

On the Derivation of RNR and its Implications

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On the Derivation of RNR and its Implications*

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1. Introduction

Right Node Raising (RNR), as shown in (1), exhibits theoretically challenging properties for formulating a theory of linearization and interpretation of the constituent shared by two conjuncts.

(1) John loves and Mary hates, syntax.

A basic property of RNR is that the first and the second conjuncts share one constituent somehow under the coordination (I call this ‘the sharing property’ of RNR), and the shared constituent is displaced in the right peripheral position. Proper theory of RNR should provide an answer to the question of how the shared constituent is related with the two conjuncts, appealing to some theoretical apparatuses.

This paper first evaluates the proposals for RNR put forward so far in the literature and it is concluded that RNR is best analyzed as an instance of ellipsis. More specifically, it is derived by the deletion at PF. Furthermore it is argued that the difference between RNR and VP-ellipsis (VPE) in terms of the disjoint reference effects can be accounted for by assuming that they are derived in the different way; the former is derived by PF deletion and the latter is derived by LF copying.

The organization of the paper is as follows: Section 2 overviews and evaluates the three approaches to RNR: the across-the-board rightward movement analysis, the multiple dominance analysis, and the PF deletion analysis. Section 3 discusses the difference between RNR and VPE in terms of the disjoint reference effects and its consequence for the analysis of VPE. Section 4 concludes the paper.

2. RNR as an Instance of Ellipsis

This section overviews and evaluates existing proposals that attempt to explain how the sharing property of RNR is derived. There have been three approaches to RNR proposed in the literature: i) rightward movement analysis (Ross (1967/1986), Postal (1974, 1998), Sabbagh (2007), a.o.), ii) multiple

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dominance analysis, which conceives of phrase markers to allow the ability for two mother nodes to dominate a single constituent (McCawley (1982), Wilder (1999), a.o.), and iii) PF deletion analysis (Wexler and Culicover (1981), Hartmann (2000), a.o.). These three analyses are examined in the following subsections one by one.

2.1 Movement Analysis of RNR

An analysis has been proposed which assumes that the movement of the shared constituent is involved in its derivation. Specifically, RNR is derived by the application of the rightward across-the-board movement of the shared constituent. An illustration of this analysis is given in (2).

(2) John loves [e] and Mary hates [e], [syntax].



The sharing property is naturally followed under this analysis, since the right node raised constituent is originated in two positions.

Several arguments have been provided against the movement analysis of RNR, however. Crucial evidence against the movement analysis is that RNR disobeys constraints posed in general on movement. This fact strongly suggests that syntactic movement is not responsible for the right peripheral position of the shared constituent. Bošković (2004), for example, points out that RNR allows a movement of an element which is otherwise immobile.

(3) a. John asked when, but he didn't ask why, Mary left.

b. I like expensive, and you like cheap, dresses.

(Bošković 2004: 14 footnote 4)

The right node raised elements in (3) cannot move under the leftward movement.

(4) a. *[Mary left]_i John asked when *t_i*.

b. *[Dresses]_i I like expensive *t_i*.

McCloskey (1986) observes that the preposition stranding is allowed under RNR in Irish, in spite of the fact that Irish is generally considered to be a language in which the preposition stranding is not allowed. As shown in (5), the preposition stranding is disallowed under rightward movement.

(5) *Bhí mé ag éisteacht le inné [_{DP} clár mór fada ar an ráidíó
 Was I listen(prog) with yesterday program great long on the radio

faoin toghachán
about-the election

'I was listening yesterday to a great long program on the radio about the election.'

In contrast, the preposition stranding is allowed under RNR, as shown below.

(6) Nil sé in aghaidh an dlí a thuilleadh a bheith ag éisteacht le nó
Is-not it against the law anymore be(-fin) listen(prog) with or
ag breathnu ar [_{DP} ráidió agus teilifís an Iarthair]
look(prog) on radio and television the West(gen)

'It is no longer against the law to listen, or to watch, Western radio and television.'

(McCloskey 1986: 184–5)

It is well attested that island-sensitivity is diagnostic of movement. RNR is, in fact, insensitive to island constraints, which makes a sharp contrast with leftward movement. The examples in (7) illustrate this contrast.

(7) a. *RNR*

John met [someone [who had read]], and Mary met [someone [who had just checked out]],
Syntactic Structures.

b. *Wh-Movement*

*What did John meet [someone [who has read]] and Mary meet [someone [who had just checked out]]?

(Wexler and Culicover (1981: 302))

In (7a) the DP *Syntactic Structures* is displaced in the right peripheral position across the relative clause. In the same fashion, the *wh*-phrase moves left across a relative clause in (7b). One might argue that the contrast in (7) is not unexpected if leftward and rightward movements are assumed to be constrained by different locality condition in the first place and it is a property of rightward movement that disobeys island constraints. In fact, it is controversial whether rightward movement is sensitive to islands constraints. Hartmann (2000) points out that extraposition can be analyzed as involving rightward movement and that it patterns with RNR in terms of disobeying island constraints. The examples from German in (8) illustrate the movement of CP complement out of a complex DP and a relative clause, respectively.

- (8) a. Stefan hat [_{DP} die Behauptung t_i] verbreitet, [_{CP} dass Petra schwanger ist]_i.
 has the rumor spread that pregnant is
 ‘Stefan has spread the rumor that Petra is pregnant.’

- b. Maria hat mal [_{DP} einen Mann t_i] gekannt, [_{CP} der rote Unterwasche trug]_i.
 has once a man know who red underwear wore
 ‘Maria once knew a man who was wearing red underwear.’

(Hertmann 2000: 64–5)

However, it should be noted that RNR departs from extraposition in terms of clause-boundedness. It has been pointed out that rightward movement is constrained by a stricter condition on upward bounding than leftward movement (Ross (1967/1986), Akmajian (1975), a.o.). This upward bounding restriction is dubbed the Right Roof Constraint:¹⁾

(9) *Right Roof Constraint*

Rightward movement may move and right-adjoin an element X to the cyclic node in which X is merged, but no further.

RNR does not pattern alike with extraposition in terms of the Right Roof Constraint, as shown in (10) and (11), where the relevant cyclic nodes are PP and vP:

- (10) a. *Jamie walked [_{PP} into t_i] suddenly, [the dean’s office]_i.

- b. Jamie walked suddenly [_{PP} into t_i], and Maria stormed quickly [_{PP} out of t_i], [the dean’s office]_i.

- (11) a. *Max said that he was going to [_{vP} return t_i to the library] yesterday, [each of the book that he checked out last week]_i.

- b. Josh promised that he would [_{vP} give t_i to Jamie], and Joss claimed that he was going to [_{vP} give t_i to Sue], [all of the answers to the final exam]_i.

(Sabbagh 2007: 350–51)

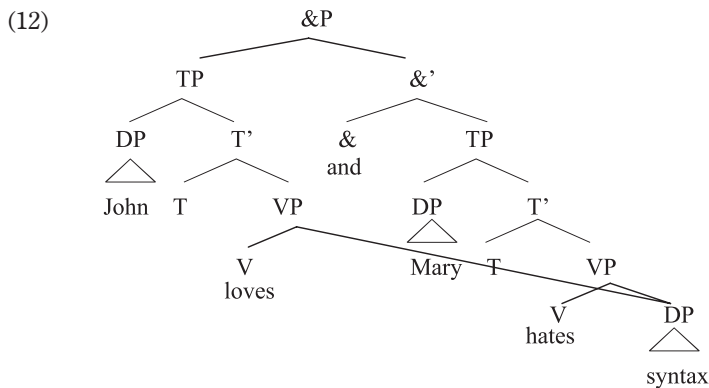
The contrast in (10) shows that the extraposition of the DP *the dean’s office* out of PP in which it

1) Several versions of the formulation of the Right Roof Constrains are available in the literature. The statement in (9) is the version of Sabbagh’s (2007).

is merged is ruled out as shown in (10a), but Right Node Raising of the DP out of PP in which it is merged is fine as exemplified in (10b). The examples in (11) illustrate the same point. As is shown in (11a) extraposition of DP beyond the cyclic node in which it is merged is not allowed. In contrast, the same pattern is fine in the case of RNR, as shown in (11b). It follows that RNR does not obey the Right Roof Constraint, which is a condition on rightward movement. This is unexpected under the movement analysis of RNR and some additional explanations are required to account for the data in (10) and (11). Thus it is concluded that although the movement analysis can provide a straightforward account for the sharing property of RNR, since this property is the result of the across-the-board movement of a single element, as shown in (2), it is not tenable when insensibility of the Right Roof Constraint, which is diagnostic of rightward movement, is taken into consideration.

2.2 The Analysis Based On Multiple Dominance

Another way to capture the sharing property of RNR is to assume that the shared constituent is literally shared by two mother nodes. This analysis assumes that the theory of phrase structure is relaxed to allow multiple dominance, that is, a phrase structure in which a single node is simultaneously dominated by two mother nodes. An illustration of this is given in (12).



In (12) the shared constituent *syntax* is simultaneously dominated by two mother nodes, that is, the VP in the first conjunct and the VP in the second conjunct. Under this analysis the sharing property of RNR is the reflex of phrase structure and nothing else is involved in it.

One of the potential problems in the multiple dominance analysis is how to linearize the shared constituent with respect to other terminals. Let me show how this is problematic by taking an overview of the linearization algorithm proposed in Kayne (1994). The bottom line of his proposal is that linear order is determined by the syntactic relation of c-command. Kayne presumes that if α is asymmetrically c-command β , then α precedes β . The algorithm that produces the linear order is

dubbed the Linear Correspondence Axiom.²⁾

(13) a. *Linear Correspondence Axiom* (LCA)

d(A) is a linear order of T.

b. $T =_{\text{def.}}$ the set of terminals in the tree

c. $A =_{\text{def.}}$ the set of pairs of non-terminals, such that the first member of each pair asymmetrically c-commands the second

d. $d(A) =_{\text{def.}}$ the image of A: the set of pairs of terminals dominated by the pairs in A

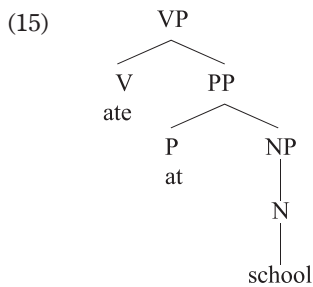
(14) *Well-formedness Condition on a Linearization*³⁾

a. If [x, y], [y, z], then [x, z]. (it's Transitive).

b. For all distinct x and y in a phrase marker, either [x, y] or [y, x]. (it's Total).

c. not ([x, y] and [y, x]). (it's Antisymmetric).

Let me take a simple example to make the LCA concrete.



The set T, the set A, and d(A) for (15) is (16).

(16) a. $T = \{\text{ate, at, school}\}$

b. $A = \{\langle V, P \rangle, \langle P, N \rangle, \langle V, N \rangle, \langle V, NP \rangle\}$

c. $d(A) = \{\langle \text{ate, at} \rangle, \langle \text{at, school} \rangle, \langle \text{ate, school} \rangle\}$

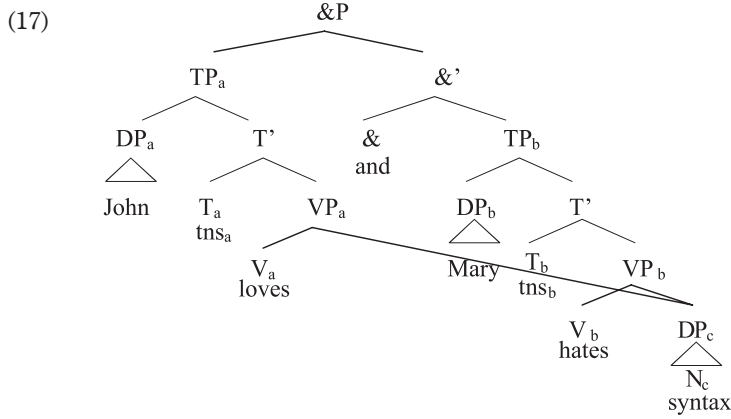
(16c) is transitive, total, and antisymmetric, satisfying the well-formedness condition (14). Thus (16c) produces the expected linear order of 'ate at school.'

Keeping how the LCA works in mind, let me go back to the case of multiple dominance shown in (12),

2) The definitions in (13) and the example in (15) are quoted from Carnie (2008) with slight modification.

3) This is cited from Johnson (2007). The symbols x, y, and z stand for any terminals.

repeated here as (17).



The set T, the set A, and $d(A)$ for (17) is (18).⁴⁾

(18) a. $T = \{\text{John, tns}_a, \text{loves, and, Mary, tns}_b, \text{hates, syntax}\}$

b. $A = \{ \langle \text{TP}_a, \&' \rangle, \langle \text{TP}_a, \& \rangle, \langle \text{TP}_a, \text{TP}_b \rangle, \langle \text{TP}_a, \text{DP}_b \rangle, \langle \text{TP}_a, \text{T}' \rangle, \langle \text{TP}_a, \text{T}_b \rangle, \langle \text{TP}_a, \text{VP}_b \rangle, \langle \text{TP}_a, \text{V}_b \rangle, \langle \text{TP}_a, \text{DP}_c \rangle, \langle \text{TP}_a, \text{N}_c \rangle, \langle \text{DP}_a, \text{T}' \rangle, \langle \text{DP}_a, \text{T}_a \rangle, \langle \text{DP}_a, \text{VP}_a \rangle, \langle \text{DP}_a, \text{V}_a \rangle, \langle \text{DP}_a, \text{DP}_c \rangle, \langle \text{DP}_a, \text{N}_c \rangle, \langle \text{T}_a, \text{V}_a \rangle, \langle \text{T}_a, \text{DP}_c \rangle, \langle \text{T}_a, \text{N}_c \rangle, \langle \text{V}_a, \text{N}_c \rangle, \langle \&, \text{DP}_b \rangle, \langle \&, \text{T}' \rangle, \langle \&, \text{T}_b \rangle, \langle \&, \text{VP}_b \rangle, \langle \&, \text{V}_b \rangle, \langle \&, \text{DP}_c \rangle, \langle \&, \text{N}_c \rangle, \langle \text{DP}_b, \text{T}' \rangle, \langle \text{DP}_b, \text{T}_b \rangle, \langle \text{DP}_b, \text{VP}_b \rangle, \langle \text{DP}_b, \text{V}_b \rangle, \langle \text{DP}_b, \text{DP}_c \rangle, \langle \text{DP}_b, \text{N}_c \rangle, \langle \text{T}_b, \text{V}_b \rangle, \langle \text{T}_b, \text{DP}_c \rangle, \langle \text{T}_b, \text{N}_c \rangle, \langle \text{V}_b, \text{N}_c \rangle \}$

c. $d(A) = \{ \langle \text{John, and} \rangle, \langle \text{John, Mary} \rangle, \langle \text{John, tns}_b \rangle, \langle \text{John, hates} \rangle, \langle \text{John, syntax} \rangle, \langle \text{tns}_a, \text{and} \rangle, \langle \text{tns}_a, \text{Mary} \rangle, \langle \text{tns}_a, \text{tns}_b \rangle, \langle \text{tns}_a, \text{hates} \rangle, \langle \text{tns}_a, \text{syntax} \rangle, \langle \text{loves, and} \rangle, \langle \text{loves, Mary} \rangle, \langle \text{loves, tns}_b \rangle, \langle \text{loves, hates} \rangle, \langle \text{loves, syntax} \rangle, \langle \text{syntax, and} \rangle, \langle \text{syntax, Mary} \rangle, \langle \text{syntax, tns}_b \rangle, \langle \text{syntax, hates} \rangle, \langle \text{syntax, syntax} \rangle, \langle \text{John, tns}_a \rangle, \langle \text{John, loves} \rangle, \langle \text{John, syntax} \rangle, \langle \text{tns}_a, \text{loves} \rangle, \langle \text{tns}_a, \text{syntax} \rangle, \langle \text{loves, syntax} \rangle, \}$

4) I assume here that intermediate projections do not work as c-commanders in order for specifiers to be linearized by the LCA. In (17), TP_a , for example, c-commands $\&'$, but $\&'$ does not c-command TP_a . As a consequence, TP_a asymmetrically c-commands $\&'$. For the status of specifiers in the LCA, see Kayne (1994).

<and, Mary>, <and, tns_b>, <and, hates>, **<and, syntax>**,
 <Mary, tns_b>, <Mary, hates>, **<Mary, syntax>**,
 <tns_b, hates>, <tns_b, syntax>,
 <hates, syntax> }

There are some problems with the ordered pairs in (18c). Five ordered pairs in bold face are violating the well-formedness condition stated in (14). These statements will announce the order of ‘syntax <and < syntax,’ and ‘Mary < syntax < Mary.’ They are not transitive, nor antisymmetric. One way to solve the problems in (18c) is to modify the LCA to allow multiple dominance. Johnson (2007) formulates a linearization algorithm that allows multiple dominance and argues that RNR is a result of multiple dominance, with some machineries to ignore the contradictory ordering pairs.⁵⁾

Another potential problem is that it seems difficult to give an account for the fact that RNR allows the sloppy reading.

- (19) a. John_i loves his_i family, and Fred_j loves his_j family.
 b. John_i loves, and Fred_j loves his_{ij} family.

The pronoun *his* can also be bound by the DP *John* in RNR as is shown in (19b), yielding a sloppy reading. Under the multiple dominance analysis the pronoun *his* should have two meanings at least in spite of the fact that there should be a single the pronoun *his*. It is hard to coin a new machinery that allows for a single singular pronoun to refer to two persons at the same time.

2.3 RNR as an ellipsis

Another approach to the sharing property of RNR is to assume the deletion of the shared constituent under the identity condition at PF. According to the deletion analysis, the sentence in (1) is derived by the deletion of *syntax* in the first conjunct, which is identical to the one in the second conjunct. This is illustrated in (20).

- (20) John loves [~~syntax~~] and Mary hates, syntax.

There are many advantages for this analysis, but I limit myself to mention some of them. The deletion approach can capture the lack of island sensibility of RNR. As shown in the previous subsection, RNR does not obey the Right Roof Constraint. This is exemplified in (10b) and (11b) repeated here as (21a)

5) I will not go into the details of Johnson’s (2007) formulation of linearization algorithm. For the details of it, see his work.

and (21b).

(21) a. Jamie walked suddenly into [~~the dean's office~~], and Maria stormed quickly out of, [the dean's office].

b. Josh promised that he would [_{VP} give [~~all of the answers to the final exam~~] to Jamie], and Joss claimed that he was going to [_{VP} give to Sue], [all of the answers to the final exam].

There is no room for the violation of the constraint posed on the rightward movement in the derivation in (21), since no movement is assumed in (21).

As mentioned in the preceding section RNR induces a sloppy reading when a pronoun is contained in the shared constituent.⁶⁾

(22) a. John_i loves his_i family, and Fred_j loves his_j family. (= (19))

b. John_i loves, and Fred_j loves his_{ij} family.

The pronoun *his* can be bound by the DP *John* and the DP *Fred* under RNR as shown in (22b), yielding a sloppy reading. It is hard for the multiple dominance analysis to give an account for the sloppy reading fact, since the pronoun *his* should have two meanings at least in spite of the fact that there is a single the pronoun *his* under the multiple dominance analysis. On the other hand, the deletion analysis can provide a straightforward account for the availability of sloppy reading, since the availability of sloppy reading is often used to be diagnostic of ellipsis.

I just mention one issue that the deletion analysis encounters.⁷⁾ It is noted that ellipsis can cancel the disjoint reference effects. This is illustrated in (23). (23) is a run-of-the-mill example of VP Ellipsis

6) There is the third reading called the third-party reading.

i) John_i loves his_k family, and Fred_j loves his_k family.

ii) John_i loves, and Fred_j loves his_k family.

The pronoun *his* is bound by someone else other than *John* and *Fred*.

7) One of the potential challenges for the deletion analysis is the case in which the right node raised constituent contains a so-called relational adjective like *same* and *different*.

i) John sang and Mary hummed, the same/different songs.

If this RNR construction is derived by the deletion, as shown in (ii), then it is difficult to obtain the so-called 'sentence internal reading,' which means that the songs which John sang are the same as/different from the songs which Mary hummed. (Carlson (1987), Moltmann (1992), and Beck (2000)), since the structure before being deleted cannot be a source for the internal reading.

(VPE).

(23) I can [_{VP} marry a student that Mary_i teaches] but she_i can't [e].

Under the deletion analysis the source for (23) should be as follows:

(24) I can marry a student that Mary_i teaches but she_i can't [~~marry a student that Mary_i teaches~~].

This is a violation of the Condition C of the Binding theory, with *Mary* bound by *she* in the second conjunct. In spite of the violation of the Condition C, (23) is licit. If RNR is analyzed as an instance of ellipsis, then it would be expected that RNR also exhibits the lack of disjoint reference effects. However, this is not the case.

(25) *She_i talked to [e], and he married, a student that Mary_i knew.

This implies that the phrase *a student that Mary knew* should be in the elided portion of the first conjunct at LF, yielding the Condition C violation. Note that the deletion analysis assumes that the phrase *a student that Mary knew* is merged with P *to* in the first conjunct and it is deleted at PF. The representation of (25) at PF is schematically shown in (26), where the phrase *a student that Mary knew* is deleted.

(26) She talked to [~~a student that Mary knew~~], and he married, a student that Mary knew.

The LF representation is given in (27).

(27) She_i talked to [~~a student that Mary_i knew~~], and he married, a student that Mary_i knew.



ii) John sang the same/different songs and Mary hummed, the same/different songs.

(ii) just has the interpretations of 'John sang several songs which are the same as/different from the ones salient in the discourse and Mary hummed several songs which are the same as/different from the ones salient in the discourse' (external reading in the sense of Carlson (1987)) or 'John sang several songs which are the same/different from each other and Mary hummed several songs which are the same/different from each other.' (reciprocal interpretation in the sense of Beck (2000)).

I leave open for the further research the question of how the derivation of RNR and the interpretation of relational adjectives interact.

In (27) the R-expression *Mary* is bound by *she* and this is the source for the disjoint reference effects. So it seems that the disjoint reference effects follow naturally from the derivation of RNR if we assume the deletion analysis of RNR.

To summarize, RNR is best analyzed as an instance of PF deletion, since the PF deletion analysis can provide accounts of the insensitivity of movement constraint, the availability of sloppy reading, and the disjoint reference effects observed in RNR.

3. Implications for VPE

The remaining problem that requires an explanation is the contrast between VPE and RNR, as shown in the preceding subsection.

(28) a. *VPE*

I can [_{VP} marry a student that *Mary_i* teaches], but *she_i* can't [e]. (= (23))

b. *RNR*

**She_i* talked to [e], and he married, a student that *Mary_i* knew. (= (25))

I argue that what is crucial to distinguish these two instances of ellipsis is the availability of vehicle change in the sense of Fiengo and May (1994). Vehicle change is an operation to give an account for a coreferential interpretation between R-expressions and pronouns which is otherwise in the violation of the Condition C. VPE is often analyzed as an instance of deletion and if the deletion should be operated under strict identity with the antecedent, then (28a) can be analyzed as follows:

(29) I can [_{VP} marry a student that *Mary_i* teaches], but *she_i* can't [~~marry a student that *Mary_i* teaches~~].

However, this is the environment of the Condition C violation and it should be ruled out, contrary to the fact. Fiengo and May propose the operation of vehicle change by which R-expression can be turned into a pronoun. They adopt the LF Copying analysis for VPE. Based on the LF Copying analysis, (28a) should be derived in the following way. First, *Mary* in the antecedent turns into its relevant pronoun *her* as shown in (30) and then the antecedent VP *marry a student that she teaches* is copied into the empty slot in the second conjunct at LF as shown in (31).

(30) I can [_{VP} marry a student that *she_i* teaches], but *she_i* can't [_{VP} e]

(31) I can [_{VP} marry a student that *she_i* teaches], but *she_i* can't [_{VP} marry a student that *she_i* teaches].



(30) is what we need for the LF representation of (28a), which can account for the lack of disjoint reference effects.

I assume that the availability of vehicle change is a source for the contrast in (28). I claim that vehicle change is not a free operation in the sense that it takes place only when some other operation is required at LF. Put it in another words, vehicle change is a kind of interpretive operation and it cannot stand alone, but it always takes place with the other operation which affects the interpretation like LF Copying. No further interpretive operation like LF Copying is required in the case of RNR, since nothing is missing in this case at LF. So the vehicle change is not available to cancel the Condition C violation.

4. Conclusion

In this paper, I argued that RNR is best analyzed as an instance of ellipsis, more specifically the derivation of RNR involves the PF deletion. This analysis can provide an account for the facts observed in RNR, such as the insensitivity of movement constraint, the availability of sloppy reading, and the disjoint reference effects.

It is also showed that the contrast between RNR and VPE in terms of the disjoint reference effects is the reflex of the difference of their derivations. That is, the former is derived by the PF deletion and the latter is derived by LF Copying. The analysis of VPE presented in this paper is theoretically challenging, since it is popular to assume that VPE is derived by the deletion at PF.

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