

Structural Distributions of Numeral Expressions in Korean^{*}

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In this paper, we aim to analyze the structural distribution of three types of numeral expressions in Korean. The first type is bare numerals, the second is numerals combined with a classifier and *-uy*, (i.e. Num-CL-*uy*), and the third is numerals with a classifier (i.e. Num-CL) in post-nominal position. We show that the bare numeral serves as a boundary between low and high modifiers (NP vs. FP modifiers); that is, it is placed right above NP modifiers and below FP modifiers that are affixed with the relative clause marker *-n*. Following Hong (2010) and An (2014), we argue that *-uy* in the Num-CL-*uy* form is a marker of FP modifiers as it can alternate with other FP modifiers in linear order. Finally, we attempt to derive post-nominal Num-CL without the *uy* marker and argue that the Num-CL form is derived by NP movement to SpecFP.

Keywords: Classifiers, Numerals, Nominal Structure, NP & DP modifiers, Reduced Relative Clauses.

1. Introduction

The ordering restriction of prenominal modifiers has been discussed in a fair amount of previous literature (Greenberg 1963, Scott 2002, Cinque 1994, 2005, 2010, among others). It is well-known that prenominal modifiers, including demonstratives, numerals, and adjectives, are positioned in particular order within noun phrases. In this paper, we will address the distribution of numerals and numeral expressions combined with clas-

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sifiers in Korean. The three types of the expressions in our interest are shown in (1a-c).¹⁾

- (1) a. Ku alumtawu-n twu say kenmwul
The beautiful-RRC two new building
- b. Ku twu chay-uy alumtawu-n say kenmwul
The two-CL-Gen beautiful-RRC new building
- c. Ku alumtawu-n say kenmwul twu chay
The beautiful-RRC new building two-CL
'the two beautiful new buildings'

In (1a-b), numeral expressions with or without classifiers are positioned prior to the head noun. Note that the distribution of bare numerals in (1a) differs from that of numerals with classifiers in (1b).²⁾ The bare numeral *twu* 'two' should be located between adjectives *alumtawu-n* 'beautiful-RRC' and *say* 'new' in (1a). In particular, it must follow the adjective with the Reduced Relative Clause (RRC) marker. On the contrary, (1b-c) show that numerals with classifiers are relatively free in linear order. It can either precede or follow the adjectives. It can even appear in post-nominal position, as shown in (1c).

Not only do the above examples show differences in position within NPs, but they also vary in morphological realizations. In (1a), the numeral *twu* 'two' appears without any inflection (hence, we call it a "bare" numeral). Meanwhile, the numeral with a classifier is affixed with genitive case marker *-uy* in prenominal position (1b).³⁾ When it lacks the case marker, it needs to appear in post-nominal position (1c).

Another question addressed in this paper is whether any co-relation

1) RRC = Reduced Relative Clause

CL = Classifier

- 2) In this paper, bare numerals include only cardinals, such as *twu* 'two' or *sey* 'three', but not *twul* or *seys* – their inflected variants. In the previous literature the latter kind shows different distributions from the former kind (Choi 2011). The inflected variants share distributions with *twu-myeng* or *sey-myeng*, which we will refer to *Num-CL amalgam*. For example, both *haksayng twul* 'two student' and *haksayng twu-myeng* are grammatical, as opposed to the bare numeral counterpart **haksayng twu*.
- 3) In section 3 we will address the issue of whether *-uy* is really a genitive marker. Following Hong (2010), and An (2014), we will argue that it is a FP modification marker.

holds between morphological forms and linear order in nominal structure. To see this, let us consider examples in (2-4). (2a-c) show the bare numeral must be close to NP; that is, it must follow a demonstrative *ku* ‘the’ and precede an adjective *say* ‘new’.

- (2) a. ku alumtawu-n twu say kenmwul
the beautiful-RRC two new building
- b. *twu ku alumtawu-n say kenmwul
two the beautiful-RRC new building
- c. *ku alumtawu-n say twu kenmwul
the beautiful-RRC new two building

On the contrary, the numeral with the classifier and *-uy* can appear in the left-most periphery (3a-b) but cannot follow the NP-modifier *say* ‘new’ in (3c).

- (3) a. twu chay-uy ku alumtawu-n say kenmwul
two -CL-Gen the beautiful-RRC new building
- b. ku twu chay-uy alumtawu-n say kenmwul
the two -CL-Gen beautiful-RRC new building
- c. *ku alumtawu-n say twu chay-uy kenmwul
the beautiful-RRC new two -CL-Gen building

In (4a), the numeral without affixation of the *uy* marker should appear in post-nominal position, but in (4b) no adjectives can do so. (4c) also shows that numerals with classifiers are prohibited without the marker in prenominal position.

- (4) a. ku alumtawu-n say kenmwul twu chay
the beautiful-RRC new building two -CL
- b. *ku kenmwul alumtawu-n say twu chay
the building beautiful-RRC new two -CL
- c. *ku alumtawu-n twu chay say kenmwul
the beautiful-RRC new two -CL building

These distributions observed in (1-4) lead us to the following two questions.

First, what does the distribution of the three types of numeral expressions tell us about the hierarchical structure of noun phrases in Korean? Second, how could we derive the fact that numeral expressions with classifiers appear post-nominally only without the *uy* marker? The remaining of this paper is organized as follows. In section 2, we will address the position of bare numeral expressions in prenominal position. In section 3, we will examine the structural distribution of the numeral expression with a classifier (henceforth Num-CL) in prenominal position and explain why it is affixed with *-uy*. We will also address the issue of whether *-uy* is the genitive case marker or a modification marker. In section 4, we will attempt to derive post-nominal Num-CL. We will address whether this form is derivationally related with the Num-CL-*uy* form. Section 5 is concluding remarks.

2. Numeral Phrase in Prenominal Position

Greenberg's (1963) Universal 20 states that there is a universal ordering restriction among prenominal modifiers: Demonstrative > Numeral > Adjective. Kang (2006), Hong (2010) and An (2014) also argue that Korean obey the constraint. Let us consider (5a-f).

- (5) a. Ku twu say kenmwul (Dem > Num > A)
The two new building
'the two new buildings'
- b. *ku say twu kenmwul (*Dem > A > Num)
- c. *twu ku say kenmwul (*Num > Dem > A)
- d. *twu say ku kenmwul (*Num > A > Dem)
- e. *say ku twu kenmwul (*A > Dem > Num)
- f. *say twu ku kenmwul (*A > Num > Dem)

(An 2014: 385)

(5a) shows the grammatical sequence of prenominal modifiers (i.e. demonstrative> numeral> adjective> noun); meanwhile, other sequences in (5b-f) are ruled out. For example, demonstrative cannot be preceded by numerals

(5c-d) or adjectives (5e-f). From the observations, we can draw a conclusion that demonstrative is placed in the left-most position. As for adjectives, it must follow both demonstratives and bare numerals, being adjacent to the head noun, as shown in (5b) and (5d-f). *Twu* 'two' cannot intervene between *say* 'new' and *kenmwul* 'building' in (5b) or precede *ku* 'the' in (5c-d). To put it simply, the numeral expression is positioned between demonstrative and adjective, which supports the Greenberg's Universal 20.

However, the examples in (6a-b) tell us a bit different story. It appears that they do not obey the Greenberg's order but still grammatical.

- (6) a. *ku saylowu-n twu kenmwul* (Dem > A > Num)
the new-RRC two building
- b. *saylowu-n ku twu kenmwul* (A > Dem > Num)
new-RRC the two building
'the new two buildings'

The examples in (6a-b) have the same linear orders with (5b) and (5e), but they are all acceptable while (5b) and (5e) are not. The only difference between (5) and (6) is morphological forms of adjectives; *say* 'new' is a bare form without any inflection affixed onto the adjective, but its counterpart in (6) *saylowu-n* 'new-RRC' is inflected with the relativize clause marker *-n*.⁴⁾ Note also that the positions of adjectives in (5-6) are different. While the adjective in bare form needs to be adjacent to the noun head, but the one with *-n* seems to appear relatively free in nominal structure.

This dichotomy is explored by Larson (1998). Larson argues that there are two positions for nominal modifiers: DP modifier and NP modifier. Let us first consider (7a-b).

- (7) a. The invisible visible stars include Capella.
b. She is a beautiful beautiful dancer.

(Larson 1998: 12)

4) In the previous literature, *say* 'new' is classified an attributive determinative. Here we follow a classification from the recent literature (Mok 2001, Kang 2005, 2006), classifying such words as *say* 'new', *hen* 'old', *cen* 'former' to attributive adjectives. The classification is based on the empirical fact that they share the distribution and semantic interpretation with attributive adjectives in English.

(7a) means ‘intrinsically visible stars that happen to be invisible at the moment include Capella.’ The adjective *visible* is closer to the noun and represents inherent and enduring visibility, hence interpreted as an individual-level predicate. On the contrary, *invisible* denotes temporary property and is interpreted as a stage-level predicate. The same holds of (7b). There are two occurrences of *beautiful*. The one closer to the noun denotes that ‘she is beautiful as a dancer,’ and behaves as an individual-level adjective. The outer one, on the other hand, denotes that ‘she is a beautiful person’. This occurrence of the adjective behaves as a stage-level predicate. It is interesting to note that the linear order between individual-level and stage-level adjectives is strictly observed: ‘Det > S-level > I-level > noun.’ According to Larson (1998) and Larson and Marusic (2004), S-level modifiers are merged at DP-level, so they are DP modifiers; on the other hand, I-level modifiers are merged at NP-level, so they are NP modifiers.

Larson’s proposal explains the difference between DP modifiers and NP modifiers well, but such difference is not morphologically realized in English. Korean overtly shows the morphological distinction between the modifiers (Kang 2006:159-160): DP modifiers are inflected with the RRC marker *-n*, as shown in (8a-b).

- (8) a. modun pikasycek-i-n kasicek pyel-tul
every invisible-COP-RRC visible star-PLU.
'every invisible visible star'
- b. *modun kasicek pikasycek-i-n pyel-tul
every visible invisible-COP-RRC star-PLU.
'every visible invisible star'

(8a) is the Korean counterpart of (7a). It is important to note that Korean shows an explicit morphological difference between individual-level and stage-level. The stage-level adjective *pikasycek* ‘invisible’ is suffixed by both copula *-i* and relativizer *-n*, but neither of them is suffixed onto the individual-level adjective *kasicek* ‘visible.’ Therefore, the former is derived by reduction of a relativize clause (RRC) and the latter is a simple adjective phrase (AP). (8a) shows a ‘RRC > AP > noun’ sequence. If the order between AP and RRC is reversed, ungrammaticality results in (8b). Two

conclusions can be drawn. First, the adjective affixed with the RRC marker *-n* behaves like a DP modifier and the one in bare form behaves like an NP modifier. Second, on a par with Larson's (1998) suggested order, DP modifiers precede NP modifiers in nominal structure.

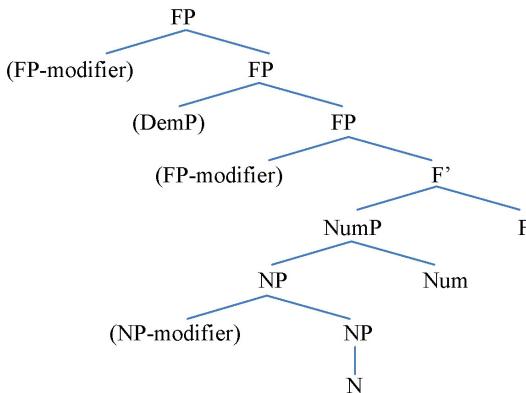
There is one thing to consider for the terminology of DP-modifiers. Recent literature argues that the highest projection of the noun phrases varies cross-linguistically (Bošković 2008, Despić 2013, among others); in other words, some are DP languages where the highest projection is DP and others NP languages where the highest projection is NP. Under the classification Korean is assumed to be one of the NP languages, so the term "DP modifier" seems to be inappropriate. In the upcoming sections, the Num head plays an important role to determine a boundary between RRCs and NP modifiers. We will assume that the high modifiers in Korean adjoin to a functional head F on top of Num. Thus, hereafter we will name the high modifiers "FP-modifiers".

Bearing them in mind, let us get back to *say* and *saylowu-n* in (6a-b), repeated here in (9a-c). Now it is straightforward that they appear in different positions in nominal structure. The examples in (9a-c) show the positions of the *say* and *saylow-n* against numerals and demonstratives.

- (9) a. ku twu (*say* / **saylow-n*) kenmwul
- b. ku (**say* / *saylow-n*) twu kenmwul
- c. (**say* / *saylow-n*) ku twu kenmwul

First, the NP modifier *say* appears next to the head noun and cannot precede numeral *twu* or demonstrative *ku* (9b-c). On the contrary, the RRC *saylow-n* can appear before numeral *twu* in (9b) or demonstrative *ku* in (9c). However, this modifier cannot intervene between the bare numeral and noun in (9a). To put together, it looks like the bare numeral serves as a boundary between RRC and NP modifiers, placed right above NP as an independent phrase, following RRCs and preceding NP modifiers. Thus, we argue that the bare numeral (i.e. number phrase) is projected between FP and NP modifiers, as diagrammed in (10).

(10)



So far we have observed that the position of bare numerals should be right above NP modifiers, and that it marks the position of FP modifiers and NP modifiers. FP modifiers, affixed with the RRC marker *-n*, must appear above the bare numeral, but NP modifiers appear below the numeral. In the following two sections, we will look into the distributions of numerals affixed with classifiers.

3. Numeral with Classifier in Prenominal Position

3.1. The distribution of numeral with classifier

In this section, we will examine another type of numeral expressions – i.e. numerals with classifiers (henceforth, Num-CL) in prenominal position. Unlike bare numerals, Num-CL must be affixed with the genitive marker *-uy* in prenominal position. The examples in (11a-c) indicate that Num-CL is prohibited without *-uy*.

- (11) a. twu-chay*(-uy) say kenmwul
two-CL-uy new building
'two new buildings'
- b. sey-kwuen*(-uy) Chelsu-uy chayk
three-CL-uy Chelsu-uy book
'Chelsu's three books'

- c. ney-pyeng*(-uy) siwuenha-n maykcwu.
 Four-CL-uy cool-RRC beer
 'four bottles of cool beer'

The position of the Num-CL-*uy* form differs from that of bare numerals. Let us consider (12a-d). While the Num-CL-*uy* form cannot be preceded by *say* in (12b), it can precede a demonstrative in (12c) and a FP modifier *saylowu-n* in (12d).

- (12) a. Ku twu-chay-uy say kenmwul (Dem > Num > NP modifier)
 The two-CL-gen new-RRC building
 'the two new buildings'
 b. *Ku say twu-chay-uy kenmwul (*Dem > NP modifier > Num)
 c. Twu-chay-uy ku say kenmwul (Num > Dem > NP modifier)
 d. Ku twu-chay-uy saylowu-n kenmwul (Dem > Num > FP modifier)

The examples above show that the Num-CL-*uy* form can share the same distribution with FP modifiers. This analysis is supported by the fact that the form can alternate with other FP modifiers. That is shown in (13a-d). (13a-b) indicates that the Num-CL-*uy* form may appear before or after FP modifiers. (13c-d) show that it can even appear before the demonstrative, just like the FP modifier with the RRC marker *-n*.

- (13) a. Ku twu-chay-uy saylowu-n kenmwul (Dem > Num > A)
 The two-CL-gen new-RRC building
 'the two new buildings'
 b. Ku saylowu-n two-chay-uy kenmwul (Dem > A > Num)
 c. Two-chay-uy saylowu-n ku kenmwul (Num > A > Dem)
 d. Saylowu-n twu-chay-uy ku kenmwul (A > Num > Dem)
 (An 2014: 384)

We have observed that the Num-CL-*uy* form behaves like a FP modifier. Before moving to the third type of numeral expressions in Korean, we will address an issue of whether *-uy* is a genitive case marker or a marker of FP modifiers in the next section.

3.2. Another FP modifier in Korean

There has been a fair amount of recent literature that addresses the role of the *-uy* marker. Traditionally, it has been considered to denote a possessor (Park 2004, Park 2014, among others), but the recent literature, such as Hong (2010) and An (2014), takes it as an allomorph of the K morpheme that marks FP-modifiers.⁵⁾ Let us consider (14a-c).

- (14) a. Chomskhi-wa-uy inthebyu
Chomsky-with-uy interview
‘an interview with Chomsky’
- b. yulep-ul-o-uy yehayng
Europe-to-uy trip
‘a trip to Europe’
- c. hayngpok-uy swunkan
happiness-uy moment
‘a happy moment’

(An 2014: 364)

In (14a), the *uy* marker is attached to the preposition phrase *Chomskhi-wa* ‘with Chomsky’, and *yulep-ul-o* ‘to Europe’ in (14b), which indicates that the marker has nothing to do with genitive case here. Since the prepositions *-wa* and *-ul-o* already assign case to the noun phrases, there is no need for *-uy* to assign case. In addition, it is also attached to nouns which do not denote possession relations, as exemplified by *hayngpok-uy* ‘happiness’ in (14c).

Besides, *-uy* does not have anything to do with theta-roles. In (15a), *kongsankwun* ‘communist’ receives an agent theta-role from *chimlyak* ‘invasion’ where the occurrence of *uy* is optional. (15b-c) show that it is required when there is an intervening element between the head noun and the agent, *kongsankwun-uy* ‘communist’. An argues that this supports the occurrence of *-uy* depends on the position, not a possessor marker.

5) An (2014:372) proposes that the markers *-n* and *-l* and *-uy* are in an allomorphic relation as described in (i).

K → *-n* / [NP Ø past/perfect/realis — N]
-l / [NP Ø future/imperfect/irrealis — N]
-uy / elsewhere

- (15) a. Konsankwun (-uy) chimlyak
 Communist army -uy invasion
 'communist's invasion'
 b. Kongsankwun*(-uy) namhan chimlyak
 communist army-uy South Korea invasion
 c. Kongsankwun*(-uy) namhan-uy chimlyak
 communist army-uy South Korea-uy invasion

(An 2014: 375-376)

Their approach goes well with our analysis for the distribution of the Num-CL-*uy* form. For one, *-uy* is obligatory in (15b-c) when the modifier is separated from the head, which indicates it is a FP modifier. Consider (16a-d). The modifier with *-uy* may appear prior to demonstratives or between demonstratives and numerals, and that the only position it cannot appear is between the head and NP modifiers *say* 'new'.

- (16) a. ku (Chelsu-uy) twu say kenmwul
 the (Chelsu-uy) two new building
 'Chelsu's two new buildings'
 b. (Chelsu-uy) ku twu say kenmwul
 (Chelsu-uy) the two new building
 c. ku twu (*Chelsu-uy) say kenmwul
 the two (*Chelsu-uy) new building
 d. ku twu say (*Chelsu-uy) kenmwul
 the two new (*Chelsu-uy) building

For another it can alternate with the RRC modifier in linear order, which also indicates that the modifier with *-uy* is a FP modifier. (17a-d) illustrate that *Chelsu-uy* and *saylowu-n* are free alternates in various contexts of nominal structure.

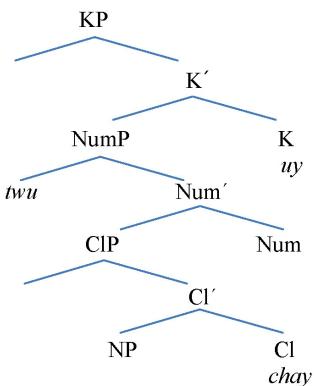
- (17) a. ku Chelsu-uy saylowu-n twu kenmwul
 the Chelsu's new-RRC two building
 'Chelsu's two new buildings'
 b. ku saylowu-n Chelsu-uy twu kenmwul
 the Chelsu's new-RRC two building
 c. Chelsu-uy saylowu-n ku twu kenmwul
 Chelsu's new-RRC the two building
 d. saylowu-n Chelsu-uy ku twu kenmwul
 new-RRC Chelsu's the two building

The alternations in (17) are identical to those of the Num-CL-*uy* form in (13), repeated here in (18). Therefore, we can conclude –*uy* in the Num-CL-*uy* form is a FP-modification marker.

- (18) a. Ku twu-chay-uy saylowu-n kenmwul (Dem > Num > A)
 The two-CL-gen new-RRC building
 ‘the two new buildings’
- b. Ku saylowu-n two-chay-uy kenmwul (Dem > A > Num)
- c. Two-chay-uy saylowu-n ku kenmwul (Num > A > Dem)
- d. Saylowu-n twu-chay-uy ku kenmwul (A > Num > Dem)
- (An 2014: 384)

Accordingly, the Num-CL-*uy* form should be adjoined to FP and on top of NumP we assume that the –*uy* head, which is dubbed K, merges, as shown in (19) (Li 1999, Borer 2005, Cheng and Sybesma 1999).⁶⁾

- (19)



To sum up, following Larson’s (1998) analysis of nominal modifiers within nominal phrase, NP modifiers must be adjacent to the head noun, but FP modifiers are projected higher than NP modifiers and have a relatively free

6) An anonymous reviewer points out that NP must be null in the Num-CL-*uy* form. For example, the NP cannot be overtly realized as *kenmwul* ‘building’. We argue that the NP could be covert, in that the classifier itself denotes the property of NP. However, it is not true that NP needs to be covert in this form; it could be overtly realized. If so, it would raise to SpecFP, resulting in *kenmwul twu chay-uy* ‘building two CL-*uy*’.

linear order. These two types are distinguishable in Korean through morphological realizations. In Korean, NP modifiers do not show any inflections, while FP modifiers should be inflected by K-suffixes either *-n*, or *-uy*. We also observed that bare numerals seem to divide NP modifiers with FP modifiers since they precede NP modifiers and follow FP modifiers. When followed by classifiers, the numeral expression needs to be suffixed with *-uy* in pre-nominal position and it behaves as a FP modifier. We also pointed out that they share the distribution with other FP modifiers, such as the RRC form.

4. Num-CL in Post-Nominal Position

In this section, we will take into account the third type of numeral expressions, which appear in post-nominal position. To achieve the goal, we will first investigate the property of post-nominal numeral phrases and then attempt to derive the post-nominal numeral.

4.1. Distribution of post-nominal Num-CL

Recall in section 2 that bare numerals must be adjacent to NP, and that they can stay in the original position. However, not all numerals may appear in bare form. Korean is a classifier language and count nouns are required to agree with a classifier (Chierchia 1998, Choi 2011, Shin 2009, among others). When numerals are accompanied with classifiers, they cannot be positioned in pre-nominal position in (20a) and (20c); instead, they must be positioned in post-nominal, as shown in (20b) and (20d).

- (20) a. ku twu (*chay) kenmwul
the two-CL building
- b. ku kenmwul twu chay
the building two-CL
'the two buildings'
- c. ku tases (*kay) thakca
the five -CL table
- d. ku thakca tases kay
the table five-CL
'the five tables'

As examined in section 3, the Num-CL form in prenominal position must be accompanied with the K-suffix *-uy*, otherwise the sentence would be degraded as shown in (21a-b).

- (21) a. ku twu chay -**(uy)* kenmwul
the two-CL-uy building
'the two buildings'
- b. ku tases kwen-**(uy)* chayk
the five -CL -uy book
'the five books'

Korean presents the Num-CL form which appears in post-nominal position, as shown in (22a-b). Note that the post-nominal modifier must bear a classifier without *-uy*.

- (22) a. saylowu-n kenmwul two-chay-(**uy*)
new-RRC building two-CL(*-Gen)
'the two new buildings'
- b. say chayk tases-kwen(*-*uy*)
new book five-CL(*-Gen)
'Five new books'

One immediately raised question would be whether the post-nominal form is a FP or NP modifier. An (2014) suggests that post-nominal Num-CL be in the same position as is Num-CL-*uy* in pre-nominal position, that head or phrase raising derive the post-nominal Num-CL form, and that the *uy* marker attaches post-cyclically. Watanabe (2006) makes a similar observation for with or without a genitive marker *no* in Japanese, in that it is suffixed to the classifier at PF. However, the data shown in this paper indicates that Num-CL in post-nominal position is unrelated to Num-CL-*uy* in prenominal position. As illustrated in the previous section, FP modifiers can alternate with each other. If post-nominal numeral expressions were FP modifiers, other FP modifiers should be able to appear in post-nominal and alternate with the post-nominal numeral modifier. (23a-b) tell us that this is not the case.

- (23) a. Kenmwul (*saylowu-n) twu-chay (*saylowu-n)
building new-RRC two-CL new-RRC
'the two new buildings'

- b. Kenmwul (*Chelsu-uy) twu-chay (*Chelsu-uy)
 building Chelsu-uy two-CL Chelsu-uy
 'Chelsu's two buildings'

(23a-b) indicate that the Num-CL modifier is the only thing that can be positioned in post-nominal position. Note that adjectives with the RRC marker cannot appear in post-nominal position in (23a), and that even the one with *-uy* cannot appear in that position (23b). This means there is no position for FP modifiers in post-nominal.⁷⁾

4.2. NP movement to SpecFP

The underlying position of post-nominal modifiers has been debated in the previous literature (see Alexiadou, Heageman, and Stabrou 2007). Some researchers, such as Lamarche (1991) and Bouchard (1997), argue that they are base-generated to the rightward of the noun; thus, the position of post-nominal modifiers is separated from that of prenominal modifiers. Others, such as Bernstein (1991), Valois (1991) and Cinque (1994, 2010), claim that post-nominals are derived by N-raising or NP movement. For example, Cinque (1994, 2010) points out that the different linear order between Romance languages and Germanic is attributed to the movement of noun, passing adjectives. Let us take a look at the examples in (24a-d).

- (24) a. The Italian invasion of Albania (Germanic)
 b. *L'Italiana invasione dell'Albania (Romance)
 c. L'invasione Italiana dell'Albania (Romance)
 d. *L'invasione dell'Albania Italiana (Romance)

(Cinque 1994: 21)

(24a) shows the adjective *Italian* precedes the noun *invasion* in English. On the contrary, (24b-c) show that the adjective should follow the noun in Romance language. To explain this different linear order, Cinque argues

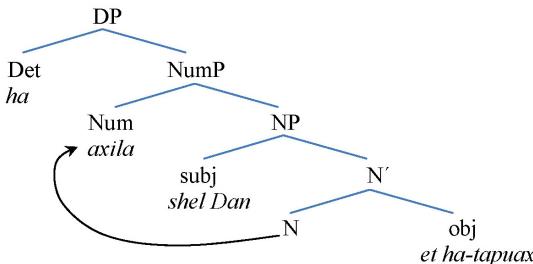
7) Shin (2009), following Li (1999), also argues that Num-CL-uy in prenominal position is different from Num-CL in post-nominal position for their semantic and selectional properties. According to Shin (2009), Num-CL-uy is just a predicational modifier of the type of <<e,t>, <e,t>>. On the contrary, Num-CL in post-nominal position is the type of <e,<e,t>>. If the morphological property is realized at PF-level, it should not affect their meaning differences. Hence, morphological realization of *uy* makes a structural influence and must be analyzed in narrow syntax. Thus, she concludes that their base-generation positions differ from each other.

that underlyingly the two languages have the same linear order (adjective-noun) but only Romance permits the noun to move up to leftward past adjectives; on the contrary, Germanic does not. Consequently, they show the different distributions.

Following this perspective, we can derive post-nominal numeral expressions in Korean as follows: the Num-CL form is base-generated in left periphery to the noun phrase, and the noun phrase raises to a position where it can check a strong feature of the functional head to derive the Num-CL form. This derivation is similar to the one found in the previous literature where the singular/plural marker placed in Num triggers noun movement to check its uninterpretable feature (Ritter 1991, Valois 1991, Bernstein 2001). (25a-b) show the derivation of noun movement to Num in Hebrew.

- (25) a. ha-axila shel Dan et ha-tapuax
 the-eating of Dan of the-apple
 'Dan's eating of the apple'

b.



(Bernstein 2001: 556)

If there is a movement to derive post-nominal Num-CL in Korean, should it be head-raising or NP-movement? We argue that it is NP that raises (cf. Choi 2011). It is on the empirical basis. We observe that NP modifiers must be put between number and noun. Importantly it cannot be stranded in-situ. To see this, let us consider (26a-d).

- (26) a. say chayk (*say) tases-kwen (*say)
 new book new five(-CL) new
 'five new books'

- b. namwu thakca (*namwu) yel-kay (*namwu)
 wooden table wooden ten-CL wooden
 'ten wooden tables'

In (26a), the NP modifier *say* 'new' cannot be stranded in post-nominal position. When the head noun *chayk* 'book' moves to a higher position across the Num-CL form, the adjective also moves up along with it. Another NP modifier *namwu* 'wooden' in (26b) shows the same phenomenon; it cannot be stranded post-nominally. If only the head noun moved to higher position, the NP modifiers should be able to stay in post-nominal position. This is not the case. The empirical evidence leads us to conclude that it is NP that raises to higher position.

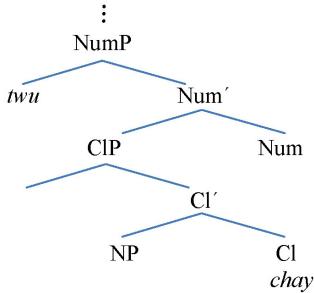
Bearing this in mind, let us address where the NP movement raises in the nominal structure. We argue that the landing site of the NP move some position right above Num-CL amalgam. The most important clue stems from the fact that FP modifiers cannot occur between NP and post-nominal numeral expressions. Let us consider the examples in (27a-d).

- (27) a. Chelsu-uy Kenmwul twu-chay
 Chelsu-uy building two-CL
 'two buildings of Chelsu's'
 b. *kenmwul Chelsu-uy twu-chay
 Building Chelsu-uy two-CL
 c. chakha-n haksayng twu-myeng
 good-RRC student two-CL
 'Two good students'
 d. *haksayng chakha-n twu-myeng
 student good-RRC two-CL

The above examples show the noun with *-uy* in (27a-b) and the adjective with *-n* in (27c-d) cannot occur in post-nominal. Given that high modifiers adjoin to FP, NP cannot raise past any FP modifiers. That is, the landing site must be higher than numeral but lower than high modifiers. The only position that NP could raise is the specifier position of a functional projection FP.

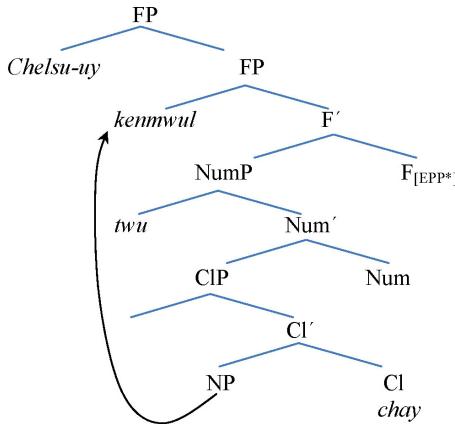
Therefore, the derivation for post-nominal Num-CL is as follows: first, numeral phrase merges with classifier phrase as seen in (28).

(28)



Up to this point, the structure is identical to Num-CL. While the Num-CL-*uy* form is derived by K-suffix on top of NumP, as illustrated in (19), the post-nominal Num-CL form merges a functional head with EPP feature. The EPP feature attracts NP to its specifier position, resulting in post-nominal Num-CL modifier in (29).

(29)



5. Concluding Remarks

In this paper we begin with a question of how to derive three types of numeral expressions in Korean. We found out that bare numerals only appear right ahead of NP modifiers, the Num-CL-*uy* form may appear in the higher modification domain, and that the Num-CL form may appear in post-nominal position.

In Korean, only bare numerals can appear right above NP, while some adjectives can precede the numeral phrase. Following Larson (1998), we suggest that there are two types of modifiers in nominal phrase: NP modifier and FP modifier. This is realized through morphological distinctions in Korean; the higher modifiers are inflected by relativize clause marker whereas the lower modifiers bear without inflections. The lower ones merge at NP-level; thus, they cannot precede number phrase. Meanwhile, the higher ones adjoin to FP, so they should precede number phrase. Thus, number phrase stands in the boundary between NP modifiers and FP modifiers.

Secondly, when numeral is paired with classifiers in prenominal, it should be suffixed with *uy*. In addition, the Num-CL-*uy* form appears in FP modifier positions alternating with other FP modifiers. This analysis is independently entertained by Hong (2010) and An (2014) that *-uy* does not just denote possessive relations, but it also represents modification relations. Consequently, the Num-CL-*uy* form is claimed to be a FP modifier.

Lastly, when a classifier is accompanied with numeral – i.e. Num-CL – in the original position above NP, it cannot stay in situ. The EPP feature on functional phrase triggers NP movement to its specifier position, resulting in the post-nominal Num-CL form.

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