

Coordination under Right Node Raising

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1. Introduction

In this paper, we study the properties of coordinated structures under Right Node Raising, which we abbreviate as CoRNR. This construction is exemplified below.

- 1) [[John loves *e*] and [Peter hates *e*]] [Mary and Susan]

The sentence in (1) has a collective reading, under which *Mary and Susan* is interpreted as being a conjoined object for both verbs (i.e., John loves both Susan and Mary, and Peter hates them). We will not deal with this reading here. The reading we are interested in is the distributive one, in which *Mary* is interpreted as the exclusive object of *love*, and *Susan* as the exclusive object of *hate*.¹ Note that under the distributive reading of (1), only crossing dependencies are allowed between the verbs and the objects. Nesting dependencies are ungrammatical. That is, (1) can only have the meaning in (2a)

- 2) a. John loves Mary and Peter hates Susan (=1)
b. John loves Susan and Peter hates Mary (≠1)

The thesis we defend is that CoRNR sentences are the result of a PF mechanism that applies as a last resort to linearise a structure that would otherwise be unlinearisable. This analysis will allow us to account for some of the most notorious properties of CoRNR sentences, and to establish a comparison between regular RNR sentences and leftward ATB extraction.

2. Non-solutions to CoRNR

2.1 CoRNR is not movement

A naïve analysis of (1) would postulate a base structure similar to (2a) with each grammatical object conjunct originating its base-generated position.. Then, the object of each clause would be moved rightwards ATB-style, and conjoined at a higher level. This is schematised below.

- 3) *CoRNR as movement*
[[John loves *t*] and [Peter hates *t*]] [[Susan] and [Mary]]
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- The diagram shows two arrows starting from the base positions of the objects. The first arrow starts under 'Susan' and points to the first 't' in the coordinated structure. The second arrow starts under 'Mary' and points to the second 't'. The arrows cross each other, illustrating that the movement paths are crossing dependencies.

This would be a most unusual kind of movement. For one, we would have to allow movement *into* both the complement and specifier positions of a coordinate structure (which itself would presumably be adjoined to the matrix clause). Moreover, it would be necessary to state an independent constraint forcing the movement paths to be crossing (rather than nesting), so as to block the inexistent

We would like to thank all the individuals who have commented on earlier incarnations of the idea presented here, especially Johan Rooryck, Aniko Liptak, Martin Salzmann, and the audience at WCCFL 24. Any remaining errors are entirely our fault.

¹ This reading is more prominent if the entire sentence is modified with *respectively*.

reading in (2b). Moreover, we would have to face the challenge that CoRNR sentences do not seem to obey island constraints, as shown in (4)

- 4) *CoRNR is insensitive to islands*
- a. ✓ I know [[a man who loves *e*] and [a woman who hates *e*]] [London and Paris]
 - b. ✓ I was at home [[before John came from *e*] and [after Peter went to *e*]] [Leiden and Utrecht]
 - c. ✓ I didn't say [[that John had talked *e*] and [that Peter had replied *e*]]
[[in a loud voice] and [with a whisper]]

Example (4a) exemplifies CoRNR “extraction” out of relative clauses, and (4b) out of adjunct clauses. Both are grammatical, which is unexpected under a movement analysis. Example (4c) features a weak island (negation). Here, it is still possible to have the embedded reading of *in a loud voice and with a whisper*, contrary to what a movement analysis would predict. We conclude, then, that CoRNR does not involve movement.

In this respect, it is interesting to note that regular RNR (without coordination) patterns together with CoRNR in being island insensitive, whereas leftward ATB extraction respects islands.

- 4) *RNR does not respect islands...*
- a. ✓ I know [[a man who loves *e*] and [a woman who hates *e*]] London
 - b. ✓ I was at home [[before John came from *e*] and [after Peter went to *e*]] Leiden
 - c. ✓ I didn't say [[that John had talked *e*] and [that Peter had replied]] in a loud voice
- 5) *...but leftward ATB extraction does*
- a. * [Which city] do you know [[a man who loves *e*] and [a woman who hates *e*]]?
 - b. * [Which city] where you at home [[before John came from *e*] and [Peter went to *e*]]?
 - c. * [How] didn't you say [[that John had talked *e*] and [that Peter had replied *e*]]?

The same point can be made with weak crossover data: ATB extraction gives rise to a WCO violation, whereas RNR and CoRNR do not.

- 6)
- a. * [Which boy_i] does [[his_i mother love *e*] and [his_i father hate *e*]]? [ATB]
 - b. ✓ [[His_i mother loves *e*] and [his_i father hates *e*]] John_i [RNR]
 - c. ✓ [[His_i mother loves *e*] and [his_i father hates *e*]] [John_i and Peter_j] [CoRNR]

Given these contrasts, we will argue in section 3 that RNR and CoRNR should be given a uniform analysis in terms of non-movement, whereas ATB extraction does instantiate movement.

2.2 *CoRNR is not pro + binding*

The most simple way to analyse CoRNR without invoking movement would be to assume that the CoRNR-ed phrase is base generated in its surface position (i.e., right-adjoined to the matrix clause). From that position, one could bind empty pronominals in the “extraction sites”. Since this configuration does not involve movement, one could predict the island insensitivity of the construction.

- 7) *CoRNR as pro + binding*
[[John loves *pro*_i] and [Peter hates *pro*_j]] [[Susan_i] and[Mary_j]]

This solution also raises a number of problems. To begin with, note that *Susan* and *Mary* are embedded in a coordinate structure. Hence, they would not c-command their respective *pros*, at least under a definition of c-command in terms of immediate domination. One would have to employ the looser notion of m-command, or something equivalent, with the consequent weakening of the overall theory. Empirically, the following sentence shows that even such a solution yields bad results.

- 8) [[John_i loves *pro*_i] and [Mary_j hates *pro*_j] [himself_i and herself_j] (respectively)]

Here, the CoRNR-ed anaphors are bound by their respective subjects. The indicated co-indexing (necessary to allow for binding) would predict this example to be ungrammatical. If *himself* and *herself* can bind their respective *pros*, then they can also bind their subjects. However, this would lead to a situation in which an anaphor binds a co-indexed R-expression –i.e., a standard Condition C violation geometry. Since the sentence is perfectly grammatical, we conclude that it involves no binding of the kind indicated above. Consequently, we reject the *pro* + binding approach.

2.3 CoRNR is not ellipsis

Abels (2004) proposes an analysis of CoRNR based on ellipsis. Under his approach, the CoRNR-ed phrase is represented twice in the base structure, once under each clause. Then, parts of these two phrases are deleted, at both PF and LF, so as to derive the correct pronunciation and semantics. His analysis of (1) is shown below, with strikethrough marking the elided parts.

- 9) *CoRNR as ellipsis*
- a. [[John loves Susan and Mary] and [Peter hates Susan and Mary]] (base structure)
 - b. [[John loves ~~Susan and Mary~~] and [Peter hates Susan and Mary]] (at PF)
 - c. [[John loves Susan ~~and Mary~~] and [Peter hates ~~Susan and Mary~~]] (at LF)

This analysis, although it derives several properties of CoRNR (such as island insensitivity, or the binding relations noted in (8)) is unattractive in that it makes use of a rather stipulative theory of ellipsis. Constituents have to be elided in precisely the way shown above in an *ad hoc* manner. Abels does not discuss what forces ellipsis to apply in this way, or how alternative derivations can be excluded. Moreover, in the second clause in (9c), one needs to elide *Susan and*. As is well known (at least since Ross 1967), the first conjunct and the coordinator do not form a constituent to the exclusion of the second conjunct. Hence, one would be led here to the unorthodox conclusion that ellipsis can target non-constituents.

A further argument against an ellipsis analysis comes from agreement facts. In (9), each verb takes a coordinate structure as their internal argument. Therefore, one would expect these verbs to show plural object agreement (even though they are interpreted as having a singular object). This point cannot be shown in English, due to its lack of object agreement. Consider, however, the following Spanish paradigm.

- 10) a. [Juan **le** ha vendido un libro y Pedro **le** ha comprado un CD]
 Juan_{CL_{SG}} has sold a book and P_{CL_{SG}} hasbought a CD
 [a Maria y a Susana]
 to Maria and to Susana
 ‘Juan has sold Maria a book and Peter has bought Susana a CD’
- b. [Juan **les** ha vendido un libro y Pedro **les** ha comprado un CD]
 Juan_{CL_{PL}} has sold a book and P_{CL_{SG}} hasbought a CD
 [a Maria y a Susana]
 to Maria and to Susana
 ‘Juan has sold Maria and Susana a book and Peter has bought them a CD’

In (10a), singular object clitics double the CoRNR-ed elements, whereas in (10b) plural object clitics are present. Interestingly, the distributive reading characteristic of CoRNR, and which we focus on in this paper, is only possible in (10a). In (10b), only a collective reading is possible. An ellipsis analysis as sketched in (9) would predict (10b) to have a distributive reading, whereas (10a) would be predicted to be ungrammatical due to an agreement mismatch (e.g., a singular clitic linked to a plural object). Since both predictions are incorrect, we also reject this type of approach to CoRNR. What these data seem to show is that when a distributive reading is present, the components of the CoRNR-ed phrase are able to be construed in their base positions within the VP. In contrast, when a collective reading is present, then two coordinated DPs are present in each VP; the coordinated DPs subsequently undergo ordinary RNR.

2.4 Interim conclusion

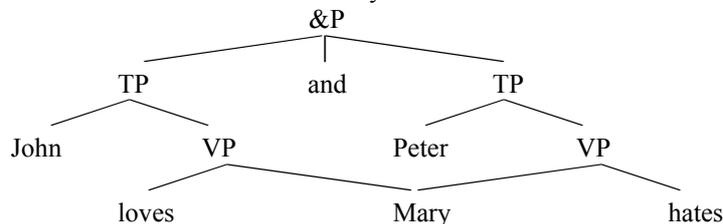
In this section, we have argued that CoRNR is neither movement, nor binding, nor ellipsis. In the next section, we will propose an analysis based on treating coordinate structures as involving parallel planes in syntax. CoRNR would then be a last resort PF mechanism.

3. A new approach to CoRNR

3.1 Coordinate structures and linearisation

Our analysis of CoRNR assumes a theory of coordination in which the conjuncts are on separate planes, linked together by the coordinator (cf. Goodall 1992). This analysis has been extended to account for RNR by Phillips (1996), and more recently by Citko (2003). These scholars argue that, in a sentence like (11) below, the RNR-ed object is shared by both conjuncts

- 11) *The Phillips-Citko structure for RNR*²
a. John loves and Peter hates Mary
b.



The intuition is that such structures are unlinearisable, since it is impossible to determine an unambiguous linear ordering between *Mary* and both conjuncts. More specifically, even though *Mary* is linked to both object positions, it seems to be the case that it cannot be linearized in both positions simultaneously. Citko argues that this problem can be resolved if *Mary* is forced to move to a higher position, where such indeterminacy would not arise. She focuses mainly on cases in which the shared constituent is a wh-word, and in this way, she derives many properties of ATB movement. In a structure like (11b), however, there is no independent motivation for the object to move to a higher position, hence the linearisation problem cannot be resolved in the way Citko (2003) proposes. What we want to propose is that there is a last resort mechanism at PF that can apply to rescue such cases. This mechanism would simply linearize the shared constituent separately from the rest of the sentence, at the right edge of the utterance.³

What we are arguing for here is, in essence, a model in which PF, exceptionally, can linearize a structure in a way that does not necessarily correspond to what it is handed down from syntax. This may only happen in cases in which it is impossible to linearize the structure otherwise. Note that this something that happens purely at PF, i.e., the syntactic structure remains unaltered. This explains why RNR constructions show no movement effects (eg. islands, WCO etc). In a similar vein, examples like (10) are easily explained since each clitic doubles the object that is underlyingly present. This will always be a singular clitic when a distributive reading is present. Moreover, since the explanation hinges on having a constituent shared by both conjuncts, it can account for cases like (12), in which the RNR/shared constituent is bound simultaneously by antecedents from both conjuncts.⁴

² For expository reasons, throughout this paper we assume a ternary branching structure for coordination. This does not reflect a commitment on our part to such structure, and the analysis would remain the same under a more conventional binary branching structure (à la Munn 1992, Progovac 1998a, 1998b).

³ There are really two claims here. One is that the shared constituent must be pronounced separately from the rest of the utterance. The other is that such pronunciation must occur at the right edge. The latter requirement might possibly be due to Phillips's hypothesis that sentences are constructed from left-to-right (cf. Phillips 1996, ch 3 for details).

⁴ Thanks to Kyle Johnson for providing this example.

- 12) [Every_i student rejected *e*] and [every_j professor continued to defend *e*]
[the analysis they_{i+j} collaborated on].

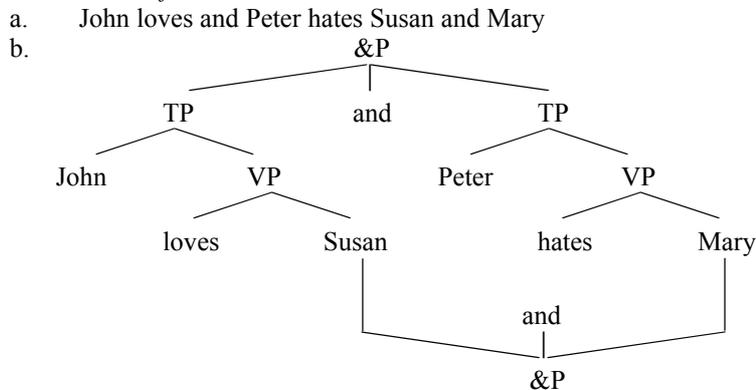
3.2 Back to CoRNR

At this point, we want to build on the intuition that RNR and CoRNR sentences are not really that different. In fact, the only visible difference between a RNR sentence like (11a) and a CoRNR example like (1) –both repeated below-- is that the latter contains one extra coordination.

- 13) a. John loves and Peter hates Mary (=11a)
b. John loves and Peter hates Mary **and** Susan (=1)

To make sense of this intuition, we would like to propose that syntax offers more possibilities than just sharing a constituent as in (11). Specifically, we argue that it is also possible to establish a second coordination embedded inside the larger one. In this case, each of the conjuncts would be a sub-constituent of each conjunct of the larger coordination. This is rather cumbersome to express in prose, but it is better reflected in the following tree.

14) *Our structure for CoRNR*



In our view, the reason why CoRNR derive from structures like (14) is the same reason why RNR sentences derive from structures like (11). That is, we argue that (14) is unlinearisable. This details, are, however, slightly different from (11). In particular, note that in this case, each verb has its own object, so this cannot be the source of the linearisation problem (i.e., each object can be linearized in the object position of its respective verb, without any indeterminacy arising). Instead, we want to blame the coordination for it. In doing so, we follow the intuition that RNR and CoRNR instantiate essentially identical structures, except for the presence of an extra coordination in the latter. Note that if CoRNR does not apply, so that *and* is forced to linearize in either object position, the sentence is crashingly ungrammatical.

- 15) a. * [[John loves Susan **and**] and [Peter hates Mary]]
b. * [[John loves Susan] and [Peter hates **and** Mary]]

Why should this be so? We propose that the constraint in (16) is responsible for it. This constraint applies at PF, and essentially requires that the coordination must be linearly adjacent to both conjuncts. This constraint is independently required anyway to rule out examples like (17), which would otherwise be legitimate ATB extractions.

16) *The Conjunct Adjacency Constraint (CAC)*

In a coordinate structure, the coordinator must be linearly adjacent to (parts of) both conjuncts

- 17) * [Who] do you love [[*t*] and [*t*]]
↑

The CAC is violated in (15a) because the coordination is not adjacent to the second conjunct, *Mary*. Conversely, in (15b), it is not adjacent to the first conjunct, *Susan*. The only way for a structure like (14) to satisfy the CAC is to linearize the entire lower coordination *Susan and Mary* together. Thus, this string is exceptionally pronounced at the right edge of the utterance, giving rise to a CoRNR sentence. As in the case of RNR, this is a process that happens in the PF component, and it does not affect the syntactic structure at all. Therefore, we correctly predict that CoRNR will not show any signs of movement, as demonstrated in section 2.1.

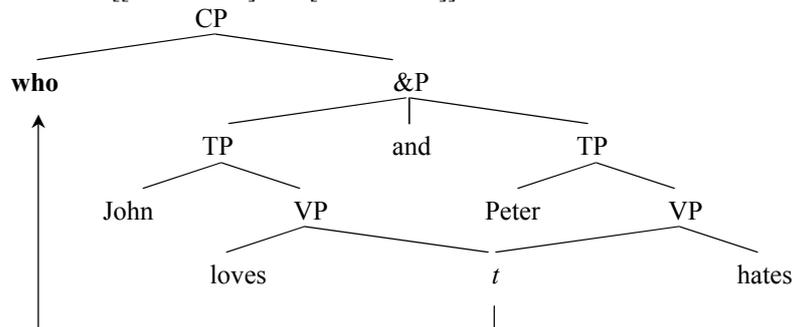
A final point we want to touch on is the recursivity of the structure in (14), and of CoRNR by extension. Note that once we allow for a coordinate structure embedded inside another, nothing blocks further embeddings. The result would be a CoRNR-ed constituent out of which some smaller constituent has CoRNR-ed in turn. The following example shows that this possibility is indeed available (although it is rather cumbersome to parse).

- 18) [[John said *e*] and [Peter denied *e*]]
 [[that Tim loves *e*] and [Ben hates *e*]]
 [[Mary] and [Susan]]

3.3 Extensions

We have argued that RNR and CoRNR sentences are the result of a last resort PF process that rescues an otherwise unlinearisable structure. In this section, we focus on cases in which such structures are actually linearisable without resorting to this process. Consequently, we will not observe reordering in these cases. Citko (2003) already points at this prediction in her analysis of ATB extraction. Consider a structure like (11) above and suppose that the object is a wh-word. This will result in a structure like (19), where *what* has moved to SpecCP.

- 19) *ATB extraction according to Citko*
 a. Who does [[John love *t*] and [Peter hate *t*]]?
 b.



In (19), the object positions of *love* and *hate* are no longer relevant for linearisation, since the shared object has moved away. The requirement now is that *what* must be linearized in SpecCP. Since there is only one such position, no linearisation problem arises, and there is no need to resort to a PF reordering process (we refer the reader to Citko's work for many other advantages of this analysis of ATB extractions).

The same argument can be made with CoRNR structures. Note that, in (14), *Susan and Mary* forms a constituent –i.e., it is a set of terminals exhaustively dominated by the same node, namely the lower &P. As a consequence, we expect that it can be moved away, under the right circumstances. This gives rise to examples like the following, which we dub W&W sentences.

- 20) a. [[Which cheerleader] and [which sorority girl]] does [[John love *t*] and [Peter hate *t*]]?
 Reply: *John loves Susan and Peter abhors Mary*
 b. [[Which book] and [which CD]] did [[John buy *t*] and [Peter steal *t*]]?
 Reply: *John bought Moby Dick, and Peter stole The Dark Side of the Moon*

Note that in both ATB and W&W sentences, we are dealing with proper syntactic movement (as opposed to reordering at PF, as in RNR and CoRNR sentences). Therefore, we expect that they should be sensitive to standard movement constraints. The island-sensitivity of ATB extraction what already demonstrated in (5). The paradigm below shows that the same holds for W&W sentences.

- 21) a. * [[Which restaurant] and [which coffeeshop]]
do you know [[a man who loves t] and [a woman who hates t]]?
b. * [[Which restaurant] and [which coffeeshop]]
were you at home [[before John came from t] and [after Peter went to t]]?
c. * [[How loudly] and [how softly]]
didn't you say [[that John had spoken t] and [that Peter had replied t]]?

Note, also, that PF reordering of CoRNR sentences is not restricted to A-bar movement. A movement can also result in a linearisable structure. Thus, (22a) exemplifies this for passivisation, (22b) for unaccusative verbs, and (22c) for scrambling in German (to AgrOP, assuming a head-initial approach) (the last sentence due to Martin Salzmann, p.c.).

- 22) a. ✓ [[John] and [Peter]] were [[hated t] and [loved t]] (by Susan and Mary)
b. ✓ [[The bottle] and [the vase]] [[broke t] and [cracked t]]
c. ✓ Er hat [[Hans] und [Peter]] [[t gefunden] und [t geholfen]]?
he has Hans and Peter found and helped
'He has found and helped Hans and Peter'

4. Outlook

RNR has been a hoary chestnut tossed between linguists for several decades. Over the past few years, however, there has been a growing consensus that RNR does not involve syntactic movement and several analyses have been proposed for it. The predictions of these analyses are subtle and it is not always easy to choose between them. Until now, CoRNR constructions were simply at odds with just about every available analysis. Given current developments in the field, we suggest that CoRNR constructions provide precisely the right environment to test the different predictions of these analyses. We thus agree that RNR and CoRNR do not involve syntactic movement *per se*. However, we have also been able to show that existing analyses display some serious shortcomings and instead we propose an analysis based on PF movement. The implication of the analysis, of course, is that the PF interface is central to the grammar, thus confirming the Strong Minimalist Hypothesis.

The proposal we have presented here, nonetheless, is still in its initial state, and many more questions and predictions arise than we can make justice to here. For instance, one may wonder whether it could be extended to examples like the following:

- 23) [John and Peter] love [Susan and Mary] (respectively)

Note that in sentences of this kind, the verb necessarily agrees in number with the subject (i.e., **[John and Peter] loves [Susan and Mary]*). This may suggest that (23) does not involve clausal coordination, in which case the distributive reading will have to be derived by another means. Similarly, as pointed out to us by Pranav Anand (p.c.), it is not clear what the scope of quantifiers is in CoRNR sentences, and what our analysis predicts about it. While these questions remain unanswered here, we hope that this contribution stimulates further research into RNR and CoRNR sentences. We believe that the study of these constructions can shed light on the properties of merger, movement and linearisation.

5. References

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