Medial left-node raising in Japanese

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1 Introduction

In a canonical right-node raising (RNR) construction, a string is shared by multiple phrases, typically conjuncts, and that string is pronounced at the right edge of the rightmost of those phrases, as in (1). Here and elsewhere, expressions shared by multiple phrases in this type of construction are shown in boldface.

(1) This tall and that short **student** are a couple. (from Shen (2015))

It has been noted in the literature that a string that is shared by multiple phrases in an RNR construction is sometimes pronounced at a location other than the right edge of the rightmost of the phrases that share it. The sentence in (2) illustrates this phenomenon, which will be referred to as *medial right-node raising* in what follows. In this example, the string *boyfriend*, which is shared by two NPs (viz. *a new boyfriend* and *that ex-boyfriend you used to date*), is pronounced within the second of those NPs, but is not at its right edge.

(2) Are you talking about a new or that ex-**boyfriend** you used to date? (from Chaves (2014))

In this paper, it will be demonstrated that there is a phenomenon which can be viewed as a mirror image of medial RNR and thus might be designated as *medial left-node raising*, and it will be argued that the properties of this phenomenon are consistent with the predictions of the HPSG-based theory of non-constituent coordination first proposed in Yatabe (2001) and modified in later works such as Yatabe (2015).

2 Left-node raising in Japanese

It is shown in Yatabe (2001) that Japanese has what might be called left-node raising (LNR) constructions, i.e. structures in which a string that is shared by multiple phrases, typically conjuncts, is pronounced only once at the left edge of the leftmost of those phrases. (3) is an example of this construction, and can be viewed as the result of applying LNR to (4). The compound verb *omoidas-* 'to recall' consists of a noun *omoi* 'thought' and a verb *das-* 'to exude', and what has been left-node-raised in (3) is its first half, which appears at the left edge of both disjuncts in (4).

(3) [[**Omoi**dasu ka] [dasanai ka]] ga mondai da.
[[recall-PRES or] ['exude'-NEG-PRES or]] NOM problem COP
<12, 3, 1, 0>
'Whether you recall it or you don't is the problem.'

(4) [[Omoidasu ka] [omoidasanai ka]] ga mondai da.
[[recall-PRES or] [recall-NEG-PRES or]] NOM problem COP

The figures shown in angle brackets after (3) and other examples below are the result of multiple questionnaire studies in which the respondents were asked to judge the acceptability of given sentences on the scale of 1 to 4 described in Table 1 (see p. 4). Each sentence was accompanied by a description of what the intended reading of that sentence was, when the 4-point scale presented to the respondents contained the parenthesized expression in Table 1, i.e. the phrase "under the intended reading". The order of sentences was randomized for each respondent. The four figures shown after a sentence indicate the number of respondents

who chose 1, 2, 3, and 4 respectively for that sentence. A sentence for which the mean acceptability rating was R is shown throughout this paper with no symbol if $1 \le R < 2$, with '?' if $2 \le R < 2.5$, with '??' if $2.5 \le R < 3$, with '?*' if $3 \le R < 3.5$, and with '*' if $3.5 \le R \le 4$. The two questionnaires whose results are reported in this section were conducted in order to test the factual claims made in Yatabe (2001).

Although Japanese is a so-called pro-drop language in which more types of expressions are omissible than in a language like English, part of a compound verb is generally not omissible, even when it is recoverable from the context. This is shown by the contrast between (5b) and (5c), which are both to be interpreted as responses to the question in (5a).

(5) a. Omoidashita?
recall-PAST
'Have you recalled it?'

b. Iya, omoidasanai. <12, 2, 1, 1>
no recall-NEG-PRES
'No, I don't recall it.'

c. ?? Iya, dasanai. <3, 3, 4, 6>
no 'exude'-NEG-PRES
'(Same as (5b))'

This observation lends support to the view that (3) above cannot be explained away simply as a case of context-dependent omission of part of a word.

The examples in (6) and (7) below, whose syntactic structure parallels that of (3) above, show that what licenses (3) is a mechanism of some generality, not some idiosyncratic properties of the particular lexical items involved.

(6) [[[**Sô yû toki ni**] **atari**chirasu ka]
[[[such occasion DAT] throw tantrums-PRES or]
[chirasanai ka]] de, zuibun inshô
['sprinkle'-NEG-PRES or]] INST considerably impression
ga chigaimasu yo. <17, 0, 1, 1>
NOM differ-POL.PRES I tell you
'The impression you leave will be considerably different, depending on whether you throw tantrums on such occasions or you don't, I tell you.'

(7) [[[**Dasareta tabemono o**] **tabe**kireru ka]
[[[serve-PASS-PAST food ACC] eat up-can-PRES or]
[kirenai ka]] ga wakaremichi desu.
['cut'-can-NEG-PRES or]] NOM crossroads COP.POL
<11, 6, 1, 1>
'Whether you can eat up the food that you're served or you cannot is the deciding issue.'

The compound verb *atarichiras-* 'to throw tantrums' in (6) consists of two verb stems, *atar-* 'to bump' and *chiras-* 'to sprinkle', and what is left-node-raised in this sentence is the first part of that compound verb and a temporal adjunct that modifies the compound verb as a whole. Example (7) involves a compound verb *tabekir-* 'to eat up', which consists of two verb stems, *tabe-* 'to eat' and *kir-* 'to cut'; what is left-node-raised in this sentence is

the first part of that compound verb and the complement of the compound verb.

As shown by the following examples, ellipsis of the first part of the compound verbs, *atarichiras-* and *tabekir-*, which appears to be involved in (6) and (7) above, is not licensed by mere pragmatic recoverability. (8b) can be, while (8c) cannot be used as an answer to the question in (8a); likewise, (9b) can be, but (9c) cannot be used as an answer to the question in (9a).

(8) a.　Atarichirashita　　no?
　　　　throw tantrums-PAST NML
　　　　'Did you throw tantrums?'

　　 b.　Iya, atarichirasanakatta.　　<18, 1, 0, 0>
　　　　no　throw tantrums-NEG-PAST
　　　　'No, I didn't throw tantrums.'

　　 c. ?? Iya, chirasanakatta.　　<2, 3, 12, 2>
　　　　no　'sprinkle'-NEG-PAST
　　　　'(Same as (8b))'

(9) a.　Tabekireta　　　no?
　　　　eat up-can-PAST NML
　　　　'Were you able to eat it up?'

　　 b.　Iya, tabekirenakatta.　　<19, 0, 0, 0>
　　　　no　eat up-can-NEG-PAST
　　　　'No, I couldn't eat it up'

　　 c. ?* Iya, kirenakatta.　　<0, 4, 11, 4>
　　　　no　'cut'-can-NEG-PAST
　　　　'(Same as (9b))'

The data presented in this section point to the conclusion that Japanese allows LNR of part of a compound.

3　Medial left-node raising

In (3), (6), and (7) above, the left-node-raised string, which is shown in boldface, is at the left edge of the first of the two conjuncts that share it, and is missing from the left edge of the second conjunct. If LNR is a mirror image of RNR, it is expected (i) that the left-node-raised string can be at a non-initial position within the initial conjunct (see (2) above), and (ii) that the left-node-raised string cannot be missing from a non-initial position within a non-initial conjunct (just as a right-node-raised string cannot be missing from a non-final position within a non-final conjunct). Two questionnaire studies were conducted in order to see if these expectations are fulfilled.

(10) and (11) are the experimental sentences in the first of the questionnaires. They both involve LNR of the first part of the compound verb *omoidas-* 'to recall'.

(10)　? [[Sukoshi wa　**omoi**dasu no ka], [dasanai
　　　　 [[at least a little recall-PRES NML or]　['exude'-NEG-PRES
　　　　 no ka]], ga　mondai da.　　<10, 10, 4, 4>
　　　　 NML or]]　NOM problem COP
　　　　 'Whether you recall it at least a little or you don't is the problem.'

(11)　?? [[Sukoshi mo **omoi**dasanai　no　ka], [sukoshi wa
　　　　 [[at all　　　recall-NEG-PRES NML or]　[at least a little
　　　　 dasu　　no ka]], ga　mondai da.　　<8, 6, 6, 8>
　　　　 'exude'-PRES NML or]]　NOM problem COP
　　　　 'Whether you don't recall it at all or you do at least a little is the problem.'

Since the phrase *sukoshi wa* 'at least a little' at the beginning of (10) is a positive polarity item and is not semantically compatible with the second conjunct, which means 'you don't recall',

we know that the phrase unambiguously belongs to the first conjunct. The left-node-raised expression in this example, i.e. the string *omoi-*, which is missing from the left edge of the second conjunct, follows this phrase within the first conjunct. Therefore the fact that (10) was rated as only slightly unnatural indicates that Japanese allows medial LNR.

In (11), which is also an instance of medial LNR due to the presence of the phrase *sukoshi mo* 'at all' at its beginning, the left-node-raised string *omoi-* is missing from a non-initial position within the second conjunct. Thus, the fact that (11) was rated as unnatural as (5c) confirms the hypothesis that an expression cannot be left-node-raised from a non-initial position within a non-initial conjunct.

The one-sided Wilcoxon signed-rank test showed that the difference in acceptability between (10) and (11) was statistically significant ($Z = 2.27$, $p \leq 0.05$). Since (10) was expected to be slightly unnatural just like most examples of medial RNR and (11) was expected to be only as bad as (5c), the less than clear-cut nature of the contrast between them was not unexpected. Medial LNR and medial RNR necessarily degrade the structural parallelism between conjuncts to a certain extent, often making them less than perfectly acceptable. Sentences like (5c), (8c), (9c), and (11) are unnatural but not completely impossible probably because it is marginally possible for the verbs *das-* 'to exude', *chiras-* 'to sprinkle', and *kir-* 'to cut' to metaphorically signify something analogous to what is expressed by the verbs *omoidas-* 'to recall', *atarichiras-* 'to throw tantrums', and *tabekir-* 'to eat up' respectively.

A second questionnaire was conducted to test the same hypotheses that the first questionnaire tested using different compound verbs and relying on a different set of respondents. (12) and (13) are one of the two experimental sentence pairs in this second questionnaire. They can both be interpreted as involving LNR of a temporal modifier and the first part of the compound verb *atarichiras-*.

(12)　[[[**Sô yû　　toki　　　　ni**]　sukoshi wa
　　　 [[[such　　occasion　　DAT]　at least a little
　　　 atarichirasu　　no ka], [chirasanai　　　no
　　　 throw tantrums-PRES NML or], ['sprinkle'-NEG-PRES NML
　　　 ka]] de, zuibun　　inshô　　ga　chigaimasu
　　　 or]] INST considerably impression NOM differ-POL.PRES
　　　 yo.　　　<14, 7, 4, 2>
　　　 I tell you
　　　 'The impression you leave would differ considerably, depending on whether you throw tantrums at least a little on such occasions or you don't.'

(13)　?? [[[**Sô yû toki　　ni**]　**atari**chirasu　　　　no
　　　 [[[such　occasion DAT]　throw tantrums-PRES　NML
　　　 ka], [sukoshi mo chirasanai　　　no ka]] de,
　　　 or]　[at all　　　'sprinkle'-NEG-PRES NML or]] INST
　　　 zuibun　　inshô　　ga chigaimasu　yo.
　　　 considerably impression NOM differ-POL.PRES I tell you
　　　 <4, 8, 12, 3>
　　　 'The impression you leave would differ considerably, depending on whether you throw tantrums on such occasions or you don't at all.'

The high rating of (12) shows that medial LNR is possible, and the low rating of (13) indicates that LNR is not possible from a non-initial position within a non-initial conjunct. The difference in acceptability between (12) and (13) was statistically significant ($Z = 3.43$, $p \leq 0.05$).

Sentences (14) and (15) are the other experimental sentence pair in the second questionnaire. They both involve LNR of an accusative NP and the first part of the compound verb *tabekir-*.

(14) ? [[[**Dasareta** **tabemono o**] dônika kônika
    [[[serve-PASS-PAST food   ACC] somehow or other
    tabekireru   ka] [kirenai   ka]] ga
    eat up-can-PRES   or] ['cut'-can-NEG-PRES or]] NOM
    wakaremichi desu.   <4, 16, 5, 2>
    crossroads   COP.POL

    'Whether you can somehow or other eat up the food that you're served or you cannot is the deciding issue.'

(15) ?* [[[**Dasareta** **tabemono o**] **tabe**kireru
    [[[serve-PASS-PAST food   ACC] eat up-can-PRES
    ka] [dô shite mo   kirenai   ka]] ga
    or] [for the life of you 'cut'-can-NEG-PRES or]] NOM
    wakaremichi desu.   <0, 4, 13, 10>
    crossroads   COP.POL

    'Whether you can eat up the food that you're served or you cannot for the life of you is the deciding issue.'

The difference in acceptability between (14) and (15) was statistically significant ($Z = 4.23$, $p \leq 0.05$). Sentence (14), which was rated as slightly unnatural but acceptable, is an instance of medial LNR, due to the presence of the positive polarity item *dônika kônika* 'somehow or other', which unambiguously belongs to the first conjunct but precedes part of the left-node-raised string. (15), which was rated as considerably unnatural, shows, together with (11) and (13), that LNR is not possible from a non-initial position within a non-initial conjunct.

Thus, the two expectations stated at the outset of this section were both fulfilled.

4 Theoretical discussion

The questionnaire results that have been presented in the previous sections seem to warrant the conclusion that Japanese allows not only canonical, non-medial LNR but also medial LNR, which is a mirror image of medial RNR.

The HPSG-based theory of medial RNR and LNR proposed in Yatabe (2012) and slightly modified in Yatabe (2015) is fully compatible with the findings of this paper. According to this theory, there are two types of RNR and two types of LNR: a phonological kind of RNR and LNR that is merely prosodic ellipsis and a syntactic kind of RNR and LNR that involves merging of multiple domain objects that has the potential of affecting semantic interpretation. LNR of part of a compound must be phonological LNR, whereas LNR of things like a temporal modifier and an accusative NP may be either of the two types of LNR. Note that, pace Kubota and Levine (2015), there is nothing in this theory that is inconsistent with the long-known fact that RNR and LNR can affect semantic interpretation; Kubota and Levine's criticism of HPSG-based theories of nonconstituent coordination is sound if read as a critique of the theory proposed in Beavers and Sag (2004), but not if read as an assessment of the theory under discussion, in which order domains are not mere phenogrammatical representations but principal carriers of semantic information.

Figure 1 shows part of the structure assigned to example (12) in this theory when the temporal modifier *sô yû toki ni* is assumed to have undergone the syntactic type of LNR. The figure depicts the local subtree where two conjuncts, namely *sô yû toki ni sukoshi wa atarichirasu no* and *sô yû toki ni atarichirasanai no*, are conjoined by two instances of the conjunction word *ka* to become a larger phrase *sô yû toki ni sukoshi wa atarichirasu no ka, chirasanai no ka*. Each node is associated with the the SYNSEM

feature and the DOM feature. The value of the DOM feature is an order domain, which is a list of domain objects, each of which has the PHON feature and the SYNSEM feature. A conjunction word like *ka* is assumed to be introduced into a syntactic structure by a linearization-related mechanism, and does not appear as a node in the syntactic tree (see Yatabe (2012)).

The first domain object in the order domain of the mother is there to represent the meaning of disjunction, and has no phonological content. The second domain object (pronounced "sô yû toki ni"), which represents the expression that has undergone the syntactic type of LNR, is the result of extracting the leftmost domain object from the order domain of each conjunct and merging those two domain objects, whose PHON values are identical with each other but whose SYNSEM values are not identical with each other because the two occurrences of this temporal adjunct modify different expressions. The third domain object (pronounced "sukoshi wa atarichirasu no ka") is the result of (i) compacting (i.e. turning into a single domain object) the first daughter with its leftmost domain object (which has undergone syntactic LNR) removed, and then (ii) adding *ka* as the last element of the PHON value of the newly created domain object. And the fourth domain object (pronounced "chirasanai no ka") is the result of (i) applying phonological LNR to (i.e. eliding) the string *atari* at the left edge of the domain object "atari chirasanai" in the order domain of the second daughter (which became the leftmost domain object in that order domain when the domain object "sô yû toki ni" was syntactically left-node-raised out of it), (ii) compacting the second conjunct thus altered, and then (iii) adding *ka* as the last element of the PHON value of the newly created domain object.

Sentence (12) satisfies the constraints on medial LNR that are stated in Yatabe (2012), irrespective of whether the temporal modifier *sô yû toki ni* is taken to have been (i) syntactically left-node-raised as in Figure 1, (ii) phonologically left-node-raised as in Figure 2, or (iii) part of the first conjunct alone all along rather than part of the left-node-raised string. According to Yatabe (2012), medial LNR is allowed only if all the left-node-raised expressions can be made to line up at the left edge of the order domain of the initial conjunct by removing one or more domain objects. The left-node-raised expressions in the example do line up at the left edge of the order domain of the initial conjunct if one domain object (namely the one to be pronounced "sukoshi wa") is removed, in the first two of the three scenarios above, and if two domain objects (namely "sô yû toki ni" and "sukoshi wa") are removed, in the third scenario.

In contrast to the theory advocated here, theories of medial RNR proposed within the framework of Categorial Grammar, such as those described in Whitman (2009), Kubota (2014), and Warstadt (2015), arguably cannot be applied to the data presented in section 3. In these theories, a right-node-raised or left-node-raised string is assumed to be located outside the relevant coordinate structure. Thus, if they are to be applied to (12), for example, it will be necessary to assume that the coordinate structure here is of the form (*sô yû toki ni*) *sukoshi wa chirasu no ka chirasanai no ka*, and that the string *atari* is infixed into it when the left-node-raised string and the coordinate structure are combined. This is an unnatural assumption, and when such an assumption is made, the low acceptability of example (13) becomes a mystery, because in this analysis a degree modifier like *sukoshi mo* and *sukoshi wa* must be allowed to combine with an incomplete verb like *chirasanai* and *chirasu* to form a grammatical and hence conjoinable unit. Thus, these theories, which are shown in Yatabe (2015) to be unable to account for the full range of facts involving medial RNR, have trouble dealing with medial LNR as well.

Table 1: The 4-point scale used in the questionnaires

rating	meaning of the rating
1	'The sentence is perfectly natural (under the intended reading).'
2	'The sentence is slightly unnatural (under the intended reading).'
3	'The sentence is considerably unnatural (under the intended reading).'
4	'The sentence is completely impossible (under the intended reading).'

Figure 1: Part of the structure assigned to example (12) when the first half of the compound verb (namely *atari*) and the temporal modifier (namely *sô yû toki ni*) are taken to have undergone phonological and syntactic LNR respectively

$$
\begin{bmatrix}
\textsc{synsem}|\textsc{cont} & \begin{bmatrix} \textsc{semhead} & \boxed{1} \end{bmatrix} \\[4pt]
\textsc{dom} & \Big\langle
\begin{bmatrix}
\textsc{phon} & none \\
\textsc{synsem}|\textsc{cont}|\textsc{ep} & \Big\langle
\begin{bmatrix}
\textsc{hndl} & \boxed{1} \\
\textsc{rel} & or \\
\textsc{conjuncts} & \langle \boxed{2},\boxed{4} \rangle
\end{bmatrix}
\Big\rangle
\end{bmatrix}, \\
& \quad
\begin{bmatrix}
\textsc{phon} & \langle\langle\langle \text{sô, yû}\rangle,\langle\text{toki}\rangle,\text{ni}\rangle,\langle\text{sukoshi, wa}\rangle,\langle\langle\langle\text{atari, chirasu}\rangle\rangle\rangle,\text{no, ka}\rangle \\
\textsc{synsem}|\textsc{cont} & \begin{bmatrix}
\textsc{ep} & \boxed{A}\oplus\boxed{B}\oplus\boxed{C}\oplus\boxed{D} \\
\textsc{h-cons} & \{\boxed{2}\ge\{\boxed{3}\},\cdots\}
\end{bmatrix}
\end{bmatrix}, \\
& \quad
\begin{bmatrix}
\textsc{phon} & \langle none,\langle\langle\text{chirasanai}\rangle\rangle,\text{no, ka}\rangle \\
\textsc{synsem}|\textsc{cont} & \begin{bmatrix}
\textsc{ep} & \boxed{E}\oplus\boxed{F}\oplus\boxed{G} \\
\textsc{h-cons} & \{\boxed{4}\ge\{\boxed{5}\},\cdots\}
\end{bmatrix}
\end{bmatrix}
\Big\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix}
\textsc{synsem}|\textsc{cont} & \begin{bmatrix} \textsc{ltop} & \boxed{2} \\ \textsc{semhead} & \boxed{3} \end{bmatrix} \\[4pt]
\textsc{dom} & \Big\langle
\begin{bmatrix}
\textsc{phon} & \langle\langle \text{sô, yû}\rangle,\langle\text{toki}\rangle,\text{ni}\rangle \\
\textsc{synsem}|\textsc{cont}|\textsc{ep} & \boxed{A}
\end{bmatrix},
\begin{bmatrix}
\textsc{phon} & \langle\text{sukoshi, wa}\rangle \\
\textsc{synsem}|\textsc{cont}|\textsc{ep} & \boxed{B}
\end{bmatrix}, \\
& \quad
\begin{bmatrix}
\textsc{phon} & \langle\langle\text{atari, chirasu}\rangle\rangle \\
\textsc{synsem}|\textsc{cont}|\textsc{ep} & \boxed{C}
\end{bmatrix},
\begin{bmatrix}
\textsc{phon} & \text{no} \\
\textsc{synsem}|\textsc{cont}|\textsc{ep} & \boxed{D}
\end{bmatrix}
\Big\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix}
\textsc{synsem}|\textsc{cont} & \begin{bmatrix} \textsc{ltop} & \boxed{4} \\ \textsc{semhead} & \boxed{5} \end{bmatrix} \\[4pt]
\textsc{dom} & \Big\langle
\begin{bmatrix}
\textsc{phon} & \langle\langle \text{sô, yû}\rangle,\langle\text{toki}\rangle,\text{ni}\rangle \\
\textsc{synsem}|\textsc{cont}|\textsc{ep} & \boxed{E}
\end{bmatrix}, \\
& \quad
\begin{bmatrix}
\textsc{phon} & \langle\text{atari, chirasanai}\rangle \\
\textsc{synsem}|\textsc{cont}|\textsc{ep} & \boxed{F}
\end{bmatrix},
\begin{bmatrix}
\textsc{phon} & \text{no} \\
\textsc{synsem}|\textsc{cont}|\textsc{ep} & \boxed{G}
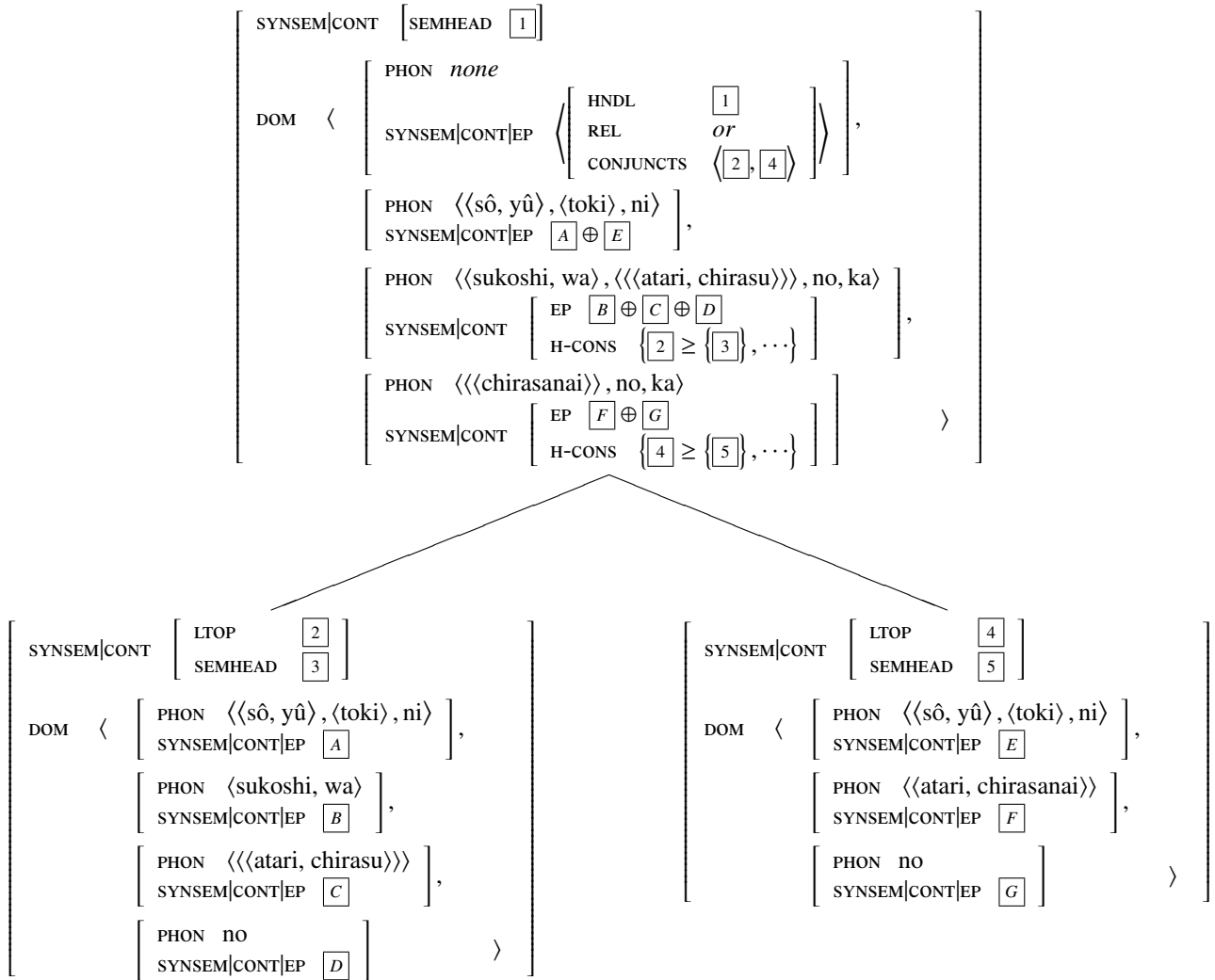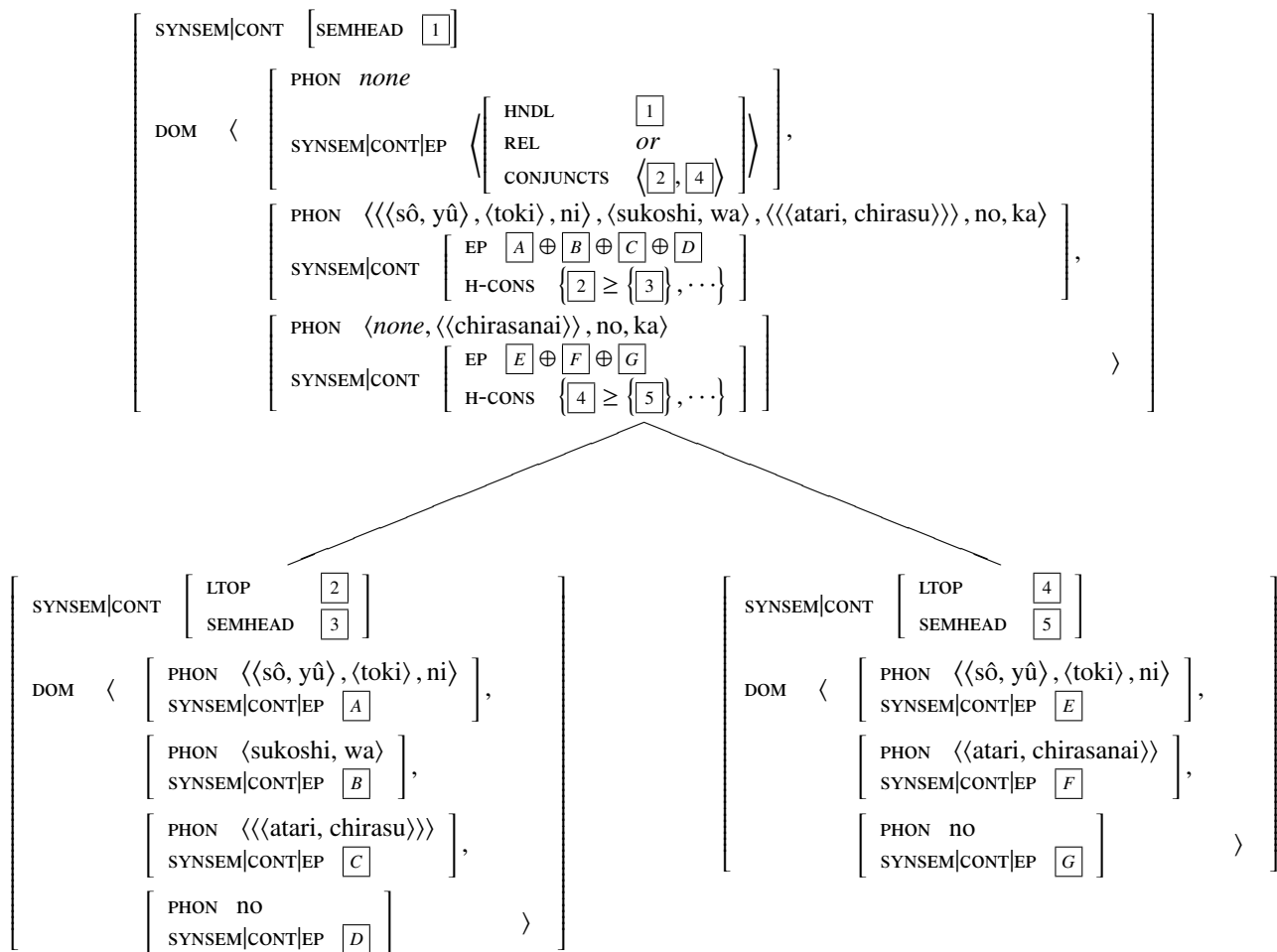\end{bmatrix}
\Big\rangle
\end{bmatrix}
$$

Figure 2: Part of the structure assigned to example (12) when the first half of the compound verb (namely *atari*) and the temporal modifier (namely *sô yû toki ni*) are both taken to have undergone phonological LNR

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