Medial Right-Node Raising and Multi-Modal Categorial Grammar

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Abstract

Several authors in the recent literature (Wilder 1999; Whitman 2009; Bachrach and Katzir 2008; Yatabe 2012, 2013) have noted an intriguing case of Right-Node Raising (RNR) in which the 'right-node raised' material is not at the right periphery of the right conjunct but is followed by some material contained in it (e.g. *John should fetch and give the book to Mary*). Due to the broken symmetry between the conjuncts, this type of RNR (which I call 'medial RNR' following Yatabe (2012)) is apparently extremely problematic for the like-category constituent coordination analysis of RNR (and of nonconstituent coordination more generally) in categorial grammar (CG). In this paper I argue that medial RNR in fact receives a straightforward analysis in a variant of CG that properly takes into account the interactions between coordination and other phenomena pertaining to word order such as scrambling in Japanese and adverb placement in English. An explicit analysis of medial RNR will be formulated in a variant of Multi-Modal Type-Logical Categorial Grammar developed in Kubota (2010, 2014). This discussion leads us to the conclusion that medial RNR provides yet another type of empirical evidence for an architecture of grammar that separates the surface morpho-phonological component and the combinatoric component of grammar, rather than posing a problem for the like-category coordination analysis of nonconstituent coordination in CG.

Keywords: right-node raising, right-node wrapping, linearization-based HPSG, coordination, Multi-Modal Categorial Grammar

1 The problem of medial Right-Node Raising

Categorial Grammar (CG) is known for a particularly elegant analysis of nonconstituent coordination (NCC)—including both Right-Node Raising (RNR) and Dependent Cluster Coordination (DCC)—which subsumes all cases of NCC under constituent coordination of like categories (see, e.g., Steedman 1985; Dowty 1988; Morrill 1994; Steedman 1996; Kubota to appear). The central hypothesis of the CG analysis of NCC is that strings of words such as *Robin bought* in (1) forms a constituent (of a non-traditional kind), which is then directly coordinated with another constituent of the same category to form a coordinate structure.

(1) Robin bought, and Leslie read, the magazine.

The RNR'ed expression is analyzed as an argument that the higher-order category assigned to the conjuncts (and hence also to the coordinated string) takes as an argument.

Not only does this analysis enable a simple characterization of the basic syntactic patterns of NCC, it has recently been shown by Kubota (2010, to appear) and Kubota and Levine (2014a,b) that it interacts properly with the analyses of various scope-taking expressions to yield the correct interpretations automatically. This includes (but is not limited to) some of the most recalcitrant problems from the literature, such as the problem of the 'internal reading' of *same* in RNR (Abbott 1976; Jackendoff 1977; Gazdar 1981):

(2) John read, and Bill reviewed, the same book.

In the internal reading, the sentence merely asserts that the book that John read and the book that Bill reviewed are identical, without invoking an anaphoric reference to a previously mentioned book. The analysis of examples like (2) has remained a problem in virtually all analyses of coordination in the literature, both in the derivational and nonderivational approaches (see Kubota (to appear); Kubota and Levine (2014a) for a detailed discussion).

Several authors in the recent literature (Wilder 1999; Whitman 2009; Bachrach and Katzir 2008; Yatabe 2012, 2013) have noted a class of examples that at first sight appear to pose a serious challenge to this otherwise very successful analysis of coordination. The problem is illustrated by the following example from Wilder (1999):

(3) John should [fetch] and [give ***the book*** to Mary].

In this example, the material shared between the two conjuncts appears *inside* the second conjunct, rather than to its right (as would be the case in in ordinary cases of RNR like (1) and (2)), since the indirect object *to Mary* is an argument of *give* but not of *fetch*.

Similar examples from English, noted by Whitman (2009), are given in (4).

(4) a. I've got friends in low places, where the whiskey [frowns] and the beer [chases ***my blues*** away].
b. The blast [upended] and [nearly slices ***an armored Chevrolet Suburban*** in half].
c. Please move from the exit rows if you are [unwilling] or [unable] to perform the necessary actions without injury.
d. In the players' box was Tony Nadal, the [uncle] and [coach] of Rafael Nadal since he started playing as a youngster.

Yatabe (2013) notes an even more vexing case from Japanese where the material shared between the two conjuncts is a discontinuous string, split in the middle by some element that belongs solely to the second conjunct.

(5) a. [Taroo-wa hidari-gawa-no manekin-ni makkuro-na], sosite [Hanako-wa awai
Taro-TOP left-side-GEN figure-DAT pitch.black and Hanako-TOP pale
pinku-iro-no ***boosi-o*** migi-gawa-no manekin-ni] **kabuse-ta**.
pink-color-GEN hat-ACC right-side-GEN figure-DAT put-PAST
'Taro put a black hat on the figure on the left and Hanako put a pale pink hat on the figure on the right.'

b. [Mazu me-no-koto-o atira-no], sosite [tuzuite kotira-no ***sensei-ni***
first eye-gen-NMLZ-ACC that-GEN and then this-GEN doctor-DAT
sinzoo-no-koto-o] **soodan-si-masi-ta**.
heart-gen-NMLZ-ACC consult-POL-PAST
'I first consulted with that doctor about my eyes and then with this doctor about my heart.'

c. [Katate-nabe-de 1-rittoru-gurai-no], sosite [sore-to heikoo-si-te tyoodo
pan-with 1-liter-about-GEN and that-with in.parallel just
5-rittoru-no ***oyu-o*** huka-nabe-de] **wakasi-masu**.
5-liter-GEN water-ACC deep-pot-with boil-POL
'Boil about 1ℓ of water in a pan and exactly 5ℓ of water in a pot simultaneously.'

In (5a), for example, the left conjunct is missing both the head noun for the prenominal modifier *makkuro-na* 'pitch black' and the sentence-final verb *kabuse-ta* 'put'. While the shared verb appears to the right of the right conjunct, the shared head noun *boosi-o* 'hat' is buried inside the second conjunct, split from the right-peripheral shared verb by a dative NP belonging solely to the right conjunct. Following Yatabe (2012), I call this type of Right-Node Raising (RNR) (encompassing both the English examples in (3)–(4) and the more complex Japanese data in (5)) MEDIAL RNR. As Yatabe (2012) notes, these examples pose a serious challenge to (at least the simplest formulation of) the CG-based analysis of RNR, since the second conjunct contains within itself what would have to be 'factored out' to the right of both conjuncts as the RNR'ed material in order for such an analysis to succeed.

These facts have not been completely overlooked in the CG literature. Indeed, Whitman (2009) proposes an analysis for a subset of the data in (4) in terms of WRAPPING (Bach 1979). Wrapping is a mechanism proposed in the early literature of CG/Montague grammar which treats discontinuous constituency in verb-particle constructions and related phenomena via a surface reordering operation. In a wrapping-based analysis, (6) is derived by first combining the verb and the particle to form an 'underlying' constituent, and the direct object of this 'complex transitive verb' is infixed right next to the verb in the surface string representation.

(6) The whiskey chases my blues away.

According to Whitman (2009), at least some of the examples in (4) can be subsumed under like-category coordination by taking into consideration this word order surface anomaly manifest in wrapping. Specifically, in (4a), the two conjuncts *the whiskey drowns* and *the beer chases away* form a coordinate structure before the shared NP is wrapped around by the verb-particle pair belonging to the second conjunct. After the shared NP is taken as an argument by the whole coordinated S/NP, surface restructuring induces the 'infixation' of the direct object *my blues* between the verb and the particle of the second conjunct, just as in the simpler case of verb-particle construction in (6). Thus, Whitman's analysis reduces the apparent anomaly of (a certain subset of) medial RNR to an independently motivated word-order anomaly exhibited by expressions that induce the 'wrapping' operation.

The key idea behind Whitman's proposal is that the apparently exceptional patterns of RNR in medial RNR can be reduced to independent word-order properties of the 'offending' elements. Though this general idea seems essentially on the right track, attributing the word order variation to the wrapping operation specifically is too restrictive. Indeed, Whitman

himself notes that his wrapping-based analysis does not extend to all of the data that he discusses. For example, (4c) is problematic since the adverbial phrase *without injury* modifies the lower verb *perform* rather than the adjective *unable*. Thus, a wrapping analysis that takes *unable without injury* to be a combinatoric unit that wraps around the infinitival VP is semantically implausible. In (4d), the *since*-clause modifies the proposition that Tony Nadal is a coach of Rafael Nadal, and hence, Whitman argues, *coach since ...* cannot be taken to be a discontinuous constituent that wraps around *of Rafael Nadal*.

Moreover, as Yatabe (2012) notes, Whitman's approach does not extend to the more complex Japanese examples in (5), since there is no independent motivation that the word order variations in these examples are licensed by a mechanism analogous to the wrapping operation traditionally recognized in the CG literature for phenomena like verb-particle constructions.

Considerations of the above facts have led some authors (most notably, Yatabe (2012, 2013)) to argue that the CG analysis of coordination is empirically inadequate, and that other approaches (such as ones based on surface deletion (Yatabe 2001; Crysmann 2003; Beavers and Sag 2004; Chaves 2007), or multi-dominance (Bachrach and Katzir 2007, 2008)) are superior since they can accommodate such data more easily. The purpose of the present paper is to formulate an analysis of medial RNR in a variant of Multi-Modal Type-Logical Categorial Grammar developed in Kubota (2010, 2014). I show that the medial RNR pattern exemplified by the data in Japanese and English above actually falls out as an immediately consequence of the CG analysis of RNR, once the interaction between RNR and independently motivated word-order properties in the respective languages is properly taken into account.

Given the overall success of CG in analyzing the syntax-semantics interface of coordination, the challenge posed by the medial RNR pattern is an important issue to be addressed. The fact that a natural solution for this problem becomes available once we enrich the syntax-(morpho)phonology interface thus suggests that the sort of multi-modal architecture of the syntax-morphophonology interface embodied in certain variants of CG (e.g., Dowty 1996; Moortgat and Oehrle 1994; Muskens 2007; Kubota 2014) is indispensable, and that this enriched surface morphophonological component needs to be coupled with a flexible combinatoric component for the syntax-semantics interface to account for the complex interactions between phenomena that affect semantic interpretation (such as coordination) and those that affect word order (such as scrambling), reinforcing the main conclusions of Kubota (2014).

2 Multi-Modal Type-Logical Categorial Grammar

In this section, I provide a brief overview of the version of Multi-Modal Type-Logical Categorial Grammar (Multi-Modal TLCG) developed in Kubota (2010, 2014). For space considerations, I assume basic familiarity with CG. The reader is referred to Kubota (to appear) and Kubota and Levine (2014a) for this background. The notion of 'multi-modality' (which has nothing to do with the notion of modality as understood in the semantics literature) was first introduced in CG by Dowty (1996). Dowty sketches an architecture of syntactic theory in which the combinatoric component pertaining to predicate-argument structure and semantic composition (called 'tectogrammar' following Curry (1961)) is separated from a component that deals with surface word order ('phenogrammar').[1] Building on the proposals by Morrill and Solias (1993), Morrill (1994), Moortgat and Oehrle (1994) and Bernardi (2002), Kubota

[1]The same basic idea has been implemented in HPSG by Reape (1996); Kathol (1995, 2000).

(2010, 2014) implements this idea explicitly within TLCG by positing different 'modes of composition' in the phenogrammatical component, where these modes essentially encode different degrees of tightness of bond between morphemes (as reflected in surface word order). Below, I present a simplified fragment based on Kubota's system and illustrate its workings.

Unlike in the original Lambek calculus, in a multi-modal system, phonological representations of linguistic expressions have richer structures than strings. Such 'enriched' phonological representations are called ABSTRACT PHONOLOGIES. In abstract phonologies, morphemes are combined with one another via one of the abstract modes of composition. For example, a mode called the SCRAMBLING MODE ($\circ\!\!\cdot$) is posited to account for the relative free order among dependents of a verb within a local clause in Japanese. Thus, the sentence *Taroo-ga Hanako-o mi-ta* ('Taro saw Hanako') is assigned the following abstract phonology:

(7) taroo-ga $\circ\!\!\cdot$ (hanako-o $\circ\!\!\cdot$ mi-ta)

To capture the property of the scrambling mode, the following two DEDUCIBILITY RELATIONS are posited in the surface morpho-phonological component:

(8) SCRAMBLING
$A \circ\!\!\cdot (B \circ\!\!\cdot C) \leq B \circ\!\!\cdot (A \circ\!\!\cdot C)$

(9) PRONUNCIATION
$A \circ_i B \leq A \circ B$ (where $\circ_i$ is any abstract mode)

(8) essentially says that elements combined in the scrambling mode can be reordered with each other, except for the rightmost one (corresponding to the head verb). (9) converts an abstract phonology to an actually pronounceable string (thus, $\circ$ designates string concatenation).

With these, the relation in (10) holds, according to which the underlying abstract phonology (7) is deducible to (i.e. can be instantiated by) the OSV string *Hanako-o Taroo-ga mi-ta*.

(10) taroo-ga $\circ\!\!\cdot$ (hanako-o $\circ\!\!\cdot$ mi-ta)
$\leq$ hanako-o $\circ\!\!\cdot$ (taroo-ga $\circ\!\!\cdot$ mi-ta) (by Scrambling (8))
$\leq$ hanako-o $\circ$ (taroo-ga $\circ$ mi-ta) (by Pronunciation (9))

Modality specifications are encoded as part of the lexical subcategorization properties of functor expressions. Thus, in a multi-modal system, forward and backward slashes now come with modality specifications, as in the following lexical entry for the transitive verb *mi-ta*:

(11) mi-ta; see; $\mathrm{NP}_a\backslash.\mathrm{NP}_n\backslash.\mathrm{S}$

The Introduction and Elimination rules for the slashes are accordingly modified to reflect this modality encoding on slashes. Specifically, both types of rules make sure that the modality encoded in the (used or derived) functor matches the modality employed in combining its phonology with the phonology of its argument. In the labelled deduction presentation of the calculus (Oehrle 1994; Morrill 1994) adopted by Kubota (2010), where deduction rules are written in the format in which both the premises and the conclusion consist of tuples $\langle \phi, \sigma, \kappa \rangle$ of phonological form (ϕ), semantic translation (σ), and syntactic category (κ) (representing the 'input' and 'output' linguistic expressions, respectively), this amounts to (re-)defining the Introduction and Elimination rules for slashes in the following way:

(12) a. Forward Slash Elimination

$$\frac{\mathsf{a};\ \boldsymbol{\mathcal{F}};\ A/_iB \qquad \mathsf{b};\ \boldsymbol{\mathcal{G}};\ B}{\mathsf{a} \circ_i \mathsf{b};\ \boldsymbol{\mathcal{F}}(\boldsymbol{\mathcal{G}});\ A}\ /_i\mathrm{E}$$

b. Backward Slash Elimination

$$\frac{\mathsf{b};\ \boldsymbol{\mathcal{G}};\ B \qquad \mathsf{a};\ \boldsymbol{\mathcal{F}};\ B\backslash_iA}{\mathsf{b} \circ_i \mathsf{a};\ \boldsymbol{\mathcal{F}}(\boldsymbol{\mathcal{G}});\ A}\ \backslash_i\mathrm{E}$$

(13) a. Forward Slash Introduction

$$\frac{\begin{array}{ccccccc}\vdots & \vdots & \underline{[\varphi;\ x;\ A]^n} & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ \end{array}}{\begin{array}{c}\mathsf{b} \circ_i \varphi;\ \boldsymbol{\mathcal{F}};\ B \\ \hline \mathsf{b};\ \lambda x.\boldsymbol{\mathcal{F}};\ B/_iA \end{array}\ /_i\mathrm{I}^n}$$

b. Backward Slash Introduction

$$\frac{\begin{array}{ccccccc}\vdots & \vdots & \underline{[\varphi;\ x;\ A]^n} & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ \end{array}}{\begin{array}{c}\varphi \circ_i \mathsf{b};\ \boldsymbol{\mathcal{F}};\ B \\ \hline \mathsf{b};\ \lambda x.\boldsymbol{\mathcal{F}};\ A\backslash_iB \end{array}\ \backslash_i\mathrm{I}^n}$$

The calculus additionally recognizes the 'Prosodic-Interface (PI) rule' (14), so that syntactic derivations can make reference to the deducibility relations between abstract phonologies.

(14) PI rule

$$\frac{\varphi_0;\ \boldsymbol{\mathcal{F}};\ A}{\varphi_1;\ \boldsymbol{\mathcal{F}};\ A}\ \mathrm{PI}$$

——where $\varphi_0 \leq \varphi_1$ holds in the prosodic calculus

The following derivation illustrates how the grammar licenses the OSV word order with the lexical entry for the transitive verb given in (11) (here and in what follows, I omit parentheses for string phonologies since hierarchical structures are irrelevant for them):

(15)

$$\dfrac{\dfrac{\mathsf{taroo\text{-}ga};\ \mathbf{t};\ \mathrm{NP}_n \qquad \dfrac{\mathsf{hanako\text{-}o};\ \mathbf{h};\ \mathrm{NP}_a \quad \mathsf{mi\text{-}ta};\ \mathbf{saw};\ \mathrm{NP}_a\backslash.\mathrm{NP}_n\backslash.\mathrm{S}}{\mathsf{hanako\text{-}o} \circ\!\!\bullet\ \mathsf{mi\text{-}ta};\ \mathbf{saw}(\mathbf{h});\ \mathrm{NP}_n\backslash.\mathrm{S}}\ \backslash.\mathrm{E}}{\mathsf{taroo\text{-}ga} \circ\!\!\bullet\ (\mathsf{hanako\text{-}o} \circ\!\!\bullet\ \mathsf{mi\text{-}ta});\ \mathbf{saw}(\mathbf{h})(\mathbf{t});\ \mathrm{S}}\ \backslash.\mathrm{E}}{\mathsf{hanako\text{-}o} \circ \mathsf{taroo\text{-}ga} \circ \mathsf{mi\text{-}ta};\ \mathbf{saw}(\mathbf{h})(\mathbf{t});\ \mathrm{S}}\ \mathrm{PI}$$

Combining the verb with its two arguments via Slash Elimination yields the abstract phonology in (7). This abstract phonology is then mapped to the surface string corresponding to the OSV order via the PI rule, which in turn is licensed by the deducibility relation in (10).

As an illustration of how the Introduction/Elimination rules and the PI rule interacts in the present system, (16) shows how an alternative entry for a transitive verb that 'directly' yields the OSV order is obtained from the lexically specified entry in (11).

(16)

$$\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{[\varphi_1;x;\mathrm{NP}_n]^1 \qquad \dfrac{[\varphi_2;y;\mathrm{NP}_a]^2 \quad \mathsf{mi\text{-}ta};\ \mathbf{saw};\ \mathrm{NP}_a\backslash.\mathrm{NP}_n\backslash.\mathrm{S}}{\varphi_2 \circ\!\!\bullet\ \mathsf{mi\text{-}ta};\ \mathbf{saw}(y);\ \mathrm{NP}_n\backslash.\mathrm{S}}\ \backslash.\mathrm{E}}{\varphi_1 \circ\!\!\bullet\ (\varphi_2 \circ\!\!\bullet\ \mathsf{mi\text{-}ta});\ \mathbf{saw}(y)(x);\ \mathrm{S}}\ \backslash.\mathrm{E}}{\varphi_2 \circ\!\!\bullet\ (\varphi_1 \circ\!\!\bullet\ \mathsf{mi\text{-}ta});\ \mathbf{saw}(y)(x);\ \mathrm{S}}\ \mathrm{PI}}{\varphi_1 \circ\!\!\bullet\ \mathsf{mi\text{-}ta};\ \lambda y.\mathbf{saw}(y)(x);\ \mathrm{NP}_a\backslash.\mathrm{S}}\ \backslash.\mathrm{I}^2}{\mathsf{mi\text{-}ta};\ \lambda x\lambda y.\mathbf{saw}(y)(x);\ \mathrm{NP}_n\backslash.\mathrm{NP}_a\backslash.\mathrm{S}}\ \backslash.\mathrm{I}^1$$

After the verb is combined with its (hypothetically assumed) two arguments, the PI rule reverses the order between the subject and the object. This has the effect of reversing the order of arguments in the 'derived' entry, via the successive applications of the two Introduction rules. Importantly, since the Introduction and Elimination rules preserve the modality specifications, the scrambling mode lexically encoded in the original transitive verb entry in (11) is retained in the derived entry in (16) for both arguments.

3 Medial RNR in Multi-Modal TLCG

The basic idea of the analysis of medial RNR I propose below is very simple: examples like those in (5) from Yatabe (2013) are grammatical since the substring consisting of the right conjunct and the RNR'ed material, if taken by itself, is a well-formed sentence. As I show below, if we allow for the possibility that elements in the right conjunct are reordered with the RNR'ed material *after* the coordinate structure is built, this pattern falls out immediately.

Before moving on, a remark is in order regarding the status of the Coordinate Structure Constraint (CSC). My analysis below rests on the premise that the CSC is not a syntactic constraint (at least for the relevant reordering operations). One might find this assumption objectionable (as Yatabe (2013) indeed does). However, there are convincing arguments in the literature that the CSC is not a syntactic constraint (Lakoff 1986; Deane 1991; Kehler 2002), which is further corroborated by Kubota and Lee's (2014) thorough cross-linguistic study on Japanese and Korean. I thus take the CSC to be a defeasible pragmatic principle, which obtains only when 'parallel' discourse relations hold between the two conjuncts.[2]

3.1 RNR in Multi-Modal TLCG

In multi-modal CG, restructuring of constituency that gives rise to non-standard constituents that appear in NCC is licensed by hypothetical reasoning if and only if all of the modes of composition involved in putting together the relevant expressions are associative (see Kubota (2014) for a more detailed discussion of this point). Since argument clusters like *Taroo-ga Hanako-o* can be coordinated, I assume that the scrambling mode is associative, meaning that it (together with the ASSOCIATIVE MODE $\circ_\diamond$ introduced below) satisfies the following two deducibility relations:

(17) RIGHT ASSOCIATION
$A \circ_i (B \circ_j C) \leq (A \circ_i B) \circ_j C \qquad (\circ_i, \circ_j \in \{\circ_\bullet, \circ_\diamond\})$

(18) LEFT ASSOCIATION
$(A \circ_i B) \circ_j C \leq A \circ_i (B \circ_j C) \qquad (\circ_i, \circ_j \in \{\circ_\bullet, \circ_\diamond\})$

For a reason that will become clear below, I posit a special mode of composition for coordination ($\circ_\mathsf{c}$), called the COORDINATION MODE. Thus, the conjunction has the following lexical entry:

(19) $\mathsf{sosite};\ \sqcap;\ (X\backslash_\mathsf{c}X)/_\mathsf{c}X$

This enables an analysis of (20) given in (21).

(20) [Taroo-ga Hanako-o], sosite [Ziroo-ga Mitiko-o] mi-ta.
Taro-NOM Hanako-ACC and Jiro-NOM Michiko-ACC see-PAST
'Taro saw Hanako and Jiro saw Michiko.'

[2]Note that the medial RNR examples in (5) (at least (5b,c)) arguably instantiate the 'non-parallel' Contiguity relation (rather than Resemblance/Parallel) in Kehler's (2002) terminology, for which the CSC is not applicable. In (5b) and (5c), the events described by the two conjuncts are both part of a larger event (most plausibly, of hospital visit and cooking, respectively). (5a) may also be construed in this way as well; the expressions *hidari-gawa-no* 'on the left' and *migi-gawa-no* 'on the right' imply that Taro and Hanako are working together, simultaneously engaged in some common larger activity (of, say, setting up figures for display).

(21)

$$
\dfrac{
\dfrac{\textsf{taroo-ga};\ \mathbf{t}; \mathrm{NP}_n \quad \dfrac{\textsf{hanako-o};\ \mathbf{h}; \mathrm{NP}_a \quad [\varphi; P; \mathrm{NPa}\backslash_{.}\mathrm{NP}_n\backslash_{.}\mathrm{S}]^1}{\textsf{hanako-o} \circ_{.} \varphi;\ P(\mathbf{h}); \mathrm{NP}_n\backslash_{.}\mathrm{S}}\backslash_{.}\mathrm{E}}{\dfrac{\dfrac{\textsf{taroo-ga} \circ_{.} (\textsf{hanako-o} \circ_{.} \varphi);\ P(\mathbf{h})(\mathbf{t}); \mathrm{S}}{(\textsf{taroo-ga} \circ_{.} \textsf{hanako-o}) \circ_{.} \varphi;\ P(\mathbf{h})(\mathbf{t}); \mathrm{S}}\mathrm{PI}}{\textsf{taroo-ga} \circ_{.} \textsf{hanako-o};\ \lambda P.P(\mathbf{h})(\mathbf{t}); \mathrm{S}/_{.}(\mathrm{NPa}\backslash_{.}\mathrm{NP}_n\backslash_{.}\mathrm{S})}/_{.}\mathrm{I}^1}\backslash_{.}\mathrm{E}
\quad
\dfrac{\textsf{sosite};\ \sqcap; (X\backslash_{\mathsf{c}}X)/_{\mathsf{c}}X \quad \begin{matrix}\vdots \quad \vdots \\ \textsf{ziroo-ga} \circ_{.} \textsf{mitiko-o}; \\ \lambda P.P(\mathbf{m})(\mathbf{j}); \\ \mathrm{S}/_{.}(\mathrm{NPa}\backslash_{.}\mathrm{NP}_n\backslash_{.}\mathrm{S})\end{matrix}}{\textsf{sosite} \circ_{\mathsf{c}} (\textsf{ziroo-ga} \circ_{.} \textsf{mitiko-o});\ \lambda G.G \sqcap \lambda P.P(\mathbf{m})(\mathbf{j}); (\mathrm{S}/_{.}(\mathrm{NPa}\backslash_{.}\mathrm{NP}_n\backslash_{.}\mathrm{S}))\backslash_{\mathsf{c}}(\mathrm{S}/_{.}(\mathrm{NPa}\backslash_{.}\mathrm{NP}_n\backslash_{.}\mathrm{S}))}/_{c}\mathrm{E}
}{(\textsf{taroo-ga} \circ_{.} \textsf{hanako-o}) \circ_{\mathsf{c}} (\textsf{sosite} \circ_{\mathsf{c}} (\textsf{ziroo-ga} \circ_{.} \textsf{mitiko-o}));\ \lambda P.P(\mathbf{h})(\mathbf{t}) \sqcap \lambda P.P(\mathbf{m})(\mathbf{j}); \mathrm{S}/_{.}(\mathrm{NPa}\backslash_{.}\mathrm{NP}_n\backslash_{.}\mathrm{S})}\backslash_{c}\mathrm{E}
$$

$$
\dfrac{\dfrac{\ldots \quad \textsf{mi-ta};\ \mathbf{saw}; \mathrm{NP}_a\backslash_{.}\mathrm{NP}_n\backslash_{.}\mathrm{S}}{((\textsf{taroo-ga} \circ_{.} \textsf{hanako-o}) \circ_{\mathsf{c}} (\textsf{sosite} \circ_{\mathsf{c}} (\textsf{ziroo-ga} \circ_{.} \textsf{mitiko-o}))) \circ_{.} \textsf{mi-ta};\ \mathbf{saw}(\mathbf{h})(\mathbf{t}) \wedge \mathbf{saw}(\mathbf{m})(\mathbf{j}); \mathrm{S}}/_{.}\mathrm{E}}{\textsf{taroo-ga} \circ \textsf{hanako-o} \circ \textsf{sosite} \circ \textsf{ziroo-ga} \circ \textsf{mitiko-o} \circ \textsf{mi-ta};\ \mathbf{saw}(\mathbf{h})(\mathbf{t}) \wedge \mathbf{saw}(\mathbf{m})(\mathbf{j}); \mathrm{S}}\mathrm{PI}
$$

Here, after the hypothetical transitive verb is combined with the two arguments that it subcategorizes for, the PI rule applies to restructure the abstract phonology of the sentence so that the hypothetically assumed φ appears on the right periphery. Crucially, the restructuring is possible here since the two arguments of the verb are combined with the verb in a mode that satisfies Right Association (17). By this restructuring, Forward Slash Introduction becomes applicable to derive the string *Taroo-ga Hanako-o* in the category $\mathrm{S}/_{.}(\mathrm{NPa}\backslash_{.}\mathrm{NP}_n\backslash_{.}\mathrm{S})$. The rest of the derivation just involves coordinating the derived expression with another expression of the same type and combining it with the missing transitive verb.

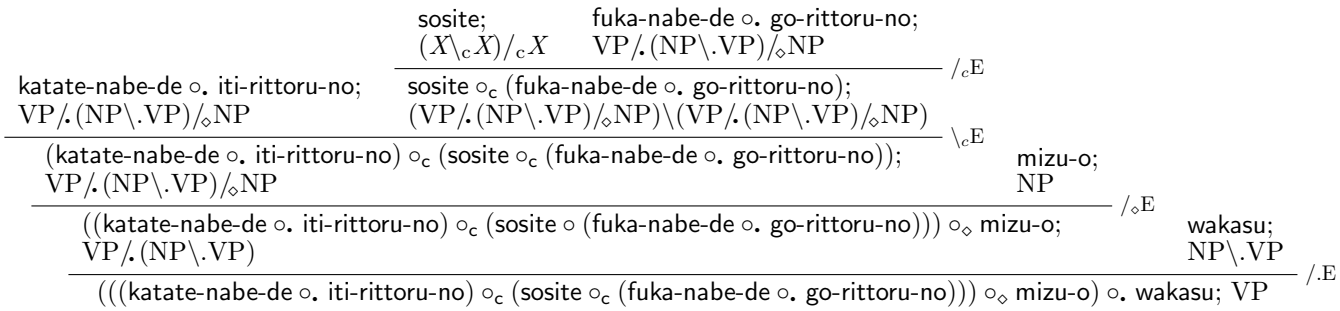
More complex example like (22) are derived in essentially the same way. In (22), the prenominal modifier is left stranded in each conjunct from the RNR'ed head noun. To derive this example, it just suffices to assume that the mode of composition employed for putting together the prenominal modifier and the head noun is also associative.

(22) [Katate-nabe-de iti-rittoru-no], sosite [huka-nabe-de go-rittoru-no] oyu-o
pan-with 1-liter-about-GEN and deep-pot-with 5-liter-GEN water-ACC
wakasi-masu.
boil-POL
'Boil 1 liter of water in a pan and boil 5 liters of water in a deep pot.'

But since, unlike arguments of verbs, prenominal modifiers alone do not undergo scrambling, a separate mode $\circ_{\diamond}$ is posited, to which only Left and Right Association ((17) and (18)) are applicable. The analysis of RNR, then, is essentially parallel to the case of (20) in (21) above (here, VP abbreviates $\mathrm{NP}_n\backslash_{.}\mathrm{S}$, and in this and other derivations below, I omit the semantics).

(23)

$$
\dfrac{\dfrac{\dfrac{\dfrac{\textsf{katate-nabe-de};\ \mathrm{VP}/_{.}\mathrm{VP} \quad \dfrac{\dfrac{\textsf{iti-rittoru-no};\ \mathrm{NP}/_{\diamond}\mathrm{NP} \quad [\varphi_1; \mathrm{NP}_a]^1}{\textsf{iti-rittoru-no} \circ_{\diamond} \varphi_1;\ \mathrm{NP}}/_{\diamond}\mathrm{E} \quad [\varphi_2; \mathrm{NP}\backslash_{.}\mathrm{VP}]^2}{(\textsf{iti-rittoru-no} \circ_{\diamond} \varphi_1) \circ_{.} \varphi_2;\ \mathrm{VP}}\backslash_{.}\mathrm{E}}{\textsf{katate-nabe-de} \circ_{.} ((\textsf{iti-rittoru-no} \circ_{\diamond} \varphi_1) \circ_{.} \varphi_2);\ \mathrm{VP}}/_{.}\mathrm{E}}{((\textsf{katate-nabe-de} \circ_{.} \textsf{iti-rittoru-no}) \circ_{\diamond} \varphi_1) \circ_{.} \varphi_2;\ \mathrm{VP}}\mathrm{PI}}{(\textsf{katate-nabe-de} \circ_{.} \textsf{iti-rittoru-no}) \circ_{\diamond} \varphi_1;\ \mathrm{VP}/_{.}(\mathrm{NP}\backslash_{.}\mathrm{VP})}/_{.}\mathrm{I}^2}{\textsf{katate-nabe-de} \circ_{.} \textsf{iti-rittoru-no};\ \mathrm{VP}/_{.}(\mathrm{NP}\backslash_{.}\mathrm{VP})/_{\diamond}\mathrm{NP}_a}/_{.}\mathrm{I}^1
$$



Here again, the crucial step is the restructuring of the phonology (shown on the fifth line of the first chunk). This restructuring enables assigning the category $\mathrm{VP}/.(\mathrm{NP}\backslash.\mathrm{VP})/_\diamond\mathrm{NP}$ to the 'nonconstituent' conjuncts.

As should be clear from the above, in this multi-modal system, whether or not a particular substring of a sentence can be reanalyzed as a (non-traditional) constituent that can be coordinated depends on whether restructuring of the abstract phonology is possible. This predicts that in environments in which such restructuring of the internal constituency is disallowed for independent reasons, NCC should be impossible. This prediction is born out by the patterns of NCC observed in certain types of complex predicates and nominal compounding constructions in Japanese as discussed in Kubota (2014, to appear). Thus, the present multi-modal approach receives support not only from the flexible notion of constituency which enables a straightforward analysis of otherwise recalcitrant examples such as (22), but also from the way in which such flexibility is systematically restricted to prevent overgeneration.

3.2 Medial RNR via 'reanalysis' of constituency

From the analysis of prenominal modifier stranding RNR in (23), it is only a small step to the medial RNR case in (5c). In fact, all we need to do is to allow for a restructuring possibility in which a substring of the whole coordinate structure corresponding to the right conjunct is 'detached' from the coordinate structure and forms a unit with the RNR'ed material. For this purpose, I assume that the coordination mode allows for a restricted mode of restructuring whereby elements inside the coordinate structure are all allowed to move out of the coordinate structure but expressions that originally do not belong to a coordinate structure are not allowed to be restructured to be part of the coordinate structure. This can be achieved by recognizing the following Mixed Association rules ('mixed' in the sense that, unlike the rules introduced above, these rules involve multiple modes in the specifications of input and output expressions).

(24) Mixed Right Association
$A \circ_i (B \circ_c C) \leq (A \circ_i B) \circ_c C \qquad (\circ_i \in \{\circ_\diamond, \circ.\})$

(25) Mixed Left Association
$(A \circ_c B) \circ_i C \leq A \circ_c (B \circ_i C) \qquad (\circ_i \in \{\circ_\diamond, \circ.\})$

Importantly, there are no counterparts of these rules in which the modes $\circ_i$ and $\circ_c$ are switched from each other (e.g. $A \circ_c (B \circ_i C) \leq (A \circ_c B) \circ_i C$, with $\circ_i \in \{\circ_\diamond, \circ.\}$). This

effectively ensures that 'extraction' out of a coordinate structure is allowed but 'infixation' into a coordinate structure isn't.

With these deducibility relations in place, the abstract phonology obtained at the end of the derivation in (23) can be further restructured as follows, where, after restructuring, the right conjunct forms a unit with the RNR'ed material:

(26) (((katate-nabe-de $\circ$. iti-rittoru-no) $\circ_c$ (sosite $\circ_c$ (fuka-nabe-de $\circ$. go-rittoru-no))) $\circ_\diamond$ mizu-o) $\circ$. wakasu
$\leq$ (katate-nabe-de $\circ$. iti-rittoru-no) $\circ_c$ (sosite $\circ_c$ (fuka-nabe-de $\circ$. ((go-rittoru-no $\circ_\diamond$ mizu-o) $\circ$. wakasu)))

The string consisting of the right conjunct and the RNR'ed material is in effect 'reanalyzed' as forming a full-fledged sentence by itself. Given this reanalysis, it straightforwardly follows that co-arguments of this reanalyzed sentence can be scrambled with each other.

(27) (katate-nabe-de $\circ$. iti-rittoru-no) $\circ_c$ (sosite $\circ_c$ (fuka-nabe-de $\circ$. ((go-rittoru-no $\circ_\diamond$ mizu-o) $\circ$. wakasu)))
$\leq$ (katate-nabe-de $\circ$. iti-rittoru-no) $\circ_c$ (sosite $\circ_c$ ((go-rittoru-no $\circ_\diamond$ mizu-o) $\circ$. (fuka-nabe-de $\circ$. wakasu)))
$\leq$ katate-nabe-de $\circ$ iti-rittoru-no $\circ$ sosite $\circ$ go-rittoru-no $\circ$ mizu-o $\circ$ fuka-nabe-de $\circ$ wakasu

We thus obtain the surface word order in (5c). The other examples in (5) can be derived analogously. In short, in the present multi-modal setup, the possibility of medial RNR straightforwardly falls out from an interaction between independently motivated analyses of RNR and scrambling, once we allow for a possibility that the right conjunct is reanalyzed to form a unit with the RNR'ed material in the morpho-phonological representation.

A comparison is perhaps useful at this point with an ellipsis-based analysis that Yatabe (2012, 2013) proposes. In contrast to the present analysis, in which the existence of medial RNR is almost an immediate prediction, the ellipsis-based analysis Yatabe advocates can capture the relevant empirical pattern only by a brute-force stipulation: in order to accommodate the medial RNR pattern, Yatabe relaxes the condition on the relevant deletion operation so that the counterpart of the deleted string in the final conjunct can be discontinuous. However, unlike the multi-modal CG analysis proposed above, such an account leaves unexplained why it is the matching string in the final conjunct and not the deleted string itself that can be discontinuous. It then seems reasonable to conclude that, contrary to Yatabe's claim, the existence of medial RNR actually provides additional support for the analysis of NCC in CG, rather than pose a challenge for it.

Note also that, though the underlying analytic intuition is very simple, the present analysis crucially relies on a key feature of contemporary variants of multi-modal CG embodied in Kubota (2014) wherein grammatical inferences pertaining to the surface word order mediated by the PI rule is interspersed with inferences pertaining to the combinatoric component of grammar mediated by the logical rules of Slash Introduction and Elimination. (The PI rule applies both *before* and *after* the coordinate structure is formed, which is mediated by the Slash Elimination rule.) This is a property that is not shared with other grammatical theories (including both the derivational and nonderivational variants of generative grammar). Thus, to the extent that the above analysis successfully captures the patterns of medial RNR, it provides yet another type of empirical evidence for the general architecture of grammar that uniquely characterizes contemporary multi-modal variants of CG.

3.3 Extending the analysis to English

It turns out that the present proposal extends straightforwardly to English data that Whitman (2009) identifies as being problematic for his wrapping-based approach.[3] The relevant examples are repeated in (28).[4]

(28) a. Please move from the exit rows if you are [unwilling] or [unable] to perform the

[3]For examples like (4), I take it that Whitman's (2009) wrapping-based account (which can straightforwardly be adopted in the version of Multi-Modal TLCG that I present below) represents an adequate (and elegant) solution. Yatabe (2012, 2013) rejects Whitman's analysis based on an observation about scopal properties of 'right-node wrapped' quantifiers due to Sabbagh (2013).

(i) a. The lieutenant will either arrest or shoot **every suspected arsonist** with his rifle. ($\vee > \forall$/* $\forall > \vee$)
b. The lieutenant will either arrest or shoot with his rifle, **every suspected arsonist**. ($\vee > \forall$/ $\forall > \vee$)

According to Sabbagh, unlike (ib), (ia) lacks a reading in which the quantifier *every suspected arsonist* scopes over disjunction. This remains unexplained in Whitman's analysis since it assigns the same combinatoric structure for (ia) and (ib), in which the quantifier appears outside the coordinate structure. (The other reading ($\vee > \forall$) is actually also derivable for both sentences in TLCG, via the 'Slanting' lemma discussed in Kubota and Levine (2014a).)

However, the interaction between quantifier scope and right-node wrapping seems actually more complex. In the attested example (ii), the more natural reading is the $\exists > \wedge$ one, exhibiting a pattern opposite of (ia):

(ii) Picasso designed, built and gave **a giant sculpture** to Chicago. (Whitman 2009)

Since the availability of the quantifier wide scope reading in (ii) and its unavailability in (ia), taken together, are equally problematic for both Whitman's analysis and Yatabe's ellipsis-based alternative, the scoping facts in right-node wrapping cannot be used to argue for either approach.

[4]Whitman (2009) discusses other potential problems for his approach as well. Among these is a pattern of right-node wrapping where both the first and the third (but not the second) conjuncts share a material which wraps around the direct object.

(i) ...the right of governments to [safeguard], [promote] and even [protect] their cultures <u>from outside competition</u>.

But this example is derivable in a multi-modal system by assuming a phonetically null conjunction between the first and second conjuncts (perhaps tied to the intonational break), conjoining *safeguard* and *promote and even protest* in the category $\mathrm{VP}/(\mathrm{VP}/_w\mathrm{NP})\backslash(\mathrm{VP}/_w\mathrm{NP})/_w\mathrm{NP}$ (where w stands for the 'wrapping' mode and $(\mathrm{VP}/_w\mathrm{NP})\backslash(\mathrm{VP}/_w\mathrm{NP})$ is the category of *from outside competition*). Phonetically null conjunction is also needed in the analysis of certain nonconstituent coordination such as the following (Beavers and Sag 2004):

(ii) Jan travels to Rome tomorrow, to Paris on Friday, and will fly to Tokyo on Sunday.

This leaves only the following two examples as potential problems for a multi-modal analysis of right-node wrapping/medial RNR (Whitman's (2009, 250) (28)):

(iii) a. [Mothers now cheerfully push strollers] and [kids dash] through his sculptures <u>as if they were playgrounds</u>.
b. We've got information on [where else] and [what else] he's wanted <u>for</u>.

For (iia), it seems possible to take the sentence-final modifier to be modifying both conjuncts, in which case it is not an instance of right-node wrapping. (iib) involves an unlike category coordination of *wh*-expressions, which is known to exhibit several idiosyncrasies (see Whitman (2004) for a detailed study of this construction). Since the exact licensing condition of this *wh*-coordination pattern is itself currently not very well understood, I set aside an analysis of (iib) for now.

necessary actions without injury.

b. In the players' box was Tony Nadal, the [uncle] and [coach] of Rafael Nadal since he started playing as a youngster.

For these examples, there is an analytic possibility (which Whitman does not consider in any detail, though he mentions in passing a related idea) according to which they essentially instantiate the same pattern as the Japanese medial RNR examples in (5) above. More specifically, given that there is a certain degree of freedom in word order for adverbs, it seems possible to take the examples in (28) as order-variants of some ordinary RNR sentence. The surface order in (28) is obtained by surface reordering of the adverb which takes place in a 'reanalyzed' constituent consisting of the right conjunct and the RNR'ed material, just as in the related Japanese examples in (5).[5]

To see how this approach may work, note first that, a shorter adverb like *easily* can be placed either before or after the whole infinitival VP:

(29) a. ... an employee is unable safely to perform a non-essential job function...
(`https://law.resource.org/pub/us/case/reporter/F3/213/213.F3d.209.97-50367.html`)

b. unable to perform a non-essential job function safely

With the expression *without injury*, as Whitman notes, the preverbal position is at best awkward.

(30) ??unable without injury to perform the necessary actions

But given the acceptability of (29a), I take the awkwardness of (30) to result from some extragrammatical factors (perhaps having something to do with disrupted prosodic alignment), and take it that that the grammar should be equipped with a mechanism that derives both of the orders in (29) for (any type of) adverbial expressions modifying VPs. For this purpose, I assume that the adjective *unable* and the VP modifier *without injury* combine with the infinitive in the REORDERING MODE, for which the following deducibility relation holds, as well as (both ordinary and Mixed) Left and Right Association:

(31) REORDERING
$A \circ_{\mathsf{r}} (B \circ_{\mathsf{r}} C) \leq A \circ_{\mathsf{r}} (C \circ_{\mathsf{r}} B)$

This is somewhat similar to the Japanese SCRAMBLING mode, but since English is head-initial, the element that stays in situ and which serves as the 'pivot', as it were, of the reordering is on the left of the elements that actually undergo reordering.

With these assumptions, (28a) can be derived as follows:

(32)

$$\dfrac{\dfrac{\mathsf{unable};\ \mathrm{Adj}/_{\mathsf{r}}\mathrm{VP}_{inf} \qquad \dfrac{[\varphi;\ \mathrm{VP}_{inf}]^1 \quad \mathsf{without} \circ \mathsf{injury};\ \mathrm{VP}_{inf}\backslash_{\mathsf{r}}\mathrm{VP}_{inf}}{\varphi \circ_{\mathsf{r}} (\mathsf{without} \circ \mathsf{injury});\ \mathrm{VP}_{inf}}\ \backslash_{\mathsf{r}}\mathrm{E}}{\mathsf{unable} \circ_{\mathsf{r}} (\varphi \circ_{\mathsf{r}} (\mathsf{without} \circ \mathsf{injury}));\ \mathrm{Adj}}\ \mathrm{PI}}{(\mathsf{unable} \circ_{\mathsf{r}} (\mathsf{without} \circ \mathsf{injury})) \circ_{\mathsf{r}} \varphi;\ \mathrm{Adj}}\ /_{\mathsf{r}}\mathrm{I}^1$$

[5]The reason that Whitman's own analysis does not cover these cases is essentially because he takes such surface restructuring in RNR to be possible only with expressions that combine in the wrapping mode, effectively limiting right-node wrapping to cases where surface reordering is *obligatory* independently of RNR. My suggestion here is to generalize this approach to cases where surface restructuring is optional.

$$\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\begin{array}{cc}\vdots & \vdots\end{array}}{\mathsf{unwilling} \circ_{\mathsf{c}} (\mathsf{or} \circ_{\mathsf{c}} (\mathsf{unable} \circ_{\mathsf{r}} (\mathsf{without} \circ \mathsf{injury}))); \ \mathrm{Adj}/_{\mathsf{r}}\mathrm{VP}_{inf} \quad (\mathsf{to} \circ \mathsf{perform} \circ \ldots); \ \mathrm{VP}_{inf}} \quad \begin{array}{cc}\vdots & \vdots\end{array}}{(\mathsf{unwilling} \circ_{\mathsf{c}} (\mathsf{or} \circ_{\mathsf{c}} (\mathsf{unable} \circ_{\mathsf{r}} (\mathsf{without} \circ \mathsf{injury})))) \circ_{\mathsf{r}} (\mathsf{to} \circ \mathsf{perform} \circ \ldots); \ \mathrm{Adj}/_{\mathsf{r}}\mathrm{VP}_{inf}}\ /_{\mathrm{r}}\mathrm{E}}{\mathsf{unwilling} \circ_{\mathsf{c}} (\mathsf{or} \circ_{\mathsf{c}} (\mathsf{unable} \circ_{\mathsf{r}} ((\mathsf{without} \circ \mathsf{injury}) \circ_{\mathsf{r}} (\mathsf{to} \circ \mathsf{perform} \circ \ldots)))); \ \mathrm{Adj}/_{\mathsf{r}}\mathrm{VP}_{inf}}\ \mathrm{PI}}{\mathsf{unwilling} \circ_{\mathsf{c}} (\mathsf{or} \circ_{\mathsf{c}} (\mathsf{unable} \circ_{\mathsf{r}} ((\mathsf{to} \circ \mathsf{perform} \circ \ldots) \circ_{\mathsf{r}} (\mathsf{without} \circ \mathsf{injury})))); \ \mathrm{Adj}/_{\mathsf{r}}\mathrm{VP}_{inf}}\ \mathrm{PI}}{\mathsf{unwilling} \circ \mathsf{or} \circ \mathsf{unable} \circ \mathsf{to} \circ \mathsf{perform} \circ \ldots \circ \mathsf{without} \circ \mathsf{injury}; \ \mathrm{Adj}/_{\mathsf{r}}\mathrm{VP}_{inf}}\ \mathrm{PI}$$

Here, by hypothesizing an embedded infinitival VP and then reordering it to the right periphery, *unable without injury* is derived as $\mathrm{Adj}/_{\mathsf{r}}\mathrm{VP}_{inf}$. Since this is the same category as the left conjunct *unwilling*, the two are coordinated and then combined with the argument infinitival VP. Via restructuring which 'incorporates' the RNR'ed material to the right conjunct, the VP modifier *without injury* can then be put back to its sentence-final position, just as in the Japanese medial RNR example in (5) above. In short, the grammaticality of (28a) is a predicted consequence of the relative free order of adverbs modifying VPs.

(28b) receives a similar treatment. Note first that appositive postnominal modifiers can appear with or without the definite article.

(33) a. Tony Nadal, the coach of Rafael Nadal, ...
b. Tony Nadal, coach of Rafael Nadal, ...

Given this, (28b) can be analyzed as a word order-variant of the following:

(34) ... was Tony Nadal, [the uncle] and, [since he started playing as a youngster, coach] of Rafael Nadal

In (34), the *since*-clause is reordered to the beginning of the second conjunct from its conjunct-final position. (34) can be derived as a standard case of RNR, and, via further reordering after the incorporation of the RNR'ed material to the second conjunct, the surface order in (28b) is obtained.

To summarize, just as in the Japanese examples involving scrambling discussed above, in these English examples too, the apparently problematic medial RNR pattern in fact receives a straightforward analysis in a multi-modal version of CG, once independently motivated factors regulating relatively flexible word-order possibilities of the relevant expressions are properly taken into account.

4 Conclusion

Medial RNR apparently poses a quite serious challenge to the like-category constituent coordination analysis of RNR standard in CG. The phenomenon, moreover, is not limited to just one language, or is it linked to one specific type of word-order anomaly (such as wrapping). This paper has shown that, despite this appearance, medial RNR in fact receives a straightforward analysis in a multi-modal variant of CG. As demonstrated above, in such a framework, the existence of this pattern of RNR essentially falls out from independently motivated analyses of RNR on the one hand and of phenomena (such as scrambling in Japanese) that pertain to surface word order on the other. Moreover, this analysis leads to a more principled account of the data than an ellipsis-based alternative due to Yatabe (2012, 2013);

the latter type of approach leaves unexplained why it is the licensor string rather than the deleted string that can be discontinuous. More generally, the phenomenon of medial RNR is important since it provides yet another type of evidence for the architecture of grammar embodied in multi-modal variants of CG. The analysis presented above crucially exploits the property of this type of CG in which grammatical inferences pertaining to surface word order is interspersed with inferences pertaining to the combinatoric component of grammar. This is a central characteristic of contemporary multi-modal CG that does not have any direct analog in other syntactic theories (including both derivational approaches and nonderivational ones). The conclusion of the present paper thus reinforces the general conclusion obtained in Kubota (2014) that such an architecture of grammar is essential in capturing a complex interactions between phenomena pertaining to surface word order (such as scrambling) and those pertaining to the combinatoric component (such as coordination) found in natural language.

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