What Looks Left-branching is Right-branching: Evidence from Phonological Phrasing in North Kyungsang Korean*

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Both possessive and conjunctive structures result in unary phrasing in North Kyungsang Korean, which proves to be a highly marked phrasing pattern, given the preferred effect of eurythmy in phonological phrasing of the left-branching structure. Thus, this paper argues for the right-branchingness of the possessive and the conjunctive constructions with reference to phonological phrasing. Specifically, this study claims that the rightmost conjunct of the conjunctive structure is syntactically followed by the conjunctive case marker, hence inducing the branching structure for that final conjunctive element. Supporting evidence for this claim is drawn from the colloquial speech of Modern Korean and the Middle Korean work Suk-po-sang-col. As a corollary to this claim, it follows that the mapping constraint referring to the left-edge automatically spins out predominantly unary phrases.

1. Introduction

It is not controversial that syntax and phonology are interconnected to some extent (Inkelas and Zec 1990, 1995, Kaisse 1985, Selkirk 1984, 1986), but the issues raised in the recent literature on the syntax-phonology interface are how far syntax is relevant to generalizations in phonology. Clarifying the ways in which certain specific types of syntactic information are available to phonological phrasing, this study suggests that phonology might, in turn, open up a feedback to syntactic

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structure.

The purpose of this study is to argue for the right-branchingness of the possessive and the conjunctive constructions with reference to phonological phrasing of North Kyungsang (henceforth NK) Korean. In this study phonological phrasing of NK Korean is accounted for by referring to the edge of maximal projection in syntactic structure (Cho 1990, Selkirk 1986, 1995, Truckenbrodt 1995, 1999). Both possessive and conjunctive structures result in unary phrasing, which given the eurythmy effect in phrasing, turns out to be a highly marked phrasing pattern. The eurythmy effect is observed neither in the possessive nor in the conjunctive structure, although stacked. The phrasing discrepancy between the possessive and conjunctive structures, however, is accounted for by resorting to the structural difference that they make in their syntactic representation: the head of the possessive construction is by nature non-branching, while the rightmost conjoined element in the conjunctive construction is structurally branching due to its following conjunctive case marker. This study argues that the last conjunct is syntactically followed by the conjunctive case marker, which is sometimes phonologically null and sometimes overt. Supporting evidence for this claim is drawn from the colloquial speech of Modern Korean and the Middle Korean work Suk-po-sang-col.

2. Preliminaries

2.1. Basic phonological phrasing

Both lexical and demonstrative adjectives group with their following head noun, as shown in (1a). When two nouns form a possessive construction, with the preceding noun modifying the following one, they group together into a single phonological phrase, as shown in (1b).

(1) a. (Adj N)
    ì namwú --> (ì námwu)       ‘this tree’
    nolán namwú --> (nolan namwú) ‘yellow tree’
    phwúlun namwú --> (phwúlun namwu) ‘green tree’
b. (Possessive N)

\[
\begin{align*}
\text{nwúna-uy mocá} & \rightarrow (\text{nwúna-uy mocá}) \quad \text{‘sister’s hat’} \\
\text{nwúna-uy yáqmal} & \rightarrow (\text{nwúna-uy yáqmal}) \quad \text{‘sister’s socks’}
\end{align*}
\]

Tone serves as diagnostics of phonological phrasing by showing a single pitch peak within a phonological phrase. The pitch peak of a phonological phrase is determined by the tonal interactions such as upstep, downstep or H-spreading. For details, refer to Kenstowicz and Sohn (1997).

By contrast, when two words are in a conjunctive relation as in (2), each of them forms its own phonological phrase.

(2) a. (N-Conj) (N)

\[
\begin{align*}
\text{moca-wa yáqmal} & \rightarrow (\text{moca-wa}) (\text{yáqmal}) \quad \text{‘hat and socks’} \\
\text{hólañi-wa kóyáñi} & \rightarrow (\text{hólañi-wa}) (\text{kóyáñi}) \quad \text{‘tiger and cat’}
\end{align*}
\]

b. (Adj-Conj) (Adj)

\[
\begin{align*}
\text{málk-ko kówán} & \rightarrow (\text{málk-ko}) (\text{kówán}) \quad \text{‘clean and fair’} \\
pálk-ko nélpun & \rightarrow (\text{pálk-ko}) (\text{nélpun}) \quad \text{‘bright and spacious’}
\end{align*}
\]

Comparing the phrasing in (1) and (2), we find asymmetry between the possessive and conjunctive structures with respect to phonological phrasing.

Following the syntactic approach referring to the edge of maximal projection in surface syntactic structure, Kenstowicz and Sohn (1997) show that it is the left-edge of the branching XP that NK Korean refers to in relation to phonological phrasing. Three types of syntactic structure in (1) and (2) are represented as follows:

(3) a. (Adj N) b. (Poss N) c. (X-Conj) (X)

\[
\begin{align*}
\text{NP} & \rightarrow (\text{NP}) \quad (\text{XP}) \\
/ \ \\ /
\text{Adj N} & \rightarrow (\text{Poss N}) \quad (\text{XP}) \quad (\text{XP}) \\
/ \ \\ /
\text{X} & \rightarrow (\text{X}) \quad (\text{X})
\end{align*}
\]

Given the constraint Align-XP-br, L referring to the left edge of the branching XP, all three syntactic structures in (3) would yield only one phonological phrase. Note that (3c) also gives only one phonological phrase since the lower XP’s are non-branching. However, this is not true given
the phrasing in (2). Therefore, the mapping constraint Align-XP alone is not capable of predicting the correct phonological phrasing in the conjunctive constructions.

2.2. Stacked structure and eurythmy effect

The asymmetry between the possessive and conjunctive constructions is even clearer when their stacked structures are taken into consideration.

(4) Possessive
   a. minwu-uy nwuna-uy yajmal  ‘Minwu’s sister’s socks’
      (minwu-uy) (nwuna-uy yajmal)
   b. minwu-uy nwuna-uy chinkwu-uy mocá  ‘Minwu’s sister’s friend’s hat’
      (minwu-uy) (nwuna-uy) (chinkwu-uy mocá)

(5) Conjunctive
   a. mocá-wa yajmal-kwa cajkap  ‘hat and socks and gloves’
      (mocá-wa) (yajmal-kwa) (cajkap)
   b. hóli wi-wa kóyá -wi -wa kañáci -wa kaykwáli  ‘tiger and cat and puppy and frog’
      (hóli wi-wa) (kóyá -wi -wa) (kañáci -wa) (kaykwáli)

In the case of the possessive, each modifier forms its own phonological phrase except for the last modifier which immediately precedes the head noun. Thus, there is \((n-1)\) number of phonological phrases when there are \(n\) number of nouns in the possessive structure. By contrast, in the case of the conjunctive construction, each conjoined element is mapped into its own phonological phrase, hence yielding \(n\) number of phonological phrases for \(n\) number of conjoined elements in the phrase.

As an extension to the structures in (3), we may postulate syntactic structures in (6) for the stacked constructions in (4) and (5). The possessive structure is represented as stacked, left-branching in (6a), while its conjunctive equivalent is represented as multiple branching in (6b).^1

^1 (6b) might be represented as a binary, left-branching structure similar to (6a), but with no consequential difference with respect to phonological phrasing.
(6) a. Possessive

```
NP
/   \   
NP-poss N
/   \   
NP-poss N
/   \   
NP-poss N
```

*(mínwu-uy) (nwána-uy) (chínkwu-uy moça): correct phrasing

b. Conjunctive

```
NP
/   \   \   
NP-conj NP-conj NP-conj NP
```

*(hóiáqi-wa) (ko'yáqi-wa) (kaqáci-wa) (kaqwáli): correct phrasing

Provided the syntactic approach referring to the edge of a maximal projection, Align-XP, L would give one phonological phrase for a stacked left-branching structure, since the left edge of XP is aligned to the initial position for all branching XP's. Note that the left edge is valid with respect to phrasing only when it constitutes the left edge of the branching XP (Kensitowicz and Sohn 1997). As a result, there is only one phonological phrase predicted by Align-XP for the two structures in (6). Unlike the prediction made by the mapping constraint, however, the optimal output holds three phonological phrases for the possessive structure (4b) and four for the conjunctive structure (5b).

Another intriguing issue arises, namely that considering the eurythmy effect in phrasing (Kim 1997, Sohn 2001), the way phonological phrases are formed in (6) is non-canonical. Unlike the otherwise parallel syntactic structure in (7), the stacked structures in (6) do not respect eurythmy. Eurythmy in phrasing effects binary grouping from the uniformly left-branching stacked structure, as shown in (7):
(7) ᐃ毳-啩 ᛱ啩-啩 ᐃ啩-啩 ᛱ啩-啩
mother-nom. send-mod. vegetable-acc. eat-prs-ind.
'(pro) eats vegetable that mother sent.'

\[
\begin{array}{c}
\text{a.} \\
\text{b. (مادة-كا ᛱ啩-啩 ᐃ啩-啩 ᛱ啩-啩) by Align-XP, L} \\
\text{c. (مادة-كا ᛱ啩-啩) (مادة-啩-啩) by Eurythmy}
\end{array}
\]

In (7a) the left edge of XP is aligned to the initial position for all branching XP's due to its stacked left-branchingness. Thus, (7b) is yielded as an output of phonological phrasing via Align-XP, L, cramming all four phonological words into a single phrase. However, the optimal output is (7c) with two phonological phrases, each with binary grouping. Eurythmy penalizes oversized as well as undersized phonological phrase S. Comparing the syntactic structure (7) with (6) representing (4b) and (5b), we reach the conclusion that neither possessive nor conjunctive structure conforms to the general pattern of phrasing of the stacked left-branching structure.

In the case where there are three words in the stacked left-branching structure, all three words group together into a single phonological phrase, as shown in (8):

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2. Refer to Sohn (2001) for a detailed discussion on the eurythmy effect.
What Looks Left-branching is Right-branching: ... 

(8) nwúna-ka ónta-ko malhá-yess-ta  
sister-nom. come-comp. say-pst.-ind.  
‘(pro) said that sister would come.’  

[[ NP VP] VP]

As the structure in (8) is uniformly left-branching, the mapping constraint Align-XP predicts a single phonological phrase. Unlike the case in (7), however, the phonological phrase predicted by Align-XP, L does not further split into a rhythmic binary phrase plus a unary phrase (or the other way around), because violation of Minimum Binarity is more fatal than that of Maximum Binarity. In other words, Minimum Binarity outranks Maximum Binarity. The tableau in (9) illustrates optimality of a single phonological phrase for the stacked left-branching structure (8).

(9) /nwúna-ka ónta-ko malhá-yess-ta/ -→ (nwúna-ka onta-ko malha-yess-ta)

<table>
<thead>
<tr>
<th></th>
<th>Align-XP, L</th>
<th>Min Bin</th>
<th>Max Bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (1 2 3)</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. (12) (3)</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>c. (1) (23)</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>d. (1)(2)(3)</td>
<td></td>
<td><em>!</em>!!!</td>
<td></td>
</tr>
</tbody>
</table>

As Minimum Binarity outranks Maximum Binarity, the candidate (9a) with no unary phrase wins out. This indicates that the stacked

3. Due to the space constraint, numerical numbers are employed in the tableau to mark the linear precedence of words.
left-branching structure respects eurythmy if there are an even number of words, and prefers ternary to unary phrasing if there are an odd number of phonological words. Phrasing patterns in the candidates (9c) and (9d) are equivalent to the possessive and conjunctive phrasing in (4a) and (5a) respectively, but they fatally lose out because of unary phrases.

To summarize, phrasing of the possessive and the conjunctive structures appears to opt for unary grouping, as shown by the data (4) and (5). With one exception in the final phrase of the possessive construction (4), all the phrases violate Minimum Binarity penalizing unary phrasing. This confirms that the syntax-prosody mapping mechanism required for the possessive and the conjunctive constructions is distinguished from the one required for the stacked left-branching structure arising from the embedded clause, although syntactically both seem to stand on the common ground of the stacked left-branching structure.

2.3. C-command analysis

In the approach crucially referring to the c-command relation, Kim (1997) groups two words into a single phonological phrase if a following phonological word c-commands its preceding word. Therefore, this analysis also incorrectly predicts a single phonological phrase, given the possessive and the conjunctive structures as in (6).

However, with an additional constraint, the structure in (6b) splits into four phonological phrases. The prohibition of the four nouns under the same phonological phrase is implemented by *(XP)*².

(10) *(XP)*² (Kim 1997 : 201)
Identical maximal projections cannot be organized into the same P-phrase.

*(XP)*² is designed to split *n* number of words in the conjunctive construction into *n* number of phonological phrases. *(XP)*² correctly accounts for the phrasing phenomena of the conjunctives: the conjoined elements are not allowed in a single phonological phrase, albeit their c-command relation, because the maximal projection contains identical phrases.
In the case of the possessive construction, however, the c-command analysis wrongly predicts a single phonological phrase from the possessive structure in (6a) since all four words are contained under a single maximal projection maintaining the c-command relation between words. Resorting to the eurythmy effect would still predict wrong output of two binary phrases: (6a) yields two unary phrases followed by a binary phrase. Therefore, c-command analysis also has difficulty in dealing with the phrasing phenomena of the possessive structure.

In what follows, the present analysis proposes an alternative account with crucial reference to syntactic structures of the possessive and the conjunctive construction, while maintaining the syntax-prosody mapping constraint Align-XP-br, L.

3. Phrasing of the Possessive Construction

The general characteristic of phrasing in the possessive construction is predominant pattern of unary phrases followed by a final binary phrase, as shown in (11):

(11) Possessive
   a. yéؤول-uy mocá
      (yéؤول-uy moca) 'Youngmi's hat'
   b. yéؤول-uy enn-uy mocá
      (yéؤول-uy) (enn-uy moca) 'Youngmi's sister's hat'
   c. yéؤول-uy imo-uy myénuli-uy mocá
      (yéؤول-uy) (imo-uy) (myénuli-uy moca) 'Youngmi's aunt's daughter-in-law's hat'

This phenomenon is reminiscent of the right-branching structure in the examples below:

(12) a. i yáqmal
    (i yáqmal) 'these socks'
   b. nólán yáqmal
    (nolan yáqmal) 'yellow socks'
(12d) with four phonological words is parallel to (11c) in its phonological phrasing, yielding three phonological phrases. Its syntactic structure is given in (13):

(13) 
```
NP1  /
      /
D    NP2  /
       /
      /  
    Adj  NP3  /
       /  
    Adj  NP4  /
        /
(i) (pwutuléwun) (nolan yáqmal)
```

In (13) alignment of the left edge of the branching XP gives phonological phrases at the left edges of NP1, NP2, and NP3, but not at the left edge of NP4 since it is non-branching.

As a parallel to the cases in (12), the present analysis accounts for unary phrasing of the possessive construction by drawing on syntactic structure. Following Chomsky (1995) and other researchers working in the minimalism framework, the present analysis makes crucial use of strictly binary syntactic representation. The possessive construction is viewed to be right-branching, where the head is assigned the possessive case by its appropriate caseassigner. Following Fukui (1986) where projection of the functional head D is argued for, this study proposes syntactic structure (14) for the possessive construction (11c):

4. An anonymous reviewer raised objection to the syntactic structure (14), pointing out the problem that structures (13) and (14) receive different semantic interpretation although they commonly share the right-branching structure. That is, every modifier in (13) modifies the final head noun, whereas each modifier in (14) modifies its immediately following noun, not the phrase-final head noun. A rejoinder to this question is dealt with
In syntactic structure (14), the possessive case marker is base-generated and the head noun is assigned the possessive case by the case marker. D dominated by DP assigns the possessive case to the head noun. That is, the noun dominated by NP$_2$ is assigned the possessive case by D$_1$, the one dominated by NP$_4$ by D$_2$, and the one dominated by NP$_6$ by D$_3$.

Provided the edge-alignment referring to the left edge of the branching XP, NP$_1$, NP$_3$, and NP$_5$ in (14) invoke the mapping constraint. Note that DP's do not invoke the mapping constraint since they do not constitute lexical category$^5$. Also note here that NP$_7$ does not invoke

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5. Truckenbrodt (1999) argues that mapping constraints apply to the lexically headed syntactic category, exempting functional categories from invoking any mapping constraint. Lexical Category Condition (Truckenbrodt 1999: 226) says “Constraints relating syntactic and prosodic categories apply to lexical syntactic elements and their projections, but not to functional elements and their projections, or to empty syntactic elements and their projections.”
Align-XP since it is non-branching, and hence it fails to form a phonological phrase of its own. This is why the head noun groups with its immediately preceding noun in the stacked possessive structure. That is, every NP in the possessive construction forms its own phonological phrase and yet the final modifier and its head group together to form a binary phrase. Thus, the analysis referring to the left edge of the maximal projection, crucially checking whether it branches or not, correctly accounts for phonological phrasing of the possessive construction in NK Korean.

Because of the final binary grouping it appears as if the stacked possessive structure respects eurythmy, but it has been argued that a binary phonological phrase at the right edge is structurally due to the fact that the head noun of the entire noun phrase does not invoke the mapping constraint since it is by nature non-branching. It follows then that the binary phrase in the possessive construction is not motivated by the eurythmy effect, but falls out from the way syntactic structure is organized, hence predominantly resulting in otherwise highly marked unary phrases.

We now turn to phrasing of the conjunctive structure.

4. Phrasing of the Conjunctive Construction

The present analysis extends syntactic representation of the possessive construction to the conjunctive, and represents the conjunctive as structurally right-branching. Conjunctive construction in (15) is repeated from (5):

(15) Conjunctive
   a. mocá-wa yáŋmal-kwa cáŋkáp
      (mocá-wa) (yáŋmal-kwa) (cáŋkáp)
      ‘hat and socks and gloves’
   b. hósláŋi-wa kóyáŋi-wa kaŋáci-wa kaykwólí
      (hósláŋi-wa) (kóyáŋi-wa) (kaŋáci-wa) (kaykwólí)
      ‘tiger and cat and puppy and frog’
In comparison with the possessive, the conjunctive construction yields unary phrasing across the board and each conjunct forms its own phonological phrase. This indicates that it is syntactically right-branching, as represented in (16):6

(16) \[\begin{array}{c}
\text{NP}_1 \\
| /
\text{NP}_2 \\
| /
\text{N'} \text{D}_1 \\
| /
\text{N} \text{NP}_3 \\
| /
\text{N'} \text{D}_2 \\
| /
\text{N} \text{NP}_4 \\
| /
\text{N'} \text{D}_3 \\
| /
\text{N} \text{NP}_5 \\
| /
\text{N'} \text{D}_4 \\
| /
\text{N} \text{NP}_6 \\
| /
\text{N'} \text{D}_5 \\
| /
\text{N} \text{NP}_7 \\
| /
\text{N'} \text{D}_6 \\
| /
\text{N} \text{NP}_8 \\
| /
\text{N'} \text{D}_7 \\
| /
\text{N} \text{NP}_9 \\
\end{array}\]

(hóláñi-\text{wa}) (kóyáñi-\text{wa}) (kañáci-\text{wa}) (kaykwúli-\text{wa})

With the base-generated conjunctive case, the conjunctive structure (16) is similar to the possessive structure (14) except for the sub-structure of

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6. An anonymous reviewer informed me of the Hebrew data supporting the conjunctive structure (16). Just as the Korean conjunctive is conjoined as “A-and B-and C” using postposition, the Hebrew conjunctive is conjoined as “A and-B and-C” using preposition. While the postposition of the Korean conjunctive surfaces as [wa] or [kwa], the preposition of the Hebrew conjunctive is phonetically realized as [va], [vu] or [va]. “These prepositions have no existence as separate words but, like the article, they attach themselves, as prefixes, to the words they govern. They are therefore called Inseparable Prepositions.” (Weingreen 1959: 27)
NP₇: NP₇ is branching in the conjunctive, while it is non-branching in the possessive structure. The representation of NP₇ branching into NP₅ and DP will be independently argued for in the following section⁷. I assume here that D dominated by DP assigns the conjunctive case to the head noun in the same way as it assigns the possessive case in (14).

Given the syntactic structure (16) for the conjunctive construction, phrasing follows automatically from the edge-alignment of the branching XP, hence resulting in four phonological phrases at the left edges of NP₁, NP₃, NP₅ and NP₇. Note that in (14) NP₇ does not invoke the mapping constraint because it is non-branching, while it does in (16) since it is a lexically headed branching node.

In what follows we discuss some consequences of the present analysis by examining the way in which the conjunctive structure interacts with its head or its modifier. Semantic meaning could be ambiguous in English depending on whether the adjective modifies its immediately following noun or noun phrase as in (17) or whether the head noun is modified by the immediately preceding conjunct or the entire conjunctive phrase as in (18).

(17) a. [[old men] [and women]] → (old men) (and women)
    b. [old [men and women]] → (old men and women)

(18) a. [[cats] [and lion's cubs]] → (cats) (and lion's cubs)
    b. [[cat's and lion's] cubs] → (cat's and lion's cubs)

The phonological phrasing in (17a) and (18a) indicates that the syntactic structure required for semantic interpretation is isomorphic to phonological phrasing, but the one in (17b) and (18b) shows that this is not always the case.

As in English, phrasing in NK Korean also differs according to whether the adjective modifies the following noun or noun phrase. In (19a) the adjective modifies the following noun, while in (19b) it

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⁷ Under the view of the base-generated conjunctive case, a morphosyntactic rule is required in standard Modern Korean to the effect that the conjunctive case marker is deleted when it stands in the conjunctive-final position. This accounts for the absence of the phrase-final conjunctive case marker in (15).
modifies the following noun phrase.

(19) a. [[Adj N-Conj] [N]]
    nálkun mocá-wa yáŋmal → (nálkun mocá-wa) (yáŋmal)
    [[old hat and] [socks]]
    sanáwun hó:lánì-wa kó:yáŋì → (sanáwun hó:lánì-wa) (kó:yáŋì)
    [[tough tiger and] [cat]]

b. [[Adj] [N-Conj N]]
    nálkun mocá-wa yáŋmal → (nálkun) (mocá-wa) (yáŋmal)
    [[old] [hat and socks]]
    sanáwun hó:lánì-wa kó:yáŋì → (sanáwun) (hó:lánì-wa) (kó:yáŋì)
    [[tough] [tiger and cat]]

Two types of syntactic structure in (19a, b) are represented as (20a, b) respectively. To simplify representations, we abbreviate the complex structure, indicating only those elements that are relevant to the syntax-prosody mapping.

(20) a. [[Adj N-Conj] [N]]
    NP₁
    / \  
    NP₂ DP
    / \ / \  
    (Adj NP₃ D₁ NP₄
    / \  
    (NP₅ DP

b. [[Adj] [N-Conj N]]
    NP₁
    / \  
    NP₂
    / \ / \  
    (Adj  NP₃ DP
    / \  
    D₁ NP₄
    / \  
    (NP₅ DP

In (20a) the left edges of NP₁ and NP₂ coincide, and NP₄ invokes another phonological phrase, hence yielding two phonological phrases. Note that NP₃ and NP₅ do not invoke a phonological phrase since they are non-branching. By contrast, in the syntactic structure (20b), both NP₁ and NP₂ trigger a phrasal boundary at the left edge. In addition, NP₄ also invokes the mapping constraint. Thus, there arise three phonological phrases when the preceding adjective modifies the conjunctive noun
phrase as in (19b). Phrasing in (19b) with three phonological phrases contrasts with its English equivalent in (17b) with a single phonological phrase.

In (21) we see the case in which the conjunctive phrase modifies its following head noun:

\[
(21) \left[ [\text{Adj-Conj Adj]} \ [N] \right] \\
\text{málk-ko kó:wán elkwúl} \rightarrow (\text{málk-ko}) (kó:wán elkwúl) \\
[\text{[clean and fair] complexion}] \\
\text{pálk-ko nélpun matáq} \rightarrow (\text{pálk-ko}) (nélpun matáq) \\
[\text{[bright and spacious] yard}] \\
\]

Phrasing in (21) contrasts with its English equivalent in (18b). The syntactic structure of (21) is represented as (22), where the modifier is left-branching to the head but the modifying AP itself is right-branching.

\[
(22) \\
\text{NP}_1 \\
\text{AP}_1 \quad \text{N} \\
\text{AP}_2 \quad \text{DP} \\
\text{D} \quad \text{AP}_3 \\
\text{AP}_4 \quad \text{DP} \\
\]

The left edges of the branching XP, namely NP₁, AP₁, and AP₃ trigger a phonological phrase, but the left edges of NP₁ and AP₁ coincide. Thus, there arise two phonological phrases given the syntactic structure (22).

As an analogy to (19) then, phrasing would differ according to whether the conjunctive adjective phrase modifies the following noun or noun phrase. In (23a) the AP modifies the following noun, while in (23b) it modifies the following noun phrase.
(23) a. [[[Adj-Conj Adj] N-Conj] [N]]
   málk-ko alumnáwun cayén-kwa inkán →
   (málk-ko)(alumnáwun cayen-kwa)(inkán)
   [[[clean and beautiful] [nature and]] [men]]
   saná-p-ko kéchín hölán-wa kóyáñi →
   (saná-p-ko) (kéchín hölan-wa) (kóyáñi)
   [[[tough and wild] [tiger and]] [cat]]

b. [[[Adj-Conj Adj] [N-Conj N]]
   málk-ko alumnáwun cayén-kwa inkán →
   (málk-ko)(alumnáwun)(cayén-kwa)(inkán)
   [[[clean and beautiful] [nature and men]]
   saná-p-ko kéchín hölán-wa kóyáñi →
   (saná-p-ko) (kéchín) (hölán-wa) (kóyáñi)
   [[[tough and wild] [tiger and cat]]

The relationship between the modifier and the head in (23a, b) is parallel to the one in (19a, b) respectively. Two types of syntactic structure for (23a, b) are represented as (24a, b) respectively:

(24) a. 
   / \  b. 
  NP1 / \  NP1
     / \   / \ 
    NP2 DP AP1 NP2
     / \   / \ 
    AP1 NP3 D NP4 (AP2 DP (NP3 DP
     / \   / \ 
    (AP2 DP (NP5 DP D AP3 D NP4
     / \   / \ 
    D AP3   (AP4 DP (NP3 DP
     / \   / \ 
    (AP4 DP

In (24a) it is NP1 (coinciding with NP2 and AP1), AP3, and NP4 that invoke the mapping constraint since they are lexically headed and branching constituents. In (24b) NP2 invokes the mapping constraint independently of NP1, hence marking another phonological phrase.

The discussion on the interaction of the conjunctive constructions
consistently shows that the mapping constraint Align-XP-br, L correctly maps out surface syntactic structure into phonological phrases, and by doing so, supports the claim that syntactic structure required for semantic interpretation is not necessarily isomorphic to phonological phrasing (Selkirk 1986, Truckenbrodt 1999).

Not only the conjunctive case marker [wa] but other coordinating conjunctives such as [na] ‘or’ (for arguments) and [kena] ‘or’ (for predicates) also work in similar fashion with respect to phrasing. The data in (25) are substitution of [na] for [wa] and [kena] for [ko] from the data in (2) and the former behaves in the same way as the latter with respect to phonological phrasing.

(25) a. (N-Conj) (N)
   mocá-na yáqmal → (mocá-na) (yáqmal)   ‘hat or socks’
   hóląqí-na kóyáqí → (hóląqí-na) (kóyáqí)   ‘tiger or cat’

   b. (Adj-Conj) (Adj)
   malk-kena kówúñ → (malk-kena) (kówúñ)   ‘clean or fair’
   palk-kena nélpun → (palk-kena) (nélpun)   ‘bright or spacious’

To summarize, it has been shown that the conjunctive structure, like the possessive, is right-branching, whereby prosodic mapping automatically results in unary phrasing. The conjunctive shares with the possessive a highly marked phrasing pattern, namely that both constructions disallow ternary phonological phrases. They differ, however, in that the former allows unary phrases across the board, whereas in the latter the last modifier and its immediately following head noun group together into a binary phrase. This provides supporting evidence to the claim that the phrase-final conjoined element is branching due to its following conjunctive case marker—a claim which has yet to be argued for.

We now turn to investigation of the phonological status of the phrase-final conjunctive case marker since it has so far appeared to be phonologically null.
5. Branchingness of the Conjunctive-final Element

Phonological phrasing in the present analysis makes crucial reference to syntactic structure in which the last conjunct of the conjunctive structure is branching by itself. Refer to NP7 in (16). In this section, the syntactic structure in which the last conjunct is branching is argued for on two grounds: one from the perspective of the contemporary colloquial speech and the other from the sourcebook of the Middle Korean work Suk-po-sang-col. In syntactic structure (26) NP3 branches into NP4 and DP2.

```
(26)    NP1
     /  \  \
NP2  DP1
     /   \ \
  D1   NP3
     /     \ \
   NP4  DP2
     /   \ \
    D2
```

a. (X-wa) (Y-wa) : Middle Korean
b. (X-hako) (Y-hako) : Colloquial Modern Korean

It is assumed that D assigns the conjunctive case to the head noun. Then, just as the conjunctive case marker is overt in the noun dominated by NP2, postulation of DP2 in (26) would make the conjunctive case marker overt in the noun dominated by NP4. Provided that the conjunctive case is base-generated, the conjunctive construction of [X-wa Y], for example, is represented as [X-wa Y-wa] as in (26a), where the phrase-final conjunctive marker [wa] is overt. This is the case that is observed in Middle Korean. In addition, the colloquial equivalent of the conjunctive case marker [hako] as in (26b) is adduced to lend supporting evidence for the branchingness of the last conjunct.

First, the conjunctive case marker following the last conjunct can be traced back to the Middle Korean. Evidence is drawn from the Middle Korean work Suk-po-sang-col published in 1447. Evidence is amply
found in *Suk-po-sang-col* to the effect that the last conjunct is followed by the conjunctive case marker, which in turn is followed by the nominative, accusative, predicate, or appositive, hence showing double case markers after noun. Examples are illustrated in (27) through (30):

(27) Nominative
   a. 모든 사람과 六師의 보고 (釋譜 六 30a)
      every person-Conj six teachers-Conj-nom. see-Conj
   b. 몰과 六과 果實의 다 맛초 didFinish (釋譜 六 31b)
      pond-Conj flower-Conj fruit-Conj-nom. all (be) prepared

(28) Accusative
   a. 沙門과 婆羅門과를 恭敬혼디면 (釋譜 六 29a)
      priest-Conj Brahman-Conj-acc. respect-conditional
   b. 부터 마리와 손톱과를 바쳐 주신대 (釋譜 六 44b)
      Buddha's hair-Conj fingernail-Conj-acc. take out-stat. give-hon.
   c. 부터와 종과를 請ᄒᆞ수보리ᄒᆞ셩다 (釋譜 六 16b)
      Buddha-Conj monk-Conj-acc. invite-intentional

(29) Predicate
   a. 세 德은 法과 身과 懼若와 解脫매라 (釋譜 六 29a)
      three virtues-nom. law-Conj body-Conj wisdom-Conj awareness-Conj-pred.-ind.
   b. 네 가짓 受苦는 生과 老과 病과 死에라 (釋譜 六 4a)
      four pains-nom. life-Conj aging-Conj sickness-Conj death-Conj-pred.-ind.

(30) Appositive
   a. 須臾이 부터와 樑閣 마을 든고 소홈도터 (釋譜 六 16b)
      Swutal-nom. Buddha-Conj monk-Conj-app. remak-acc. hear-Conj get goosebumps

These conjunctive constructions support the representation as in (26a), where the last conjunct is overtly followed by the conjunctive case marker.

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8. I am grateful to Professor Doo-Hyun Baek for the invaluable data from the Middle Korean.
[wa]. The conjunctive case marker [wa] as a formal form in Modern Korean is no longer overt in the phrase-final position (refer to footnote (8)), but it seems that it leaves its structural trace behind in the syntactic structure.

The function of the structural trace, however, is more than a historic relic. Its existence is reflected in the colloquial speech of Modern Korean by way of an overt conjunctive case marker after the last conjunct. This constitutes the second evidence for postulating DP2 in (26). In less formal speech the conjunctive case marker [wa] is replaced by [hako]. What is noteworthy in this style of speech is that the final conjunct in the conjunctive construction surfaces with an overt conjunctive case marker [hako], as illustrated below:

(31) a. Nominative
yáømal-hako mocá-hako philyohata → (yáømal-hako) (moca-hako philyohata)
socks-Conj hat-Conj (nom.) necessary-ind.
'Socks and a hat are needed.'

b. Accusative
yáømal-hako mocá-hako sayôghanta → (yáømal-hako) (moca-hako sayôghanta)
socks-Conj hat-Conj (acc.) use-ind.
'(pro) uses socks and a hat.'

c. Predicate
yáømal-hako mocá-hako-ta → (yáømal-hako) (moca-hako-ta)
socks-Conj hat-Conj (pred.) be-ind.
'(They're) socks and a hat.'

d. Appositive
yáømal-hako mocá-hako-la-nun mal-e → (yáømal-hako) (moca-hako-la-nun mal-e)
socks-Conj hat-Conj-app. word-loco
'at the remark of socks and a hat'

9. This is also true of [nɑ] 'or', as introduced in (25). Cases are illustrated below:

a. Nominative
yáømal-ina mocá-na philyohata → (yáømal-ina) (moca-na philyohata)
socks-or hat-or (nom.) necessary-ind.
'Socks or a hat is needed.'

b. Accusative
yáømal-ina mocá-na sayôghanta → (yáømal-ina) (moca-na sayôghanta)
socks-or hat-or (acc.) use-ind.
'(pro) uses socks or a hat.'
In the colloquial speech of Modern Korean the conjunctive case marker [hako] overtly surfaces at the end of the conjunctive construction, although as discussed above, its formal counterpart [wa] is not phonologically overt in this position.

To summarize, the branching structure of the rightmost conjoined element, namely postulation of DP$_2$ in (26) is argued for on the ground of the overt conjunctive case marker [hako] in Modern Korean as well as [wa] in Middle Korean, making contrasts with the possessive construction where the final head noun is non-branching. This leads to the asymmetry between the conjunctive and the possessive constructions with respect to phonological phrasing, namely that the former yields unary phrases across the board, whereas the latter allows a binary grouping wrapping the final modifier and its immediately following head noun.

6. Which Level of Syntax Interfaces with Phonology?

From the syntactic point of view, the possessive and conjunctive structures (14) and (16) may look like an amalgam of the syntactic and semantic structures or a locus somewhere in between them. An alternative to the syntactic structure (14) is to start from the structure (32), where the maximal projection of the noun is dominated by DP, following Fukui (1986):
In order to derive the desired phrasing effect from the structure (32), mapping constraints must apply to DP's, maximal projection of the functional category (cf. footnote 5). As a trade-off on the part of the syntactic structure while maintaining Lexical Category Condition (Truckenbrodt 1999), I suggest that morphological restructuring takes place by Chomsky-adjoining D to the NP to which it assigns its possessive case, as represented in (33):

\[
\begin{array}{ccc}
\text{NP} & \text{D} & \text{NP} \\
\text{D'} & \text{DP} & \\
\text{NP} & \text{D} & \text{DP} \\
\end{array}
\]

The structure (33) serves as the syntactic input to which prosodic phonology has access. As claimed in Chomsky (1995), D' is invisible at the interface or computation, and hence the structure (33), one D' is out of picture, becomes equivalent to the structure (14) in its right-branchingness when (33) is identified as the structure where the syntax-phonology interface occurs, it is crucial for the NP to maintain the branching structure, so that the branching NP triggers a phonological phrase at the left edge.

From the phonological point of view, the issue of the syntax-phonology interface lies in which level of surface syntax is relevant to generalizations in phonology. The suspicion on the syntactic structure (14) may be mitigated by the classical problem posed by the bracketing paradoxes between phonology and morphology or between phonology and semantics,
as illustrated by much-discussed examples like ungrammaticality and unhappier respectively (refer to Pesetsky (1985)). Cliticization of the verb in we're and wanna contraction in English may also be categorized as instances of morphological restructuring crossing over the syntactic phrasal boundary. Provided the literature replete with the unresolved conflicts between the components of the grammar, the structure (14) may be borne out as a level in which the syntax-phonology interface takes place. In defense of the structure (14), one might speculate that phonology is interconnected to syntax after morphological restructuring, but before the semantic trajectory of the left-branching structure like (6a).

7. Conclusion

In this study tones are employed as diagnostics of phonological phrasing, which proves to be valuable in clarifying the ways in which syntax and phonology interconnect with each other. This paper provides phonological evidence to the claim that the possessive construction is syntactically right-branching since it yields unary phrasing except for the final rhythmic phonological phrase containing the head. Also argued in this paper are that the conjunctive construction is another right-branching structure, and that the rightmost conjunct of the conjunctive structure is syntactically followed by the conjunctive case marker, hence inducing the branching structure for that final conjunct. As a corollary to this claim, it follows that the mapping constraint referring to the left-edge automatically spins out predominantly unary phrases, which otherwise are a highly marked phrasing pattern in NK Korean.

Recent trends in phonology (Hale and Selkirk 1987, Nespor and Vogel 1986, Selkirk 1986, 1995, Truckenbrodt 1995, 1999) have increased the role of phonologically defined prosodic structures, and share the assumption that only surface syntax is relevant to define the prosodic structure. The present study provides supporting evidence to this generalization, claiming that phonology accesses surface syntactic structure that embraces (empty) functional categories although they do not directly
participate in invoking the mapping constraint.

**References**


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Appendix

(11b) (yé-mi-uy) (énni-uy mocā)

(11c) (yé-mi-uy) (imọ-uy) (myénni-uy mocā)

(12c) (i) (nọlan yağmal)

(12d) (i) (pwtulewun) (nọlan yağmal)

(19a) (nàlkun mocà-wa) (yağmal)

(19b) (nàlkun) (mocà-wa) (yağmal)

(23b) (màlk-kọ) (alumtawun) (càyèn-kwa) (inkàn)

(31) (yağmal-hako) (mocà-hako)