The Semantics of *before* and *after* in Korean

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**ABSTRACT**

The Journal of Studies in Language 35.2, 259-274. The main goal of this paper is to provide a formal account of Korean *before* and *after* clauses with special attention paid to their morphological selection. Being apart from temporal morphology, the current analysis of Korean *before* and *after* clauses can shed new light on the discussions of selectional requirements of *before* and *after* clauses. In particular, I will show that *before* and *after* in Korean exhibit the schism based on the presence of *Earliest* operator of the type \(<i,t>,t>\) only in *after* clauses. The current paper also presents various language-specific tests, including the distribution of *mod-insertion rule* (cf. Kitagawa and Ross 1982, An 2014 among others). It will be shown that the complement of \{Earliest, After\} has to be relativized to provide a correct syntactic/semantic composition in *after* clauses. In contrast to Korean *after*, Korean *before* does not involve such pronominal element; therefore, it does not require the relativization of the embedded clause.

Keywords: semantics, before, after, temporal adjunct clauses, selection

1. Introduction

This paper aims to provide a formal account of morphological selection of Korean *before* and *after* clauses in terms of semantics. Being tenseless however marked with different morphemes, Korean *before* and *after* clauses shed a new light on the discussions of selectional requirements of *before* and *after* clauses. While I follow the standard assumption that both *before* and *after* should receive the uniform semantics (cf. Beaver and Condoravdi, 2003), I will show that *before* and *after* *ariest* operator of the type \(<i,t>,t>\) only in *after* clauses, and *after* in Korean exhibit the schism based on the presence of *Earliest* operator of the type \(<i,t>,t>\) only in *after* clauses, which is in nature a pronoun. This will be confirmed with various tests including the distribution of *mod-insertion rule* (cf. Kitagawa and Ross, 1982, An, 2014 among others) in the relevant data. As a result, the complement of \{Earliest, After\} has to be relativized to provide a correct syntactic/semantic composition in *after* clauses.

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본인이 투고한 논문은 다른 학술지에 게재된 적이 없으며 타인의 논문을 표절하지 않았음을 서약합니다. 추후 중복재적 혹은 표절된 것으로 밝혀질 시에는 논문 게재 취소와 일정 기간 논문 제출의 제한 조치를 받게 됨을 인지하고 있습니다.

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In contrast to Korean *after*, Korean *before* doesn’t involve such pronominal element therefore it does not require the relativization of the embedded clause.

2. Background

This section provides the basic patterns showing the selectional requirements of *before* and *after* clauses. Most notably, Korean *before* requires its complement clause to be marked with \(-ki\), whereas *after* requires it to be marked with \(-n\).

(1) a. John-i Mary-ka tochakha-\(\text{ki}^*/-\text{n}\) ceneey cipey ka-ss-ta.
   John-NOM Mary-NOM arrive-ki/-n before home go-PAST-DEC
   ‘John went home before Mary’s arrival’
   b. John-i Mary-ka tochakha-\(n^*/-\text{ki}\) hwuey cipey ka-ss-ta
   John-NOM Mary-NOM arrive-n/-ki after home go-PAST-DEC
   ‘John went home after Mary arrived.’

Note that the clauses in (1) do not have any temporal morphemes. Although it is possible to use temporal morphemes with \(-ki\) and \(-n\) in other context as shown in (2), they cannot be used under the before clauses as in (3). In section 4, I will analyze the paradigms in terms of their particular semantic/morphological behaviors that are distinguishing each other. This will be crucially related to the fact that Korean lacks of the Sequence of Tense (SOT) phenomena.

   I-TOP John-NOM sleep-PAST-KI-ACC wished
   ‘I wished that John was sleeping.’
   I-TOP run-PAST-EVID-REL woman-ACC met
   ‘I met a woman who has run.’

(3) a. John-i Mary-ka tochakha-\(\text{ki}^*/-\text{n}\) ceneey cipey ka-ss-ta.
   John-NOM Mary-NOM arrive-KI/-n before home go-PAST-DEC
   ‘John went home before Mary’s arrival’
   b. John-i Mary-ka tochakha-\(n^*/-\text{ki}\) hwuey cipey ka-ss-ta
   John-NOM Mary-NOM arrive-n/-ki after home go-PAST-DEC
   ‘John went home after Mary arrived.’

Another paradigm that is relevant to the current investigation is the availability of *GEIS-ambiguity* (Geis, 1970, Sharvit, 2013 among others), which is argued as they are sensitive to complementation of *before* and *after*. The *GEIS* ambiguity refers to the different interpretations in terms of their temporal references in doubly embedded clauses under *before* and *after* clauses.
The Semantics of before and after in Korean

(4) Geis Ambiguity

a. John watered the plant before Mary said she arrived.

b. High reading: At 3pm, Mary said: “I arrived”. John watered the plant prior to Mary’s speaking time (3pm); i.e., prior to EARLIEST$_C$({t | there is a t’ < SP such that Mary says at t’ “I arrived” and t’=t}).

c. Low reading: Mary said: “I arrived at 1pm”. John watered the plant prior to Mary’s declared arrival time (1pm); i.e., prior to EARLIEST$_C$({t| Mary said “there is a past time t’ such that I arrived at t’ and t=t’”}).

Sharvit (2013) argues for before clauses the GEIS-ambiguity appears if the complement is a nominal. The relevant example comes from Spanish, where the before clause that takes a DP complement momento ‘moment’ allows the low reading, compared to the clausal DP complement of before.

(5) a. Juan llegó antes de que María pensara que Pedro se había ido
    ‘Juan arrived before of that Maria would.think(subj) Pedro CL had left
    High/*Low

b. Juan llegó antes del momento en el que María pensó que Pedro se había ido
    ‘Juan arrived before of the moment in which M. thought(indc)Pedro CL had left
    High/Low

Based on (5), Sharvit (2013) argues that GEIS-ambiguity can be also used as a test if the complement of before clauses are pronominal or clausal. However, in this paper, it will be shown that this prediction is not supported by Korean patterns, which has pronominal complement yet does not exhibit GEIS-ambiguity. Let us consider the patterns in (6).

    J-NOM M-NOM arrive-PAST-DEC-C say-KI before tree-LOC water-ACC give-PAST-DEC
    ‘John watered the plant before Mary said that she arrived.’
    High/*LOW

What (6) shows that the clause ending with -ki does not allow the intended low reading this is like (4b). In section 3 and 4, it will be shown that -ki in Korean is a nominalizer and there are more components than being DP to enable the GEIS-ambiguities for the embedded clause, namely the mood-requirements. This will reveal the fine-grained map of interactions between different requirements of before and after clauses in question.

3. Syntax of -ki and -n

This section further investigates the syntactic behavior of the morphemes ki and n, showing that the clause headed by -ki functions as a nominal clause whereas the clause headed by -n functions as a relative clause. As a test, this paper will apply An(2014)’s approach to the distribution of -n morpheme to the relevant data.

As shown in the previous section, Korean before and after impose a different requirement for their complement types, as repeated in (7). In details, they are realized differently in their morphology; before clauses take a clause ending with -ki, and after clauses take one ending with -n.
   John-NOM Mary-NOM arrive-KI/-n before home go-PAST-DEC
   ‘John went home before Mary’s arrival’

b. John-i Mary-ka tochakha-[ki/-n] hwuey cipey ka-ss-ta
   John-NOM Mary-NOM arrive-ki/-n after home go-PAST-DEC
   ‘John went home after Mary arrived.’

In addition to this, both complements in question cannot be tensed under before and after clauses in Korean, which means that the tense does not contribute to their distribution in (7).

   John-NOM Mary-NOM arrive-PAST-KI before house-to go-PAST-DEC
   ‘John went home before Mary’s arrival’

   Chelswu-NOM home-LOC go-PAST-n after I-TOP school-LOC go-PAST-DEC
   ‘I went to school after Chelswu went home.’

What is interesting here is that the clauses ending with -ki and -n behave differently in other contexts than before and after clauses. First, let us investigate the behavior of ki -clause. It is rather clear that the clauses ending with -ki is a nominal clause, and to support this, various tests can be applied. The first empirical support for the DP function of –ki clause can be obtained from a conjunction wa\(^1\), which only takes nominal (Yoon and Lee, 2005): ki can be conjoined via wa however –n cannot be conjoined via the same morpheme. Note that the other conjoined element with ki in (9) is a DP. This strongly suggests that the clause ending with –ki functions as DP.

(9) Cip-ey ka-ki/-n-wa hakyo-ka swip-ta.
   home-LOC go-KI/-n-and school-NOM easy-DEC
   ‘Going home and school are easy.’

Crucially, the nominal conjunction can appear under before clauses, which confirms the nominal status of –ki ending clauses in the relevant constructions:

\(^1\) The nominal conjunctive suffix –wa is usually marked on the non-final conjunts and the final conjunct is Case-marked. It has been argued that only nouns can be conjoined via –wa (Yoon and Lee 2005, Yoo 2014). For example, CPs cannot be conjoined by the suffix –wa.

   K-NOM J-NOM pretty-be-C-CONJ M-NOM handsome-be-C think-do-DEC
   Intended: ‘k think that J is pretty and M is handsome.’

The sentences can be improved if the embedded clauses are nominalized by –kes.

   Intended: ‘k think that J is pretty and M is handsome.’

The fact that the clauses ending with –ki can be conjoined by the nominal conjunctive –wa shows that they are DP.
The Semantics of before and after in Korean

(10) masi-ki-wa ssip-ki ceney pro son takko oseyo
    drink-KI-and chew-KI before hand wash come
    ‘lit. wash your hand before drinking and chewing’

In contrast to ki, n morpheme is realized when you relativize a clause to modify a noun. This is shown in (11), where the clause ending with \(-n\) modifies the head noun yeça ‘woman.’ For now I will simply assume that the morpheme \(n\) is located at C, and therefore the clause ending with \(-n\) is a relative clause.

(11) Chelswu-ka [DP tali-ey [seissnu-[n] [DP yeca-lul]]] manna-ss-ta
    Chelswu-NOM bridge-LOC standing-n woman-ACC meet-PAST-DEC
    ‘Chelswu met the woman who was standing at the bridge.’

The different status of ki and \(n\) clauses can be confirmed with their distributions within a noun phrase. ki clause has to be followed by genitives, compared to \(n\) clause:

(12) a. phoksik-ha-ki-uy kyelkwa-nun hangsang pokthong-ita
    voracity-do-KI-GEN result-TOP always stomach.ache-COP
    ‘The result of voracity is stomachache.’

b. phosik-ha-\(n\) kyelkwa-nun pokthong-ita.
    voracity-do-\(N\) result-TOP stomach.ache-COP
    ‘The result of voracity is stomachache.’

The distribution of morphemes in (12) can be accounted for under the mod-insertion rule (cf. An 2014):

(13) Insertion of the K-suffix (modified from Mod-insertion rule in Kitagawa and Ross 1982)
    \[ K > -n / [NP \not\exists PAST/PERFECT/REALIS ____ N] \]
    \[-l / [NP \not\exists FUTURE/IMPERFECT/IRREALIS ____ N] \]
    -uy / elsewhere

The mod-insertion rule in (13) accounts for the distribution in (12) in the following way: The clause that ends with \(-ki\) does not carry any temporal interpretation inside and henceforth it receives the Genitive Case in the nominal structure. For the clause that ends with \(-n\), it carries the temporal interpretation as PAST/PERFECT/REALIS and henceforth \(-n\) is inserted. Given its temporality of the \(-n\) marked clauses, \(-n\) morpheme itself can be sometimes treated as an instance of relativizer. Note that when the clause has FUTURE/IMPERFECT/IRREALIS it receives \(-l\) morpheme instead. However, such morpheme cannot appear under the after clause. The temporal property of before and after will be discussed in section 4.

To summarize, the morphemes \(-ki\) and \(-n\) have the different distributions in other contexts and the paradigms show that the former is nominal, whereas the latter is showing that the clause is a relative clause. In the next section, a formal
account that distinguishes before and after clauses in such a way that the former requires a nominal whereas the latter requires a relative clause for the semantic type reasons will be introduced.

4. Formal Account

This section provides a formal account of the selection of Korean before and after clauses. The major claim here is that Korean after clause obligatorily involves Earliest as its complement, which functions similar to the pronoun. This accounts for the appearance of \( n \) morpheme in after clauses, given the mod-insertion rule applies within the nominal clauses (cf. Beaver and Condoravdi, 2003; von Stechow, 2009). The situation is different for before, due to the lack of pro. This syntactic difference is tied to the semantics of phrasal/clausal complementation of before/after clauses that is suggested in Penka and von Stechow (2008). I also adopt the uniform treatment of before and after in Beaver and Condoravdi (2003) namely that the only difference between before and after in terms of semantics is the different direction of the temporal ordering.

To begin with, I will introduce the basic temporal semantics of before/after clauses in general. Following von Stechow (2009), the current system uses the semantic type \( i \) for times, in addition to the \( e \) (entities), \( v \) (events) and \( t \) (truth values). Times are points or intervals on the time scale ordered by the ‘earlier than’-relation \(<\). For any two time points (moments) \( m \) and \( m' \), it holds that either \( m>m' \) or \( m'<m \) (also written as \( m>m' \)), or \( m=m' \). The \(<\)-relation is extended in a natural way to intervals: The interval \( t \) is before the interval \( t' (t<t') \) iff each moment in \( t \) is before any moment in \( t' \).

Following Kratzer(1998), von Stechow(2009) among many others, I assume that the most internal argument of verb is a temporal argument. For the ease of exposition, an unaccusative verb like arrive can be considered:

\[
(14) \quad [[\text{arrive}_{i(e,t)}]] = \lambda_t. \lambda_x. x \text{ arrives at time } t.
\]

At deep structure the temporal argument of verb is filled with a semantically empty pronoun PRO, which has no meaning and no type. The temporal arguments are passed up in the syntactic structure by \( \lambda \)-binding until they are bound by a tense operator, creating a type \(<i,t>\) (cf. Kratzer 1998, von Stechow 2009).

\[
(15) \quad \text{TP: } ( \exists t < s^*) \text{ John arrives at } t
\]

\[
\begin{align*}
\text{VP: } & \lambda_t [\text{arrive(John)(t)}] \\
\text{PAST: } & \lambda_t. P_t. ( \exists t < s^*)P(t) \\
\text{PRO}_{\perp} & \\
\lambda_1 & \\
\text{John} & \\
\text{arrived}_{<,<t,>} & t_1
\end{align*}
\]

The before and after clauses are adjoining to VP in the current system. Beaver and Condoravdi(2003) show that the semantics of before and after clauses can be symmetric in a way that only the direction of the temporality is different.
provide a simplified version of their semantics in this paper, since the current analysis only requires the extensional semantics. I refer readers to Beaver and Condoravdi(2003) and Condoravdi(2011) for the detailed discussion on the issues.

(16) a. \[[\text{before}]\] = \(\lambda \ t \ i. \ t' < t\)
b. \[[\text{after}]\] = \(\lambda \ t \ i. \ t' > t\)

Because DP is the type of \(e\), we need to introduce a type shifter \(\tau\), which associates an event with its running time. The following derivation accounts for \textit{John arrived before/after the meeting}:

(17) \[\begin{array}{c}
TP\\
T\\
\text{T}\\
\text{VP}_{\substack{2<\langle t, \iota \rangle > \\ \text{\langle Predicate Modification\rangle}}}
\text{VP}_{\substack{1<\langle t, \iota \rangle > \\ \text{\langle before/after<Predicate Modification\rangle}}}
\lambda \ t \ i. \ t' < t \ \lambda \ t' \ i. \ t' > \ \langle \tau \rangle \ \text{NP}_e
\end{array}\]

(18) \[\text{[[VP_2]]} = \lambda \ t \text{. John arrives at } t \text{ & } t < \tau \text{ (the meeting)}\]

In so far I haven’t discussed the semantics of \textit{PAST}, which is located at \(T\). I simply adopt an indefinite semantics of tense (cf. Prior(1967), von Stechow(2009) among many others), which uses an existential quantification for the time. Note that the current system is also compatible with the pronominal/referential theory of tense (Partee, 1973).

(19) \[\text{[[PAST]]}^s = \lambda \ P. \ (\exists t < s^*)P(t)\]

This renders the TP as a type of \(t\), as follows:

(20) \[\begin{array}{c}
T^0\\
\text{T}\\
\text{VP}_{\substack{1<\langle t_0, \iota \rangle > \\ \text{\langle before/after<Predicate Modification\rangle}}}
\text{VP}_{\substack{2<\langle t, \iota \rangle >}}
\end{array}\]

Here is the derivation of the LF of the sentence \textit{John arrived before/after the meeting}:

(21) \[\begin{array}{c}
\text{TP: (} \exists t < s^* \text{) John arrives at } t \text{ & } t < \tau \text{ (the meeting)}\\
PAST\\
\text{VP}_1: \lambda \ t \text{. John arrives at } t \text{ & } t < \tau \text{ (the meeting)}\\
\text{VP}_2: \lambda \ t_i \text{. John arrives at } t_i \text{ before/after: } \lambda \ t_i \text{. } t < \langle \tau \rangle \text{ (the meeting)}\\
\text{PRO}_1\\
\text{VP}\\
\text{before/after the meeting}
\end{array}\]
(22) a. \[
\text{[[arrive}_{i,e,t}﻿\text{(PRO}_i\text{)\text{=}\lambda x. x arrives}}
\]
b. \[
\text{[[[[arrive}_{i,e,t}﻿\text{(PRO}_i\text{)\text{=}1} \text{ iff John arrives}}
\]
c. \[
\text{[[VP}_3\text{\text{=}\lambda t. John arrives at } t_i}}
\]
d. \[
\text{[[before/after the meeting]\text{=}\lambda t. t </\> } \tau \text{ (the meeting)}}
\]
e. \[
\text{[[VP}_3\text{ before/afterP] \text{=}\lambda t. John arrives at } t \& t < \tau \text{ (the meeting)}}
\]
f. \[
\text{[[PAST([[VP}_3\text{]]) \text{=} \exists t < s^*} \text{ John arrives at } t \& t < \tau \text{ (the meeting)}}
\]

Now we can apply this derivation for Korean before clauses as in (22). Here I simply assume that \textit{ki} functions as nominalizer, which maps \textless i,t\textgreater to \textless e\textgreater.

(23) Mary-ka John-i o-ki ceny ttenassta.
\hspace{1cm} Mary-NOM John-NOM come-KI before left
\hspace{1cm} ‘Mary left before John’s coming.’

(24) \[
\text{TP: ( } \exists t < s^* \text{) Mary left at } t \& t > \tau \text{ (John’s coming)}
\]

(25) a. \[
\text{[[arrive}_{i,e,t}﻿\text{(PRO}_i\text{)\text{=}\lambda x. x comes at } t}
\]
b. \[
\text{[[[[arrive}_{i,e,t}﻿\text{(PRO}_i\text{)\text{=}1} \text{ iff John comes at } t}
\]
c. \[
\text{[[VP}_3\text{\text{=}\lambda t. John arrives at } t_i}
\]
d. \[
\text{[[ki}_{i,e}﻿\text{([[VP}_3\text{]})\text{=}John’s coming}}
\]
e. \[
\text{[[beforeP]\text{=}\lambda t. t < } \tau \text{ (John’s coming)}}
\]
f. \[
\text{[[VP}_3\text{ beforeP]\text{=}\lambda t. Mary left at } t_i \& t_i < \tau \text{ (John’s coming)}}
\]
g. \[
\text{[[PAST([[VP}_3\text{]]) \text{=} \exists t < s^*} \text{ Mary left at } t_i \& t_i < \tau \text{ (John’s coming)}}
\]
The morpheme –ki in the embedded clause is the type of \(<i,t\),e> (cf. Kratzer (1998) for the similar approaches that map temporal intervals to individual), which functions the same as English gerundives/nominalizer (e.g. –ing and –al). The τ shifter then converts the type e out of the –ki clause to the of I, then merges with before. In this configuration, the clause ending with –n that is compatible with after clauses cannot appear given the mod-insertion rule: For the morpheme –n to be inserted, there must be a noun that triggers the insertion, which is not the case for before clauses. Now, we turn to the after clauses that take a complement of the type \(<i,t\>, which can be treated as a relative clause. The leitmotif of this approach is based on Heim 1992’s claim that the clausal complement of before/after clauses are interpreted akin to the relative clauses. Penka and von Stechow 2008 further develops this system that adopts the Earliest Operator (cf. Beaver and Condoravdi, 2003):

\[
(26) \quad [[\text{Earliest}]] = \lambda P_n. (tt)P(t) \land (\forall t')P(t') \rightarrow t < t' \quad (= \text{the earliest } t \text{ such that } P(t))
\]

I argue that in Korean after clauses always involve the Earliest. In addition to this, the embedded clause in Korean is tenseless. The empty position is then filled with the existential operator \(\exists_{<i,t>} (\lambda P_n. (\exists t)P(t))\) The schematic derivation for a sentence like Mary left after John came is given as follows.

(27)  Mary-ka   John-i   o-N     hwuey    ttenassta.
       Mary-Nom John-NOM come-N     after    left
       ‘Mary left after John came.’
(29) a. \[[\text{come}_{i<,i<,t>\rangle}](\text{PRO}_{i}) = \lambda x. x \text{ comes at } t\]
    b. \[[[\text{come}_{i<,i<,t>\rangle}](\text{PRO}_{i})](\text{John}) = 1 \text{ iff } \text{John} \text{ comes at } t\]
    c. \[[\text{VP}_3]\] = \lambda t_i. \text{John comes at } t_i
    d. \[[[\text{VP}_3][[\text{at which time}]]]\] = \lambda t_i. [[\text{John comes at } t_i \text{ and } t_i \text{ at which time}]]
    e. \text{PAST}([[\text{VP}_3][[\text{at which time}]]]) = (\exists t_1 < s^*) \text{John comes at } t_i \text{ and } t_i \text{ is at which time}.
    f. \[[\text{CP}_3]\] = \text{WH}(\text{PAST}([[\text{VP}_3][[\text{at which time}]]])) = \lambda t_2. (\exists t_1 < s^*) \text{John comes at } t_i \text{ and } t_i \text{ is at } t_2.
    g. \[[\text{Mary left after John came}]\] = \lambda t_i. t > \text{earliest } t_3 \text{ such that } (\exists t_1 < s^*) \text{John came at } t_i \text{ and } t_1 \text{ is at } t_3.
    h. \[[\text{huey}]\][[\text{EarliestP}]] = \lambda t_i. t > \text{earliest } t_3 \text{ such that } (\exists t_1 < s^*) \text{John came at } t_i \text{ and } t_1 \text{ is at } t_3.
    i. \[[\text{VP}_2]\] = \lambda t_4. \text{Mary left at } t_4
    j. [[\text{VP}_1]] = \lambda t_5. \text{Mary left at } t_5 \text{ and } t_5 > \text{earliest } t_3 \text{ such that } \text{John came at } t_i \text{ and } t_i \text{ is at } t_3.
    k. [[\text{Mary left after John came}]] = (\exists t_5 < s^*) \text{Mary left at } t_5 \text{ and } t_5 > \text{earliest } t_3 \text{ such that } \text{John came at } t_1 \text{ and } t_1 \text{ is at } t_5.

Note that the embedded clause is relativized, which is a system that is presented in Heim 1992. For example, \textit{before/after Mary left} is equivalent to \textit{before the time at which Mary left}. This can be instantiated by assuming a covert \textit{at}-phrase, where \(t = t'\). The \textit{at} phrase is of the type <i,t> and adjoins to VP. (31) describes the LF of \textit{Mary left at 2PM}.

(30) F(at)=\lambda t.\lambda t'.\lambda P_{it}.t'=t

(31) [[\text{PAST}][[[\lambda t_1. [[\text{Mary leaves } t_1]\text{[t}_1 \text{ at 2PM]}}]\\\lambda t_4. t_4. t_5. t_5 > \text{earliest } t_3 \text{ such that } (\exists t_1 < s^*) \text{John came at } t_i \text{ and } t_1 \text{ is at } t_3."

And the temporal argument of \textit{at} then can be abstracted to form a relative clause, creating a relative clause of type <i,t>.

(32)

The temporal pronoun \textit{Earliest} may seem speculative, however there is empirical evidence that shows it is indeed the case. Given the mod-insertion rule as in (13)(as repeated in (33)), the appearance of the morpheme \textit{n} in the embedded clause shows that the pronoun indeed present. This is shown in (34). I refer readers to An 2014 for the detailed discussion on (33). What is important here for the purpose of this paper is that the morpheme \textit{n} is only inserted only if the nominal element presents in the phrase.

(33) \textit{Insertion of the K-suffix} (modified from Mod-insertion rule in Kitagawa and Ross 1982)

\begin{align*}
K &> -n / [NP \emptyset \text{PAST/PERFECT/REALIS } _{____ N}] \\
-1 &/ [NP \emptyset \text{FUTURE/IMPERFECT/IRREALIS } _{____ N}] \\
-uy &/ elsewhere
\end{align*}

Mary-Nom John-NOM come-N after left

‘Mary left after John came.’
To summarize, the crucial difference between Korean *before* and *after* clauses is the presence of the temporal pronoun *Earliest*. The current claim crucially adopts Heim 1992’s system where the clause under *before* and *after* has to be relativized. Hence the current analysis distinguishes *before* clauses that takes a nominal element from *after* clauses that takes a relative clause, as only in the latter the temporal pronoun present.

### 5. Mood requirement of *before / after* clauses

This section investigates the interactions of Nominal/Relative-clause-taking properties with other requirements of *before*/*after* clauses; Mood distinction (Arregui and Kusumoto, 1998; Sharvit, 2013), Tense distinction (Ogihara, 1996; Arregui and Kusumoto, 1998; Sharvit, 2013) and Nominal/Relative-clause (Penka and von Stechow, 2008; von Stechow, 2009). This shows that the Nominal/Relative-clause property indeed exists in addition to the other requirements of *before*/*after* that are caused by their inherent semantic properties. Crucially, this gives us an account of (3), where the tense morpheme cannot appear within *before*/*after* clauses, where the subjunctive mood blocks the GEIS ambiguity.

First, we will consider the mood requirement of *before*/*after* clauses. As noted in the literature, in languages like Greek, before clauses take subjunctives whereas after clauses take indicatives (which is realized with past tense in this example) (cf. Giannakidou (2009) and Sharvit (2013)):

(35) Greek:

a. Prin (na) kimiti, epline ta dontia tu.
   before SUBJ sleep.PNP.3sg washed.PP3g his teeth
b. *Prin kimitihike, epline ta dontia tu.
   before slept.3sg washed.pp3g his teeth
   ‘Before he slept, he washed his teeth’
c. *Afu (na) kimiti, figame.
   after SUBJ sleep.PNP.3g left.3sg
d. Afu kimitihike, figame.
   after slept.3sg left.3sg
   ‘After he slept we left.’

The mood requirement also holds for Korean *after* clauses. Korean relative clauses can be realized in two different ways with regard to their mood/interpretation. The \(-n\) morpheme 2) is used if the clause has an interpretation of past, perfect and realis (cf. An, 2014). The \(-l\) morpheme is used if the clause has an interpretation of future, imperfect and irrealis. The morpheme that is required by after clauses is \(-n\):

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2) While the nature of these morphemes and their syntactic location require the further research, such differences would not affect the current analysis.
Chelswu-ka cip-ey [hwuey] na-nun hakkyo-ey ka-n-ta
Chelswu-NOM home-LOC go-n/-l after I-TOP school-LOC go-NONPAST-DEC
‘I will go to school after Chelswu went/goes home.’

This indicates that the Korean after clauses are only compatible with the indicatives, as like in Greek (35). Hence, (36) shows that the complement of Korean after has to be indicative in addition to be CP.

The interaction of the Nominal/Relative-clause requirements and the mood requirements also accounts for the incompatibility of −l morpheme (i.e. subjunctive) and before clauses. As show in (35), Greek before clauses select subjunctives. However Korean before clauses cannot take the clause ending with −l, given that Korean before clauses are phrasal:

John-NOM Mary-NOM arrive-l before house-to go-PAST-DEC
‘Intended: John went home before Mary [woll] arrive’

The data in (37) further supports the current claim that both Nominal/Relative-clause distinction and the mood distinction are independently present in the system.

Now, let us discuss the interaction of tense and the mood requirement under temporal adjunct clauses. The comparison between Korean and Spanish before in terms of the presence of embedded past tense under the subjunctive clauses is in order. The morpheme ki which is selected by Korean before clauses in fact can appear with the optional past tense, yielding counterfactual interpretation (Han,1996).

I-TOP J-NOM home-LOC go-PAST-KI-ACC hope-PAST-DEC
‘I hoped that J would go home’ (but J didn’t)

Given that the past tense under the subjunctive generally does not yield an indicative interpretation, it is rather puzzling that Korean before clauses cannot take tensed complement as follows.

John-NOM Mary-NOM arrive-PAST-KI before house-to go-PAST-KI-ACC hope-PAST-DEC
‘John went home before Mary arrived.’

Note that we cannot appeal to nominal property of Korean before here since the embedded clause is also marked with ki in both (38) and (39). (38) also shows that Korean clause ending with −ki can be used in the non-veridical context, and in fact it is required in such context. This nicely conforms to the mood requirement of before clauses in other languages. Let us assume that in Korean −ki morpheme functions as subjunctive morpheme in addition to its DP-status. Then, we can compare (39) to Spanish, which requires the complement of before in the same context to be i. subjunctive ii. tensed:
The Semantics of before and after in Korean

The tense asymmetry between Korean (39) and Spanish (40) can be correlated to Sequence of Tense phenomena. Crucially, Korean is the non-SOT language whereas Spanish is the SOT language.

We can correlate the different behaviors of the embedded past in Korean and Spanish to the tense asymmetry in before clauses. Specifically, the lack of simultaneous interpretation in (41) suggests the lack of so-called SOT-rule, which deletes the embedded past tense (Ogihara, 1996; Arregui and Kusumoto, 1998; von Stechow, 2009; Sharvit, 2013 among many others). In this system, the simultaneous interpretation in Spanish (42) is obtained by the deletion of the embedded past.

The availability of SOT-rule in a language crucially determines the availability of past tense in the complement of before clauses. Assuming all the embedded past tenses are anchored by the matrix tense\(^4\), the default interpretation of the embedded clauses are the so called 'shifted' interpretation. This then causes an inherent incompatibility of past tense and before clauses, since the matrix clause event time functions as the reference time of the embedded tense, then the embedded tense will order the before event with respect to the matrix clause event (cf. Ogihara, 1996; Arregui and Kusumoto, 1998 among others). Since before requires the embedded event to be prior to the matrix event, the embedded past has to be deleted, via the SOT-rule. This implies that a language that doesn’t have the SOT-rule cannot use the past tense in the before clauses, which is in fact the case.

\[^3\] For speakers of those dialects, (37) is fine when Mikel hasn’t arrived yet (cf. Sharvit 2013). Its Korean counterpart patterns the same, but it is not possible to embedded PAST in Korean. This shows that we cannot resort the difference between (36) and (37) to the different interpretation.

\[^4\] Von Stechow 2009 provides a formal account of this as follows: the semantic present N can be replaced by T\(_{\text{PRO}}\) in the embedded context. Then, the operator \(P\_\text{AST}\) takes \(T\(_{\text{PRO}}\)\); \(P(T\(_{\text{PRO}}\))\), where \(T\(_{\text{PRO}}\)\) is bound to the matrix N. I refer readers to Ogihara 1996 and von Stechow 2009 for further details.
The lack of SOT-rule in Korean, therefore, explains why the past tense cannot appear in the before clauses. Korean (41) and Spanish (42) illustrate the interaction of the mood requirement and tense requirement, because even though the mood requirements of before is satisfied, still the different requirements on tense play a role here. Also note that Korean before clauses are nominal-taking whereas Spanish before clauses that are discussed in (42) are Relative-clause-taking, nevertheless they do not yield any asymmetries here. This shows that the three different requirements (Nominal/Relative-clause, mood, tense) are indeed present in the system and they should all match to derive before/after clauses. In the following section I further extend the interaction in terms of the availability of GEIS-ambiguity (Geis 1970).

6. GEIS-ambiguity

This section provides an alternative account to the availability of GEIS-ambiguity that is discussed in Sharvit 2013. In Sharvit 2013, it is argued that only the DP-taking before involves the GEIS-ambiguity, as the following Spanish data shows:

(44) a. Juan llego antes de que Maria pensara que Pedro se habia ido
    Juan arrived before of that Maria would.think(subj) Pedro CL had left
    ‘Juan arrived before Maria thought Pedro left’ High/*Low

   b. Juan llego antes del momento en el que Maria penso que Pedro se habia ido
    Juan arrived before of.the moment in the which M. thought(indc) Pedro CL had left
    ‘Juan arrived before Maria thought Pedro left’ High/Low

In (44) the relative clause headed by momento can bring the low-reading, compared to its non-relativized counterpart. Sharvit(2013) accounts for the difference by arguing that only the before that takes DP-complement can induce the low-interpretation. In details, the clause in (44) involves a covert relativization of the temporal pronoun, as discussed in Section 2. Henceforth, the relativized clause then merges with the Earliest, however the location that the temporal pronoun gets generated can vary: if it is from the higher clause, you will obtain the High reading and if it is from the lower clause, you will get the low reading.

This approach in fact matches with the current claim that in Korean before clauses does not involve relativization like after clauses, even though the clause is in fact DP:

    J-NOM M-NOM arrive-PAST-DEC-C say-KI before tree-LOC water-ACC give-PAST-DEC
    ‘John watered the plant before Mary said that she arrived.’ High/*LOW

In (45), the complement of before is DP in the same way as the Spanish sentence in (44), however the low-reading is not possible. Therefore, I conclude that the relativization process plays a crucial role to determine the availability of the GEIS-ambiguity.
Furthermore, there is another restriction on the availability of GEIS ambiguity that is not discussed in Sharvit 2013, namely the mood requirement. To derive the ambiguity in Korean, we need to relativize the embedded clause as follows. Since Korean relative clauses can be marked with \( \sim n \) or \( \sim l \) given realis/irrealis context, it is possible to use both when we relativize the clause. Interestingly, when it is marked with \( \sim l \), which indicates the irrealis context, we can observe the asymmetries in the GEIS-ambiguity: only the realis marker \( \sim n \) allows it.

    ‘John watered the plant before the time Mary said that she arrived.’ High /LOW

    ‘John watered the plant before the time Mary would say that she arrived.’ High /*LOW

(46) and (47) are a minimal pair with regard to the mood and the availability of GEIS-ambiguity. Note that in Spanish data (44), the pair has two differences: DP/CP and mood. Korean data strongly suggest that to derive GEIS-ambiguity, the complement of before has to be i. DP and ii. marked with a morpheme for realis context. One way to capture these two requirement of GEIS-ambiguity under the current system is as follows: i. Lets assume that for GEIS-ambiguity the complement of before has to be marked with indicative or its alikes ii. Since the complement of before has to be irrealis, the only way to obviate the requirement is to relativize the clause with different head noun such as the time. This gives us the paradigms in Spanish and Korean. We also can account for the indicative requirement of GEIS-ambiguity as follows: given GEIS-ambiguity is driven by the relativization process (Geis 1970, von Stechow 2009 and Sharvit 2013), if we use the subjunctive at the embedded clause, this makes an intervention effect that is found in the same context in conditionals (Bhatt and Pancheva, 2013).

7. Conclusion

I have shown that the complementary distribution of \( \sim ki \) and \( \sim n \) clauses in Korean under before and after clauses can be accounted for solely by DP-taking/CP-taking properties of before and after clauses. I also show that the morphemes that are used in Korean are compatible with other requirements of before and after, namely the mood requirement and tense requirement. The investigation on the interactions between the requirements reveals that there are three independent requirements, and the DP/CP-taking is one of them. Finally, the availability of GEIS-ambiguity is analyzed in a way that the required usages of indicative morphology and the mood requirement of before clauses.

References


