The Inherent Syntactic Incompleteness of Right Node Raising

1. Introduction

In this paper I address the nature of the interesting interpretive dependency found in Right Node Raising constructions (RNR) and the nature of syntactic dependencies in general. The RNR-specific relation has traditionally been analyzed as one syntactic in nature, but here I argue that this cannot be the case. Each of our traditional syntax-mediated means of capturing interpretive dependencies is insufficient and ill suited to account for RNR. This leaves us with two options: 1) add to the syntactician’s toolkit so as to maintain the idea that the RNR dependency is syntactic in nature or 2) conclude that the dependency is not-mediated by syntax (or at least not mediated by current by syntactic mechanisms found in current conceptions of syntax). I show that this second option is forced given the facts and I propose a mechanism by which the dependency can be mediated by extra-syntactic concerns. Further, so as to restrict the extra-syntactic dependency from applying across the board, I posit some restrictions on what can possibly be construed as a syntactic dependency.

1.2 Background

The term Right Node Raising was first used in Postal 1974 to describe constructions like that in (1) below. Here there is a sentence involving coordination
wherein a string (underlined here) on the right edge of the sentence is interpreted both superficially in-situ as well as in the right edge of the first conjunct (following *bought*).\(^1\)

(1) Becky bought and Bruce perused *the collection of short stories*.

There is a one-to-many interpretive relation between the underlined string and the rest of the sentence: it is interpreted both as the internal argument of *perused* and the internal argument of *bought*. These dependencies are the ones of interest in studies of RNR – the one between the underlined material and the first conjunct in particular. It is the un-marked case when an internal argument appears adjacent to the verb that it is the object of. The non-canonical case is the one where it does not appear adjacent to the verb. For this reason, this paper concerns itself mostly with this second relation.

1.2.1 Categorial promiscuity

It is important to note how relatively free RNR is with respect to the element that enters into this one-to-many relation. This *shared element* seems to be able to be any sort of category as seen below:

(2) a. Ivy said, and Becky denied, that Iris had been there.

\(^1\) Further, as is to be expected with coordination, it is possible to iterate RNR conjuncts like in (i) below.

(i) Becky bought, Bruce perused, and Brit criticized the collection of short stories.

For ease of exposition I refer to the first and second conjunct of RNR, but these should be read as non-final and final conjunct respectively for more generalizeable accuracy.
b. Ivy said that Becky, and Bruce said that Brit, should read the book.

c. Brit should, and Ivy must, attend the class.

d. Brit sold, and Ivy donated, a book to the school.

e. Ivan donated a book, and Ivy donated a chalkboard, to the school.

Further, it need not be the case that the shared element is a traditional syntactic constituent. This is seen below in (3).

(3)   a. Becky sang, and Bruce recorded, some songs at the concert.
      b. Bruce doesn’t know whether to study micro- or macro-economics.

Given the facts above, it seems clear that an explanatorily adequate approach to the construction must eschew reference to particular syntactic categories and perhaps even syntactic categories altogether.

1.2.2 Typological pervasiveness

An additional background concern of RNR is how typologically mundane it appears to be. It has been documented in a wide variety of languages across many language families. A small collection of examples is presented below:

(4)   German:

      *Hans soll*   *und*  *Ute muss*  *heimfahren*

      Hans should and Ute must  home.go
‘Hans should, and Ute must, go home.’

(5) Tagalog:

_Hindi nagluto' ng bigas at hindi kumain ng fish abs same woman_

not cooked erg rice and not ate erg isda ang parehong babae

‘The same woman did not cook rice and did not eat fish.’

(Sabbagh, 2008):

(6) Mandarin:

_John hui dan Mary bu-hui mai na-ben shu_

John will but Mary not-will buy that-CL book

‘John will, but Mary won't, buy that book.’

(7) Hindi:

_Shiti-ne seb aur Ivan-ne nashpati khay-ii_

Shiti-Erg apple(Masc.) and Ivan-Erg pear(Fem) ate-Fem

‘Shiti [ate] an apple, and Ivan ate a pear.’

(8) Japanese:

_John-ni hanao, sosite Bill-ni tyokoreetoo Mary-ga okutta (koto)._ 

John-to flower and Bill-to chocolate Mary sent fact

‘Mary sent flowers to John, and she sent chocolates to Bill.’

(Saito 1987)

(9) Russian:

_On ne soxranil, a vybrosil, pechen’e iz poezdki v Angliju._

he not kept, but discarded, cookie from trip to England

‘He did not keep, but rather threw out, cookies from a trip to England.’
Given the above facts, it is perhaps wise for theories of RNR to not hinge upon properties of language that are easily subject to variation. That is, if RNR were the result of nothing but language-specific grammatical properties, its cross-linguistic prevalence would need to be taken to be coincidental.

In short, RNR is very free as to that which can serve as shared element and is common across a typologically diverse set of languages. I take these to help to constrain the plausibility of any RNR analysis. A sufficiently explanatory RNR analysis will have this state of affairs as a predicted outcome.

1.2.3 Types of relation

In the RNR example in (1) we find an instance of what I will call *interpretation at a distance*. As opposed to the un-marked state of affairs where an internal argument arises in a position adjacent to its verb, here we find an internal argument appearing at an arbitrarily long linear distance away from the verb and a gap instead adjacent to it. Much like instance of *action at a distance* in physics, it is imperative to make sense of these sorts of long-distance interaction.

Syntacticians have devised a number of means to make interpretation at a distance less mysterious. In effect, they posit that the gap near the verb is not what it seems. Instead there is, or at some point in derivational history was, an instance of the element that is interpreted in the gap actually sitting in the gap site.

This sort of logic defuses the mystery, but there are still various ways this idea can
be cashed out. There are two main ways of doing so. In the gap position there is either something that is inherently not-pronounced or something that is inherently pronounced, but made un-pronounced via some operation. Let’s look at some examples of these.

There are certain instances of interpretation at a distance that have been more thoroughly studied than RNR. These include wh-dependencies, control dependencies, and ellipsis dependencies.

(10)  a. What did Bruce suggest __?
     b. Becky wanted __ to leave.
     c. Ivy ate, but I don’t know what __.

In (10a) there is a sense in which the wh-word what is interpreted in the object position of the verb suggest. In Chomskyan syntax, this relation has been derived via a movement operation which leaves behind either a co-indexed inherently unpronounced ‘trace’ or an otherwise pronounceable copy that has been made unpronounced.²

(11)  a. What did Bruce suggest t_i?
     b. What did Bruce suggest what_t_i?

Further, even if one assumes an analysis with inherently unpronounced elements, theories can differ as to the particular type of unpronounceable element. Take (10b) for

² I do not discuss non-Chomskyan long-distance dependencies like those in modern phrase structure grammars (Pollard and Sag 1994) and categorial grammars (Ades and Steedman 1982). The techniques proposed in these formalisms do not relevantly distinguish them from Chomskyan grammars as far as RNR is concerned.
example. The gap in this construction has been argued to be filled with a particular type of null element, namely a null pronominal anaphor PRO (as in Chomsky 1981). It has also been analyzed as involving the same sort of trace as in (11b) (as in Hornstein 1999). These are shown in (12) below. In (12a) there is a null element dependency but is not derived via movement, in (12b) the dependency is derived via movement.

(12) a. Becky$_i$ wanted PRO$_i$ to leave.
   b. Becky$_i$ wanted t$_i$ to leave.

Finally, there are analyses of the example in (10c) that have been argued to involve deletion of otherwise pronouncable elements as seen in (13) (Ross 1969; Merchant 2001) or the use of inherently un-pronounced elements (I use pro here) in the sense of Lobeck 1995.

(13) a. Ivy ate, but I don’t know what Ivy ate.
   b. [Ivy ate], but I don’t know what pro$_i$

In short we have three basic syntactic tools for capturing interpretation at a distance. The first involves null elements (both inherent and not) derived via movement as in (11) and (12b). The second involves inherently null elements in non-movement relations like in (12a) and (13b). The third involves inherently pronounceable elements derived via movementless dependencies like in (13a). These effectively exhaust our traditional syntactic means of capturing interpretive dependencies and will in turn be used
as potential analyses of RNR. The main question vis a vis RNR can be posed as: which of the above dependencies does RNR pattern like? In the next section we will explore various answers to this question.

2. Previous analyses

In this section I will discuss the previous analyses of RNR. These analyses exploit the various means of long-distance dependency formation outlined in the previous subsection. In addition to those, RNR provides the option to straightforwardly capture the relation between the shared element and the second conjunct by means of simple complementation. This sort of local dependency will not play into the discussions much.

2.1 Movement dependencies

The earliest analysis of RNR going back to Ross 1967 involves syntactic movement of the shared material in an across-the-board fashion to the right (see also Postal 1974; Williams 1981; and Sabbagh 2007, 2008 as well as Gazdar 1981 for a GPSG analysis of the same sort). That is, at some stage of the derivation, the shared material shows up as two separate tokens, one in each conjunct. A movement operation takes these two and moves the derivationally simultaneously to a shared position where they are pronounced as a single element (traces are used here, but they are not crucial. Unpronounced traces would work just as well):

\[(14) \quad \text{a. Prior to movement: } \text{Becky bought [the books], and Bruce perused [the books]},\]

\[\text{b. Post-movement: } [[\text{Becky bought } t_i \text{ and Bruce perused } t_i] \text{ [the books],}]]\]
This approach captures the interpretation of the shared material in the first conjunct, because in some sense the shared material is *still there* in the first conjunct, albeit in the form of a trace or unpronounced copy of the vacated material.

This approach however runs into various problems (some more fundamental than others) that preclude it from being the correct analysis of RNR. One classic problem with this sort of analysis is that this movement is unlike traditional movement dependencies in that it is impervious to syntactic island violations. First noted in Wexler and Culicover 1980, this sort of asymmetry is seen in the examples in (15).

(15) a. *It’s [the collection of short stories], that I met [island the man who wrote t₁]
    b. I met [island the man who wrote t₁], and you met [island the woman who published t₁], [the collection of short stories].

Sabbagh 2008 presents a movement theory of RNR that explains away this asymmetry in convincing manner that relies on the rightwardness of the movement. While this approach saves the movement account from the asymmetries with respect to leftward movement, there remain asymmetries with respect to non-RNR rightward movement. In English it is not possible to moved the object of a preposition rightwards as seen in (16a). However the object of a preposition may serve as the shared element in a RNR sentence as seen in (16b).

(16) a. *Becky was talking to t₁ yesterday [an old man].
b. Becky was talking to ti, and Bruce was talking about ti, [an old man].

The fact that RNR is impervious to not just leftward islands, but any islands, forces one to accept that movement cannot be the correct answer for RNR.³

Further, we saw above that a wide variety of elements can serve as the shared element. It is not the case the movement is so free. Non-constituents, as per classical constituency tests, cannot be moved. The sentence in (17a) provides an example of this. However, similar non-constituents can indeed serve as the shared element in RNR (17b).

(17) a. *It was [a package], [out the window] that Joe threw to ti

b. Joe threw to ti and Sally nudged to ti, [a package], [out the window]

Again we are compelled to conclude that movement as commonly understood cannot be the correct analysis of RNR. Outside of being a long-distance dependency, it simply shares none of its properties.

2.2 Non-movement dependencies

RNR does not show the symptoms of movement, yet there is another type of long-distance dependency that may fit the bill. The lack of movement constraints suggest that the relevant gap in RNR is not derived via something vacating it, but rather something residing there yet not being pronounced. Given the discussion in the previous section, this could possibly be an inherently null pro-form or some deleted instance of a sufficiently

³ Further, Larson 2011 discusses an instance wherein the particular version of a given constituent can serve as the shared material when it otherwise cannot move.
identical element in the subsequent clause (this latter option being vastly more popular, see Wexler and Culicover 1980; Kayne 1994; Wilder 1997; Hartmann 2000; Ha 2006; An 2007; and Ince 2009 among others). That is the example in (1) could be underlyingly represented as in (18a) or (18b).

(18)  
   a. Becky bought proi and Bruce perused [the collection of short stories].
   b. Becky bought [the collection of short stories]i and Bruce perused [the collection of short stories]i.

Each of these accounts would better the movement account. Not only do such accounts capture the fact that the shared element is interpreted in the first conjunct (again it is literally still there in a sense), but these accounts also explain the lack of movement restrictions. But this type of approach also runs into problems.

First, the pro-form account fails very simply in that if it were true it would require a large array of null elements otherwise unattested in languages with RNR. There would need to be a null pro-form corresponding to every element that can serve as the shared material and as we saw above, that list is rather unconstrained. It is eminently unexplanatory to posit null elements specially for RNR.

Further, positing such elements would make false predictions. English for example does not freely use null internal argument pro-forms even when the overt counterpart is very salient:

(19) Becky finally bought [the car]i. *Roger inspected proi
Deletion accounts stand a better chance in being freer with what it can apply to, but they succumb to similar problems. Again, RNR can involve object nominals as the shared material, but ellipsis in English simply cannot. This can be seen by taking the example above in (19) and ‘re-analyzing’ it as an instance of ellipsis:

(20) Becky finally bought [the car]. *Roger inspected [the car].

Just as we do not want to allow a large array of pro-forms proprietary to RNR, so too is it unenlightening to posit novel forms of ellipsis that are also proprietary to RNR. In addition to object nominals other elements can serve as RNR shared material that cannot be elided. This can be seen in the contrasts below:

(21) a. *Lana conversed with Becky and Ivy conferred with Becky.
    b. Lana conversed with Becky and Ivy conferred with Becky.
(22) a. *Lana sent flowers to Jill and Becky handed flowers to Jill.
    b. Lana sent flowers to Jill and Becky handed flowers to Jill.

There are other arguments against a deletion account of RNR (see Abels 2004 for a good compendium), but this problem is the most severe. Movement accounts of RNR fail because RNR elements can do what moved elements cannot and deletion accounts of
RNR fail because RNR elements do what deleted ones cannot. There is no way around this sort of problem outside of dull stipulation.

3. Contingency plans

In the previous section I argue that our traditional syntactic means of capturing interpretation at a distance are insufficient to explain the nature of RNR. RNR simply looks different. The leaves us with, to my mind, three options:

I RNR involves not a syntactic, but a semantic type of relation.
II RNR involves a non-traditional type of syntactic relation.
III RNR works in ways that we do not currently have the means to explain.

In this section I explore the first two options and show that we are forced to adopt the third option as a last resort.

3.1 A semantic dependency

In the previous section we saw that our traditional syntactic tools could not capture the relevant RNR dependency. This does not mean however that we have no traditional tools left. It could be the case that while there is no syntactic relation between the shared material and, say, the first conjunct, there is indeed a non-syntactic, semantic dependency

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4 Another logical possibility is that RNR is derived via ellipsis when ellipsis is a viable and via movement when movement is possible. The purview of each derivation is thus smaller than a monolithic approach to the construction would require. This sort of God-of-the-gaps strategy has been pursued by Barros and Vicente 2011 for various analyses to RNR. Larson 2012 offers criticism of this approach on empirical grounds.
between them. After all, the main motivation in the first place for even looking for an analysis of the dependency was that there is something interpreted in the first conjunct. It could be that all that intuitive interpretation amounts to is a solely semantic dependency.

In semantic theory there is one way to represent long-distance dependencies: scope. For example, in wh-question formation, the dependency between the wh-word and its thematic position is represented semantically via an operator corresponding to the wh-word taking scope over a variable corresponding to the site of the trace:

(23) a. *Syntactic form:* What, did you say t,?
    b. *Semantic form:* for what x [you said x]

This wh-operator arrived in its scope-taking position via overt movement in the syntax, but this is not necessary. Scope taking elements can do so without moving overtly as seen in (24). Here, *everyone* takes scope over *someone* though it does this without corresponding overt syntactic movement

(24) Someone loves everyone (with the interpretation that everyone is such that someone loves them)

This is simply to show that it is not impossible that RNR might be derived by means of the shared element taking scope over (and binding) a variable in the semantics. It need not be the case that this semantic variable have an overt syntactic counterpart and perhaps its general applicability it masked by a lack of non-overt movement derived
instances where it can be bound.

While not impossible, this account cannot work. For one, it is not the case that the shared elements in RNR be things that can bind variables. They need not be inherently quantificational in the sense of Lasnik and Stowell 1991. Further, the position from where the semantic binding arises overtly is not such that it can bind things in the position where the gap arises. Take the example in (25) for instance. Here the object of the second conjunct is a potential semantic binder and the object of the first clause is a potential semantic bindee. However, the bound reading of the pronoun is not possible:

(25) Jerry caught him, and Ivy reprimanded every boy.

Given this restriction on binding, it is quite implausible that such a semantic analysis of RNR is likely to be correct. It would require a means of scope-taking proprietary to RNR.

3.2 A new syntactic dependency

Our traditional tools, both syntactic and semantic, are not in a position to represent RNR accurately. One remaining option is to maintain that RNR is derived as a syntactically-mediated dependency, just of a non-traditional sort. In fact, such an approach has been proposed in the literature. First proposed for RNR by MacCawley 1982, an analysis in which the shared material of an RNR sentence is immediately dominated by two distinct mother nodes avoids the problems met by movement and deletion accounts. Call this the multidominance approach (MD). An example of this for
the sentence in (26) is roughly represented like in (27).

(26) Ivy read, and Ivan bought, the book

(27)

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CP
  /
 TP   TP
 /     /
Ivy   Ivan
   /   /  
read bought
     /
   the book
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In the representation in (27) it is clear that the shared material has neither moved nor undergone any sort of deletion. This allows us to explain why there are no normal movement restrictions on RNR and also that otherwise un-deleteable elements can be right node raised. True, this sort of tree transparently violates the classical single mother condition, but Citko 2005 shows that given certain commonly-held assumptions, there is no reason to rule out MD structures in principle. As long as some sort of linearization scheme forces the shared material to arise overtly in the second conjunct and not the first, the basic explananda of the construction are accounted for: there is a gap in the first conjunct that bears the same sort of interpretation as a string in the second conjunct.

In light of the problems that movement and deletion accounts face, numerous researchers have followed MacCawley’s lead in exploring MD as an option for RNR (see
Phillips 1996; Wilder 1999; de Vos and Vicente 2005; Gracanin-Yuksel 2007; Bachrach and Katzir 2009; Grosz 2009; and Larson 2009 among others). However, there are still problems with this last best option.

The problems with MD approaches to RNR are of a different type than those I have presented above for movement and deletion accounts. Deletion and movement are venerable operations/theoretical dependencies and as such have accrued a variety of discernable characteristics (island sensitivity, categorical constraints, etc). In expanding the syntactic toolkit, researchers proposing MD accounts cannot rely on simple diagnostics for when a node is multiply dominated or not. Its properties are not well known or defined. Further, it is not known whether something like MD actually ‘exists’ as licit or empirically justifiable type of dependency (see Larson 2011 for some criticisms).

The best recourse in this situation is to look for that which is knowable about MD relations: theoretical properties that MD entails and that are better understood. One such property is that of c-command. The representation in (27) clearly indicates that the shared material is c-command both by elements in the first conjunct and elements in the second conjunct. As such, we should expect the overt instantiation of c-command-mediated relations to manifest themselves equally between the shared material and each conjunct. That is, relations that are grammatical or not depending on c-command should be active in both conjuncts equally.

For example, if we take c-command as a proxy for scope, it should be the case that negative polarity items should be able to be licensed by negation in either conjunct. First, it is clearly the case that when both conjunct contain a relevant type of negative element,
an negative polarity item in the shared element is licit. This is shown in (28). Further, when neither conjunct contains a negative element, the negative polarity item is not licensed as seen in (29). These facts have been previously discussed by Kayne 1994 (see also Phillips 1996; Hartmann 2000; and Sabbagh 2008).

(28) Becky didn’t buy, and Bruce didn’t sell, any books about trees.

(29) *Becky bought, and Bruce sold, any books about trees.

However, Kayne (1994: 67) notes that there is an asymmetry vis a vis negative polarity item licensing in RNR. When the negative element is found in the first conjunct, the negative polarity item in the shared material is not licensed whereas when the negative element is in the second conjunct it is. This is seen in the pair of sentence in (30).

(30) a. *Becky didn’t buy, and Bruce sold, any books about trees.
    b. Becky bought, but Bruce didn’t sell, any books about trees.

This pattern is unexpected under a straightforward interpretation of the MD account. The shared material containing the negative polarity item is in the identical structural relation with respect to the various conjuncts. As such, the sentence in (30) should be predicted to either be equally acceptable (the most plausible expectation) or equally unacceptable (perhaps if this sort of licensing can be ruled out by its lack of applicability in at least one conjunct. This is prima facie evidence against the MD
account. It should be the case that these structural concerns are symmetrical between
conjuncts, but they are not.

This sort of asymmetry abounds in RNR. For example, in Brazilian Portuguese it is
the case that certain verbs require that clauses that they select for be of a certain type.
Verbs like ‘want’ demand that their embedded clauses not be marked as indicative. This
is seen in (31) below:

(31)  *Maria quer que Ana vai viajar

       Maria wants that Ana will.indic travel

       ‘Maria wants that Ana will travel’

Other verbs, such as a the factive ‘regret’ allow indicative marking in their
embedded clauses:

(32)  Maria lementa que Ana vai viajar.

       Maria regrets that Ana will.indic travel

       ‘Maria regrets that Ana will travel.’

This constraint on the use of the indicated holds when ‘want’ is the second conjunct
verb, but not when it is the first conjunct verb. This is seen in (33) below.
(33) a. *Pedro lamenta, mas Maria quer que Ana vai viajar

Pedro regrets but Maria wants that Ana will travel

‘Pedro regrets, but Maria wants, that Ana will travel.

b. Pedro quer, mas Maria lamenta que Ana vai viajar

Pedro wants but Maria regrets that Ana will travel

‘Pedro wants, but Maria regrets, that Ana will travel.

Again, it should be the case, under an MD account, that these two sentences in (33) should be judged equally acceptable or unacceptable.

One final instance of asymmetry in RNR (though others are easily conceivable) comes from constraints on wh-dependencies. Whitman 2002 was the first to notice a distinction in acceptability in what I will called coordinated-wh questions like (34) below.

(34) a. What and when did Becky eat?
b. *What and when did Becky devour?

As seen above, optionally transitive verbs like eat are licit in this construction, while obligatorily transitive verbs like devour are not. There have been various analyses of this construction in English that attempt to explain this difference. (see Gracanin-Yuksek 2007, Citko and Gracanin-Yuksek 2012, and Larson 2012). Important here is that the basic set-up to this construction is similar to RNR. It is possible to ‘expand’ either side of the coordinator to get an RNR sentence, and when this is done the distinction in
verb-type remains:

(35)  a.  Bruce wondered what, and Becky wondered when, Ivy would eat.

       *Bruce wondered what, and Becky wondered when, Ivy would devour.

Under the MD account, the particular order of the conjuncts should not matter. When there is an optionally transitive verb in the shared material, the sentence should be acceptable no matter the conjunct order. When there is an obligatorily transitive verb in the shared material, the sentence should maintain the unacceptability. This is not the case. As seen in (36) below (and echoing results found in Lewis, Larson, and Kush 2012), both verb types are acceptable with the inverted conjunct order:

(36)  a.  Becky wondered when, and Bruce wondered what, Ivy would eat.

       Becky wondered when, and Bruce wondered what, Ivy would devour.

There is an asymmetry between sentence (35b) and sentence (36b) that is not predicted in MD accounts.

The accumulation of these and other asymmetries undermines the attractiveness of MD accounts to RNR. TO the extent that MD makes clear predictions (ones concerning selection, c-command, and so forth) it makes the wrong ones. Since these are our only real tools to judge it, left without a solid explanatory account of RNR. That is, even expanding our toolkit so as to include new types of relations, RNR is still puzzling.
3.3 Another new syntactic dependency

There is one final novel, non-traditional means of deriving relations that may be applicable to RNR. This is *sideward movement* like that proposed in Nunes 2004. Sideward movement is not subject the same sort of constraints that traditional ‘upward’ movement is. For instance, it can stem from within an island without effecting unacceptability. The parasitic gap example can be analyzed as involving sideward movement of the wh-word from $t_1$ to $t_2$ even though $t_2$ is island-internal.

(37) What did Ivy read $t_1$ [island before burning $t_2$]?

We saw above that RNR is impervious to island restrictions. Perhaps it is because the shared element has undergone sideward movement from the first conjunct as depicted in (38).

(38) Becky bought $t_1$ and Bruce sold [the collection of books].

This logical possibility has been less studied than the MD approach (see Fetters 2011 for a preliminary investigation), but it captures much of the same data. There are nevertheless clear problems with such an approach given the terms that Nunes lays out for sideward movement.

For the trace within the island ($t_2$) in (37) to be licensed it must be the case that a co-indexed copy of it be in a certain configuration with respect to it. Nunes posits that as

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5 To be precise, sideward movement avoids island constraints by vacating structure before that structure ‘becomes’ an island for movement. See Nunes 2004 for details.
long as the relevant wh-word c-commands that trace at the end of the derivation, the trace is licit. This is quite clearly not the case for RNR in a sideward movement account. The moved element never comes to c-command the trace of sideward movement and as such, such an account of RNR fails on its own terms.

3.4 Conclusion

RNR is not readily captured by the traditional syntactic dependencies of movement and deletion. This leads us to explore other avenues of analysis: semantic relations and non-canonical syntactic ones. We have seen unfortunately that even these less constrained contingency plans are similarly not up to the task to the extent that we can test them. This leaves the study and analysis of RNR in an interesting place with respect to grammatical theory: There is currently no satisfying analysis of the construction and it is essentially linguistically mysterious. Option three stated above seems to be the only assessment left: RNR works in ways that we do not currently have the means to explain.

In the next section I offer a potential alternative avenue of analyzing RNR that accommodates the apparent freedom of its relevant dependency while distinguishing it from traditional syntactic dependencies.

4. An extra-syntactic dependency

In the above section we have seen that capturing the interpretive dependency between the shared material and the gap in the first conjunct is not possible with traditional tools such as movement, deletion, and scope. Nor is it the case that expanding our syntactic means will adequately explain the construction’s properties. The gap in the
first conjunct cannot be a trace. It cannot be an elided element. It cannot be a null operator. It cannot be there syntactically and pronounced elsewhere. This exhausts our options are we are left saying that the gap in the first conjunct contains literally nothing. That is, the correct syntactic representation for an RNR sentence like (39a) is like in (39b). The verb in (39b) goes without an object in the syntax.

(39)  

a. Becky bought and Bruce read the books  
b. [Becky bought] and [Bruce read the books]

The second conjunct in RNR is a fully complete clause with a verb and its attendant arguments. The first clause is incomplete. It’s verb is obligatorily transitive yet there is no internal argument, nor any trace of one.

This type of representation avoids the shortcomings of the previous ones. We do not expect any syntactic relation at all between the gap and the shared material because there isn’t one. Not only does it avoid these problems, it is also the case that this analysis is forced upon us as the previous failed approaches exhaust all possible other options.

It must however be the case that when a given element has no complement (as is the case with the verb bought above) that this does not necessarily lead to an ungrammatical sentence. Subcategorization restrictions must hold only when there is a complement that they can hold of. Since there is no such complement in the first conjunct of (39), the sentence is not possibly ruled out due to subcategorization restrictions. Again, this sort of statement must hold given the fact that it seems that nothing can reside in the object position of the first conjunct’s verb.
The main issue left to address is how this emptiness is comes to bear the interpretation of the internal argument in the second conjunct.

4.1 Deriving the interpretation

At a glance, it is not entirely apparent how the first conjunct is interpreted as involving the shared material under this account. For the previous accounts, this interpretation assignment works by transparent analogy to any otherwise normal, non-coordinated sentence. The shared material is actually in the first conjunct at every stage of the derivation. In this sparse account however, it is never there and it is unclear how any relation is established between, say, a verb in the initial conjunct and an object in the shared material. There is no direct structural relation between the two.

I posit that sentences with missing arguments (like RNR) can be acceptable so long as the missing argument can be inferred in a certain way. This inference will rely in large part on Herburger's (1997, 2000) study of focus and its effect on event semantics. I suggest that the shared material of an RNR sentence is interpreted as part of the restrictor of an event quantifier, thus causing the shared material to be presupposed. This presupposition will allow the content of the shared material to be inferred into both conjuncts.

This sort of analysis relies on Neo-Davidsonian conception of semantic representation that I will dub Predicate Conjunction (PC) in the vein of Pietroski (2005) as well as Higginbotham 1986, Parsons 1990, and Schein 1993 among others. In this view verbs do not serve as functions nor nouns arguments. Rather, each is a predicate of
an event variable. For example, a sample sentence like (40a) below would have PC logical form like (40b) and a English paraphrase like that in (40c).

(40)  
   a. Ivy ate an apple in the park.
   
   b. $\exists e \{ \text{run}(e) \& \text{Agent}(\text{Ivy}, e) \& \text{Theme}(\text{an apple}, e) \& \text{in-the-park}(e) \}$
   
   c. There was event of running with Ivy as its agent and an apple as its theme that took place in the park.

In the next subsection I will explore how this sort of semantic representation could be used to capture missing arguments in a test construction before moving on to RNR in a subsequent subsection.

4.2 Missing arguments in Edo

A test case of this “missing argument” situation in PC-style semantic composition can be found in Edo double verb constructions. The sentences, like that in (41) and analyzed by Baker (1989) as (42), involve null coordination and a null $pro$.

(41) Ozo gha le evbare re
     Ozo will cook food eat
     ‘Ozo will cook food and eat it’

(42) Ozo will cook food, and eat $pro_1$
The sentence above has some interesting and severe restrictions on its interpretation. For one, sentences in this mould can only have the interpretation in which the cooking was done with an eye towards the eating. As Pietroski (2002) puts it, the sentence must describe a single event that begins with a cooking and ends with an eating. Second, the food that is to be cooked must be the self-same food that is eaten.

Pietroski develops a PC analysis of how this *pro* is interpreted given the fact that the sentence describes only one single event. In short, the *pro* needs to somehow be interpreted as necessarily co-indexed with food. But Pietroski wonders how this is to be done given that there is no c-command relation between the two. Even if there were c-command between the two, it is unclear how this would be guaranteed.

Pietroski suggests that we take it as a premise that an event can only have a single Theme. The sentence has one clear Theme: the complement of cook. That complement is then locked in as the Theme of the sentence and any other argument in a Theme position, say *pro*, must be interpreted as the same thing. And this is the reading we get. Thanks to the fact that there is only one event described in this sentence, the *pro* that is eaten must be the food that is cooked. This captures the meaning of *pro* in a simple syllogistic way.

However, Baker notes that there is no independent evidence for *pro* in Edo. It's a relatively ad hoc entity to posit in this position. Suppose we were to eschew ad hoc entities. We might see what goes wrong by dropping *pro*, like in (43).

(43) Ozo will cook food eat
The same mechanism that gives *pro* its interpretation when we had it can save the verb’s requirement of a Theme. This sort of inferential mechanism presumably resides outside semantics proper and its underlying logic will serve as a guide through the discussion of RNR in the next subsection.6

4.3 RNR logical forms

Much like in the Edo case, I argue that there is a missing argument in RNR. This time however there is nothing obvious to force the interpretation per se. Unlike the Edo case, the sentence in (44) need not necessarily begin with cooking and end in eating.

(44) Ivan cooked, and Ivy ate, a lot of food.

It could be the case that Ivy ate a lot of food on Sunday and Ivan cooked a lot of food on Monday. It follows that the food need not be the self-same food as it was in the Edo case. Ivan could have cooked a lot of food completely unaware that Ivy was concurrently eating a lot of food across town. The interpretations of (44) are much freer than in Edo case.

Remember, that there was a mere single event in the Edo case allowed for syllogistic guidance in determining the missing argument’s interpretation: There is one Theme per event, food is the Theme of this event, eat conceptually requires a Theme, food is that Theme. We no longer have that guidance in these cases. This suggests

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6 Not just any sort of inference is possible. I maintain that the inference here relies on the existence of an LF entity that serves as the basis for the inference. That is, a mentioned or implied object from some previous discourse would not count. If an apple had previously been mentioned or pointed at, it would not exist in the LF of the sentence in question and thus not count a potential basis for the inference.
multiple events. In fact, Schein (2012) analyzes what I consider to be a RNR sentence as involving two events. The sentence in (45) must involve two events because, as Schein argues, a clumsy event cannot also be a graceful one.

(45) Jones gracefully, and Godfrey clumsily, buttered the pastries.

As a result, sentence (44) would have a LF something like that in (46). That is to say: There was a cooking event with Ivan as its agent and there was an eating event with Ivy as its agent and a lot of food as its theme.

(46) \[ \exists e \exists e' \{ \text{Agent}(e, \text{Ivan}) \land \text{cooking}(e) \land \text{Agent}(e', \text{Ivy}) \land \text{eating}(e') \land \text{Theme}(e', \text{a lot of food}) \} \]

The above LF is to be amended in the next section, but for now, it is heartening that there are multiple events in the LF. That there are multiple events correlates with freer interpretation, but it means that we are going to have to determine the missing RNR argument in a different fashion that in the Edo case. There is no longer the syllogistic guidance. In what follows, I propose a means to determine the missing argument in a way that closely mirrors the Edo way.  

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7 An interesting sidenote, it seems that if the coordination in a potentially RNR sentence is low enough, its interpretation mirrors that of the Edo double verb construction, see (i):

(i) Ivan cooked and ate a lot of food.

Though it could be argued that this is mere verb coordination and not an instance of RNR.
4.4 RNR Presupposition

In the above subsection, we were left with a puzzle. How is the shared material to be interpreted in the first conjunct. The novelty of this approach in general is that the first conjunct is not fully formed in the syntax. Something must be done outside of the syntax then.

A signature aspect of RNR has been ignored in this essay so far. As noted by Hartmann (2000), the shared material in RNR sentences must be somehow presupposed. That is, as a response to the question in (47) a RNR sentence is unacceptable. Compare this with the question-answer pair in (48). Here only the shared material finds antecedence in the question.8

(47)  

a. What did Ivy and Iris do? 

b. *Ivy bought, and Iris read, Pale Fire

(48)  

a. What was done with Pale Fire? 

b. Ivy bought, and Iris read, Pale Fire

The shared material must then in some way be presupposed, topic material that finds an antecedent in the discourse. Herburger (1997, 2000) handles such material in an

8 Note that an object wh-question is sufficient to license an RNR response (adapted from Hartmann).

(i)  

a. What did Ivy buy and Iris read? 

b. Ivy bought, and Iris read, Pale Fire

Erteschik-Shir (1997:105) argues that wh-questions introduce discourse referents of sorts. They restrict the set of possible referents presented by the wh-word. This is arguably sufficient to license the novel shared material.
interesting way. She argues that non-focused material in the scope of an event quantifier is obligatorily interpreted as part of the restrictor to that quantifier. That is, for a sentence like (49) in which *wrote poetry* is the element unfocused in the sentence, an event-semantic representation of the sentence would be like in (50)

(49) ROSALIA wrote poetry

(50) \[ \exists e: \text{write}(e) \& \text{past}(e) \& \text{Theme}(e, \text{poetry}) \] \{Agent(e, Rosalia)\}

The above can be translated into English as something like: Some event of writing poetry in the past was such that its agent was Rosalia. Rosalia is then entailed as the agent of the poetry-writing. She is the agent of events restricted to those of past poetry-writing. The restrictors can be interpreted in the relevant roles despite this not being directly represented as complements to their respective verbs.

We can capture this inference without necessarily affixing the restrictor material with thematic roles. Take for example (51) and a possible semantic representation like in (52).

(51) ROSALIA WROTE poetry

(52) \[ \exists e: \text{poetry}(e) \] \{Agent(e,Rosalia) \& past(e) \& write(e)\}

This would be translated as: There is some event involving poetry such that its agent was Rosalia and it was a past writing. Here, the inference that the poetry was the theme of the event is nowhere explicit. I contend that this is nevertheless retrievable via
extra-grammatical accommodation (in the sense of Stalnaker 1979) rather easily. If Rosalia was the agent in an event of writing and some poetry was involved, it ought to be the default case that the poetry was the theme of that event. The poetry having any other thematic role would be quite odd, and while not ruled out grammatically, will hardly ever arise.

How to make this work for our RNR cases? First, recall that the shared material in RNR is presupposed and as such under the Herburger approach will be part of the event quantifier restrictor.9

Further, to insure that the shared material is interpreted in both conjuncts, I follow Schein (1993) in invoking the notion of a plural event variable (see also (Gillon 1990; Pietroski 2005; Schein 2006; Schwarzschild 1991, 1996). Otherwise, the shared material would need to be interpreted as predicated one of the events or the other, but not both. Again, note that it is not strictly necessary to specify thematic roles in the restrictor if they can be accommodated elsewhere. That said, a sentence like (53) could then have a semantic representation like in (54):

(53)  Ivan bought, and Ivy read, Pale Fire.

(54)  \[\exists E: E_e & E_e' & \text{Pale Fire}(E) \} \{ \text{Agent}(e,Ivan) & \text{past}(e) & \text{buy}(e) & \text{Agent}(e',Ivy) & \text{past}(e') & \text{read}(e') \}\]

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9 It may be the case that more than just the shared material goes un-focused, but this is not important in the present account.
Translated: There are some events of which one is event-A and one is event-B and these events involved Pale Fire such that event-A's agent is Ivan and it is a past buying and event-B's agent is Ivy and it is a past reading.

Given the sort inferential accommodation suggest above, it is possible to reconstruct Pale Fire into the first conjunct despite its never having been there syntactically. The events all involved Pale Fire and one of them was a buying with Ivan as the agent. It is rather intuitive that Pale Fire be the thing that Ivan bought. Pale Fire was necessarily involved in that event and could hardly make sense with any role other than that of Theme.

This then handles one of the trickier problems with the present approach. Under this semantic account, there is no asymmetry in the inference and thus no privilege to being syntactically related to a given conjunct or not. Both conjuncts are supplied an argument via this inference.

Further, it is the case that the shared material can superficially bear an arbitrary amount of different thematic roles (55) and (56), and this approach is well-suited to accommodating this. The shared material can be divorced from thematic roles and we can avoid requiring a single argument to formally bear multiple thematic roles.

(55) Ivan saw, Ivy was seen by, and Iris gave a flower to, the large police officer.
(56) Iris expected, and soon enough there arrived, a tall dark stranger

That is, for the above sentence the shared material has no particular thematic role at LF and as such it can be inferred into each conjunct without any contradiction.
4.5 Conclusion

In this section I have proposed a means to derive the interpretation of RNR sentence without recourse to a syntactically- or semantically-mediated dependency between the shared material and the first conjunct. Instead, the shared material comes to be presupposed in both conjuncts despite only being syntactically there in the second one. This presupposition effects the correct interpretation without any explicit formal dependency.

This is however merely a possible attempt made in light of the deeper failures of the previous accounts. As is generally the case with scientific inquiry, the analysis of the interpretive dependency given here will surely be shown wrong, but the syntactic background for that analysis seems unavoidable. That is, the fact that the first conjunct cannot hold the shared material must be true if we want to maintain our standard conceptions of syntax.

5 Constraining the dependency

In the previous section I argued against traditional accounts of RNR in favor of one that was free of their restrictions. This seems necessary for RNR but it introduces a very powerful means of dependency formation into the grammar. This dependency holds irrespective of constraints such as islandhood, deleteability, and scope. This raises the question of how this new type of dependency is to be reined in so as not to apply across the board. In this section I explore how to quarantine it to RNR-like constructions.

5.1 C-command
It is clear that the dependency between the shared material and the first conjunct gap can span an island boundary. Why is it not the case that they same sort of dependency can be formed in all instances of cross-island dependency? Why is the sentence in (57) unacceptable?

(57)  *Becky talked to yesterday the old man.

In (57) the relevant dependency between the old man and the complement position of the preposition is blocked for some reason. This is unexpected if all that were required for a dependency to be made was the correct sort of presupposition. Extraposition cases like that one above work similar to RNR in that the rightward element is in some sense presupposed and as such this should work just like RNR. We cannot allow it to be the case that the RNR-relation can apply here.

I posit that syntactic relations enjoy a sort of primacy in grammatical relations and that if a syntactic relation is possible, it must hold. A syntactic relation is possible if the two related elements are in a c-command relation with one another. If we assume that the sole structure building mechanism in syntax is Merge (see Chomsky 1995 and Hornstein 2009) then syntactic dependencies will always necessarily result in c-command. When this c-command relation holds, no other sort of grammatical mediation can supersede it. This means that if a grammatical relation holds across and island boundary, it will lead to an island violation. When there is no c-command relation, no syntactic dependency is forced and as such the dependency cannot possible fail on syntactic grounds.
This is what is happening in RNR. There is no possible syntactic relation (no c-command) and as such islands are irrelevant. In the example in (57), c-command does hold, a syntactic relation is forced across a movement barrier and the sentence is ruled out. This sort of constraint seems intuitive. C-command in the current state of the theory is THE fundamental long-distance syntactic relation and for it to take precedence over the freer presupposition-based relation in RNR is not too radical.

5.2 Deletion

Constraining this RNR-type dependency to just non-c-commanding relations is insufficient. We need a means to rule out the RNR-type dependency for relations that would otherwise be ruled out by constraints on deletion. For example, it must be possible to rule out sentences like (58) where there has been deletion of an object DP, impossible in English.

(58) Joey petted the dog. *Becky fed the dog.

Under the analysis of the meaning of RNR presented here, it is not immediately clear why (58) should be unacceptable given that the dog in the sentence is plausibly presupposed and liable to be interpreted in the gap position following the verb fed without any restrictions.

I posit that the reason that the RNR-type relation cannot hold in (58) is that a deletion analysis is forced. When it is forced and not possible, the result is unacceptable.
like in (58). When it is forced and is possible, the result is something like (59) which is acceptable.

(59)  Joey can swim. Becky can’t swim.

That which forces the deletion is 1) the lack of c-command between the two elements (otherwise a syntactic movement relation would be forced) and 2) the fact that the overt antecedent precedes in null correlate. If these two conditions hold, a deletion analysis must hold and can potentially lead to ungrammaticality if the to-be-deleted element is of a type that is not deletable in that language.

RNR evades these strictures because its directionality differs. The overt element comes after its null counterpart. As such, so deleteability restrictions hold for it. This is seen in (60). When the conjuncts are in opposite orders, deletion must hold and the sentences thus differ in grammaticality in (61).

(60)  a.   Joey petted, and Becky fed, the dog.
       b.   Joey can, but Becky can’t, swim.

(61)  a.   *Joey petted the dog, and Becky fed.
       b.   Joey can swim, but Becky can’t.

This stricture is admittedly less natural than the one concerning c-command (though it finds an ancestor in the literature in the form of the Backwards Anaphora Constrain of Langacker 1969 and Ross
1967) but it suffices to adequately quarantine the very free sort of relation necessary for RNR.\textsuperscript{10}

5.3 Summary

In short, the RNR-type relation based in large part on presupposition is essentially a last option when more primary relations are not applicable. Again, it is important to note that inapplicability does not mean ‘runs afoul of strictures’ but rather that the strictures (such as islandhood) cannot possibly apply. The relation in RNR is simply of a particular type that is not within the purview of traditional syntax and semantics. Given this, a freer option can hold. In a sense, the initial failures of syntax and semantics with respect to RNR end up forcing us to posit that they are all the more central. They hold for when possible and only when not possible does this other dependency hold.

6. Conclusion

In this paper I have argue that RNR poses deep problems for modern syntactic theory. Without recourse to narrowly construction specific mechanisms, our means of capturing the relevant interpretative dependency in RNR fail. It is not the case that they fail on superficial grounds, but rather fundamental ones that cannot easily be explained

\textsuperscript{10} The two restrictions on the applicability of the RNR-relation do not crucially rely on coordination and as such we should expect to find RNR-like relations elsewhere. One such candidate can be found in relative clauses like in (i) below:

(i) The man who loved met the woman who wrote about trees and shrubs.
away. For this reason I posit that there is in fact NO syntactic relation between the shared material and the gap site because there cannot possibly be one.

This leads to a question as to how the meaning of RNR sentences is derived. I have offered a possibility that relies on independent assumptions about the nature of non-focused elements and their role in RNR. Given certain assumptions it is possible to say that the shared material is interpreted as shared in virtue of being restricted in to the event that the first conjunct describes. This sort of restricting in is very free and not subject to locality constraints.

This non-syntactic relation is so free that it must be reined in so as not to rule in every possible dependency that would otherwise be ruled out on syntax-internal grounds. This led me to posit a few conditions under which movement or deletion relations must hold. When these are not applicable, the freer relation can potentially hold.

Whatever the true full account of RNR is, it will play an important role in grammatical theorizing. Either it is the case that we need to re-think our notions of syntactic dependencies or, as I have attempted here, investigate novel means of dependency formation that hold in the absence of traditional ones.


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