *Topics in Ellipsis*, Kyle Johnson (ed.), 229-258. Cambridge University Press, Cambridge.
Zhang, Niina. 2004. Move is remerge. *Language and Linguistics* 5, 189-209.
Zwart, Jan-Wouter. 1994. Dutch is head initial. *The Linguistic Review* 11, 377-406.