

# The Korean Case System: A Unified, Constraint-based Approach\*

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## Abstract

One of the most intriguing phenomena in Korean is its case system. In addition to canonical case assignment patterns, it displays intriguing phenomena such as case stacking, case alternation, case on adverbs and verbal elements, and so forth. This paper extends the idea of the previous lexicalist analyses of Korean case such as that of Bratt (1996), Yoo (2002), and Choi (2003), and develops a constraint-based system that allows more tight interactions among lexicon, syntax, and semantics. Lexicon provides concise, flexible, non-redundant information; syntax specifies appropriate constraints in combining words or phrasal elements with proper case information; lexical semantics restricts the right semantic case value on the predicate's argument(s). This analysis allows us to provide a unified approach for the various case patterns in Korean and is much simpler in capturing the aforementioned case phenomena with much more broad coverage.

## 1 Two Basic Issues

Nominal expressions in Korean can carry case markers. Depending on the relationship that these case markers express, cases can be generally divided into two groups: grammatical case markers and semantic cases. The examples in (1) are some canonical examples:

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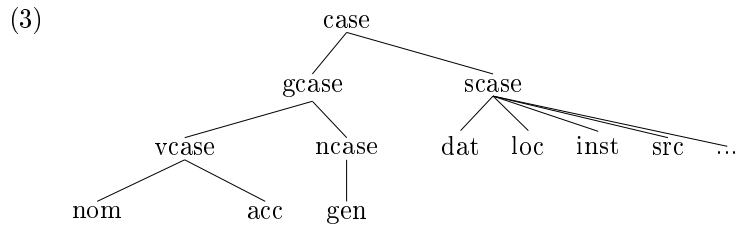
- (1) a. haksayng-i chayk-ul ilk-ess-ta  
 student-NOM book-ACC read-PST-DECL  
 ‘The student read a book.’  
 b. haksayng-i chayk-ul sangca-ey neh-ess-ta  
 student-NOM book-ACC box-LOC put-PST-DECL  
 ‘The student put a book in the box.’

The nominative (NOM) and accusative (ACC) grammatical cases here indicate syntactic functions such as subject and object. Meanwhile, semantic cases like locative (LOC) in (1)b express semantic functions of the NP *sangca* ‘box’. Other semantic cases, closely related to the semantic role of the nominal, include goal (GOAL), instrument (INST), source (SRC), and the like.

Among the grammatical cases, NOM and ACC are assigned by verbal elements whereas genitive (GEN) by nominal elements as illustrated in (2):

- (2) a. John-i/\*uy chinkwu-lul/\*-uy manna-ss-ta  
 John-NOM/\*GEN friend-ACC/\*GEN meet-PST-DECL  
 ‘John met a friend.’  
 b. John-uy/\*i chinkwu  
 John-GEN/\*NOM friend  
 ‘John’s friend’

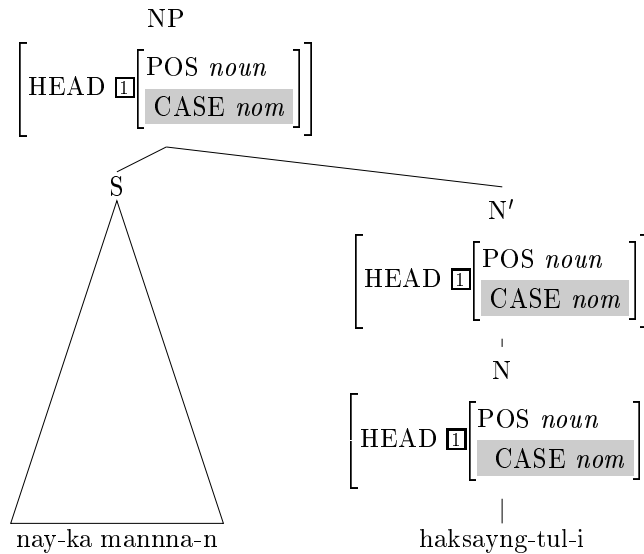
Based on these observations, we could then classify case values as in the following hierarchy in which *gcase* and *scase* stand for grammatical case and semantic case, respectively:



In dealing with the system of Korean case, two main issues are then (a) how to form case-marked or noncase-marked expressions in a systematic way and (b) how to constrain their occurrences in syntax in a proper way. In what follows, we present a case system that utilizes this type hierarchy of case values. We will observe that the constraint and grammar-rule based approach on the realization of case values can provide us with answers to account for complicated case marking patterns as well as intriguing phenomena such as case stacking, case alternation, multiple nominative/accusative cases, case on adverbs and verbal elements, and so forth.



(6)



An issue that arises within the syntactic analysis concerns the fact that, as given in (7), the grammatical case markers are sometimes optional in proper context: this is an unexpected property as either a syntactic or a morphological head (cf. Zwicky 1993).<sup>2</sup>

- (7) haksayng-tul-(i) motwu chak-(ul) ilk-ess-e.  
student-PL-NOM all book-ACC read  
'Students all read books.'

The optionality of case markers indicates that case markers are not heads at least though they could serve as independent syntactic elements.

The syntactic analysis seems to encounter further issues. For example, as noted in Bratt (1996), there exist certain lexical idiosyncracies in the attachment of case markers:

- (8) a. nay-ka/\*na-ka 'I-NOM/I-NOM'  
b. cey-ka/\*ce-ka 'I-NOM/I-NOM'  
c. nwu-ka/\*nwukwu-ka 'who-NOM/who-NOM'

We also could observe that nominals can occur with postpositions, semantic cases, and grammatical cases all together, but they must be in a strict ordering relation:

- (9) a. sensayng-nim-tul-pwuthe-man-ul 'teacher-PL-from-only-NOM'  
b. sensayng-nim-tul-kkeyse-man-i 'teacher-HON-PL-HON.SUBJ-only-NOM'  
c. \*sensayng-nim-tul-pwuthe-ul-man 'teacher-PL-from-ACC-only'

<sup>2</sup>This situation is different from the omission of English complementizer *that* as in *I think (that) John is honest*. The caveat here is that this does not mean that the head is optional. It just tells that verbs like *think* select either a CP headed by the complementizer *that* or a simple S.

Considering that the language allows free word order in syntax, such a tight ordering restriction is unexpected. If we treat the three types of elements as independent syntactic elements, we would then need to explain why only post-position (or Kase) phrases are in strict ordering restrictions (cf. Yoon 1995).

## 2.2 Formation of Cased-Marked Nominals

In order to capture the strict ordering restrictions, it has traditionally been assumed that just like verbal elements, nominal elements with case markers are formed by a template like the following:

- (10) N-base – (Hon) – (Pl) – (Postp) – (Conj) – (X-Delim) – (Z-Delim)
- (11) a. Hon: *nim*  
 b. Plural: *tul*  
 c. Postposition: *eykey(se)* ‘to’, *hanthey(se)* ‘from’, *ey(se)* ‘at’, *(u)lo* ‘with’, *kkaci* ‘to’, *kkey(se)* ‘honorific NOM’  
 d. Conjunctive: *hako* ‘with’, *(k)wa* ‘with’, *pota* ‘than’, *(i)na* ‘or’, *pwuthe* ‘from’, *chelem* ‘like’  
 e. X-delimiter): *man* ‘only’, *kkaci* ‘also’, *mace* ‘even’, *cocha* ‘even’, *ppakey* ‘only’  
 f. Z-delimiter): *(n)un* ‘TOP’, *(i)lato* ‘even though’, *to* ‘also’, *i/ka* ‘NOM’, *(l)ul* ‘ACC’, *uy* ‘GEN’

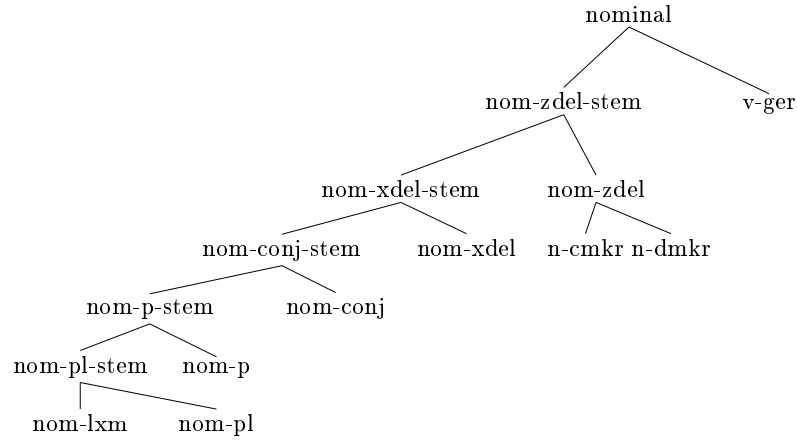
One example would suffice to see how this template works:

- (12) *sensayng* + (nim) + (tul) + (eykey) + (man) + (un)  
 teacher + Hon + Pl + Postp + X-Delim + Z-Delim  
 ‘to the (honorable) teachers only’

Though nominal suffixes are also under tight ordering restrictions, unlike verbal suffixes, all of these nominal suffixes are optional. Even though this kind of templatic mechanism could generate well-ordering restrictions, it suffers from issues of positing null elements for unrealized suffixes (see Kim 1998b for further discussion of some problems in the templatic approach). The same effect could be achieved by a precisely defined type hierarchy system, with no postulation of empty elements in forming nominal elements. With the basic assumption that the nominal particles are not independent words but optional inflectional suffixes attached to the nominal in the lexicon, we take the formation of a nominal element to be a step-by-step process based on the following hierarchy:<sup>3</sup>

<sup>3</sup>The necessity of introducing each of these stems in the grammar could be easily supported by the fact that each of these stems appears in syntax.

(13)



The building process of nominal elements starts from the basic lexical elements of the type *nom-lxm* (nominal-lexeme) that includes subtypes such as *vn*, *n-bn*, *n-cn*, *n-cl*, *n-prop*, *n-pron* (verbal nouns, bound nouns, common nouns, classifiers, proper nouns, pronouns). This means nominal word formation observes the following step-by-step process:

(14)  $nom-lxm \rightarrow nom-pl-stem \rightarrow nom-p-stem \rightarrow nom-conj-stem \rightarrow nom-xdel-stem \rightarrow nom-zdel-stem$

One crucial difference from the process of forming verbal elements is that any of these processes can be skipped and then directly be realized as (pumped up to) a *word* element in syntax.<sup>4</sup> The constraints on each type place restrictions on the ordering relationship among nominal suffixes. For example, let us consider a few:

(15) a.  $nom-p \rightarrow [\text{STEM } nom-pl-stem]$   
 b.  $nom-zdel \rightarrow [\text{STEM } nom-xdel-stem]$

These constraints mean that the type *nom-p* requires its STEM value to be a type of *nom-pl-stem*, and the type *nom-zdel* specifies its STEM value to be *nom-xdel-stem*. These constraints explain why (16)a and (16)b are well-formed, but not (16)c:

(16) a.  $[_{nom-pl} \text{ sensayngnim-tul}]-\text{eykey}$  ‘teacher-PL-DAT’  
 b.  $[_{nom-lxm} \text{ sensayngnim}]-\text{eykey}$  ‘teacher-DAT’  
 c.  $*[_{nom-zdel} \text{ sensayngnim-nun}]-\text{eykey}$  ‘teacher-TOP-DAT’

<sup>4</sup>The grammar specifies only *v-free* to be realized as *v-word* whereas for nouns it permits all the instances of type *nominal* to be realized as *n-word*. This in turn means any subtype of *nominal* can serve as a syntactic element in accordance of the type hierarchy in (13).

Both *nom-pl* and *nom-lxm* are subtypes of *nom-pl-stem*, and this thus observes the constraint in (15)a. However, in (16)c, the type *nom-zdel* cannot serve as the STEM value of the postposition *-eykey* according to (15)a since it is no subtype of *nom-pl-stem*.

This kind of type hierarchy system minimizes the burden of specifying what kind of STEM value is possible for each stem. For example, even though the case marked nominal (*nom-cmkr*) element, *nom-zdel*, requires its STEM value to be *nom-x-del*, all of its subtypes could satisfy this constraint:<sup>5</sup>

- (17) a. [*nom-lxm* *sensayngnim*]-un ‘teacher-TOP’  
 b. [*nom-pl* *sensayngnim-tul*]-un ‘teacher-PL-TOP’  
 c. [*nom-p* *sensayngnim-eykey*]-nun ‘teacher-DAT-TOP’  
 d. [*nom-conj* *sensayngnim-tul-kwa*]-nun ‘teacher-PL-CONJ-TOP’  
 e. [*nom-xdel* *sensayngnim-tul-pwuthe-man*]-i ‘teacher-PL-SRC-DEL-NOM’

The type hierarchy system thus generates various options with no additional constraints.

As noted earlier, there is a complementary distribution between Z-delimiters and case markers: they occupy the same slot. In terms of our constraint, this is due to the fact that they both require the same kind of STEM value. This means that we would generate cases like (18)a but not cases like (18)b and c:

- (18) a. [*nom-xdel* *sensayngnim-man*]-i/to ‘teacher-only-NOM’  
 b. \*<sub>[*nom-zdel* *sensayngnim-un*]-i ‘teacher-TOP-NOM’</sub>  
 c. \*<sub>[*nom-zdel* *sensayngnim-i*]-to ‘teacher-NOM-TOP’</sub>

The attachment of Z-del and case marker is possible only to *nom-xdel*, not to the type itself.

Within this kind of system, once we assign more concrete information to each type when nominal affixes are attached,<sup>6</sup> case marked nominal elements would have at least the following information (cf. see Kim 1998b for the internal structure of such words):

- (19) a.  $\left[ \begin{array}{l} \langle \text{haksayng-i} \rangle \\ \text{HEAD} \left[ \begin{array}{l} \text{POS } \textit{noun} \\ \text{CASE} [\text{GCASE } \textit{nom}] \end{array} \right] \end{array} \right]$  b.  $\left[ \begin{array}{l} \langle \text{chayk-ul} \rangle \\ \text{HEAD} \left[ \begin{array}{l} \text{POS } \textit{noun} \\ \text{CASE} [\text{GCASE } \textit{acc}] \end{array} \right] \end{array} \right]$

Our system, reflecting the case hierarchy in (3), allows the occurrence of one semantic case and one grammatical case as in cases like *hakkyo-eyse-uy* ‘school-at-GEN’ or *yeki-pwuthe-ka* ‘here-from-NOM’:

<sup>5</sup>The type *nom-cmkr* means nominals with the *gcase* markers whereas *nom-dmkr* means those with discourse markers like *un*.

<sup>6</sup>For example, the attachment of delimiter markers will add semantic information.

- (20) a.  $\left[ \begin{array}{l} \langle \text{hakkyo-eyse-uy} \rangle \\ \text{HEAD} \left[ \begin{array}{l} \text{POS } \textit{noun} \\ \text{CASE} \left[ \begin{array}{l} \text{GCASE } \textit{gen} \\ \text{SCASE } \textit{loc} \end{array} \right] \end{array} \right] \end{array} \right]$  b.  $\left[ \begin{array}{l} \langle \text{yeki-pwuthe-ka} \rangle \\ \text{HEAD} \left[ \begin{array}{l} \text{POS } \textit{noun} \\ \text{CASE} \left[ \begin{array}{l} \text{GCASE } \textit{nom} \\ \text{SCASE } \textit{src} \end{array} \right] \end{array} \right] \end{array} \right]$

Such morphological elements will be generated without violating any morphological conditions or feature operations.

### 2.3 Formation of Case-marked Non-nominal Elements

The language allows a limited set of dependent verbs and adverbs to form XDEL or ZDEL marker words:

- (21) a. mek-e-man-un/ul po-ass-ta  
eat-COMP-XDEL-ZDEL try-PST-DECL  
'tried to eat only'  
b. han sikan-man-un/ul nol-ass-ta  
one hour-ZDEL-ZDEL play-PST-DECL  
'played only for one hour'

The case markers cannot be attached to any *v-ind* verb in (22)a; they can occur only with a *v-dep* verb.

- (22) a. *v-ind*: mek-ess-ta 'eat-PST-DECL', mek-ela 'eat-IMP', mek-ca 'eat-SUG', etc  
b. *v-dep*: mek-e 'eat-COMP', mek-ko 'eat-COMP', mek-key 'eat-COMP', mek-ci 'eat-COMP', etc

The present system is easy to handle such just by expending the types of *v-dep* as the following as an example:

- (23)  $\left[ \begin{array}{l} \textit{v-dep-zdel} \\ \text{ORTH } \langle \text{mek-e-man-ul} \rangle \\ \text{STEM} \left[ \begin{array}{l} \textit{v-dep-xdel} \\ \text{ORTH } \langle \text{mek-e-man} \rangle \\ \text{STEM} \left[ \begin{array}{l} \textit{v-dep} \\ \text{ORTH } \langle \text{mek-e} \rangle \\ \text{HEAD } \boxed{\text{FORM ae}} \end{array} \right] \\ \text{HEAD } \boxed{\phantom{\text{FORM ae}}} \end{array} \right] \\ \text{HEAD } \boxed{\phantom{\text{FORM ae}}} \\ \text{HEAD } \boxed{\phantom{\text{FORM ae}}} \left[ \begin{array}{l} \text{POS } \textit{verb} \\ \text{FORM } \textit{ae} \\ \text{CASE} | \text{GCASE } \textit{acc} \end{array} \right] \end{array} \right]$

The same method can be applied to adverbs too: only duration and frequency adverbials can occur with grammatical case markers, but not pure adverbs:

- (24) a. han sikan-i/ul ‘one hour-NOM/ACC’, sey pen-i/ul ‘three times-NOM/ACC’,...  
 b. \*ppali-ka/lul ‘fast-NOM/ACC’, \*cal-i/i ‘well-NOM/ACC’,...

Within the present system where grammatical case markers are attached to lexemes in the lexicon, nothing hinders us from generating such case-marked verbal and adverbial elements though they are quite restricted. The well-defined type system allows us to specify which types of elements are possible to have case markers.

### 3 Case Principles in Syntax

Once we have the right generation of nominal elements with case information, the next issue is how argument-selecting heads and grammar rules contribute their case information to nominal elements. As noted by Bratt (1996), Yoo (2002), and others, phenomena such as case alternation illustrated in (25) make it hard for a head lexically to specify the CASE value on its argument(s):<sup>7</sup>

- (25) a. John-i     **sakwa-ka/lul**     mek-ko     siphessta  
 John-NOM apple-NOM/ACC eat-COMP would-like  
 ‘John wanted to eat apples.’  
 b. John-un     **Mary-ka/lul**     ttokttokhata-ko sayngkakhayessta  
 John-TOP Mary-NOM/ACC smart-COMP thought  
 ‘John thought Mary is smart/Mary to be smart’

If we lexically specify the case value on the argument(s), we would require two different lexical entries for the verb *mek-* ‘eat’ and *ttokttokha-* ‘smart’ since their arguments can be realized either as nominative or accusative in such examples.

Case alternation in psych verb constructions also questions the lexical assignment of case values, as noted by Bratt (1996):

- (26) a. John-i     nokcha-ka/\*lul     coh-ass-ta  
 John-NOM green.tea-NOM/\*ACC like-PST-DECL  
 ‘John is fond of green tea.’  
 b. John-i     nokcha-lul/\*ka     coh-a     hanta  
 John-NOM green.tea-ACC/\*NOM like-COMP do  
 ‘John likes green tea.’

What we observe here is that when the psych verb combines with the auxiliary verb and functions as a non-stative verb, its theme argument must be ACC. A lexical approach would require either to posit a certain rule that changes the lexically assigned case ACC verb into NOM or vice versa, or to introduce two

<sup>7</sup>See Chung (1993) and Lee (1991) for the case phenomenon in raising constructions.

lexical entries for the verb *coh-* ‘like’ here. Both of these options appear to be unsatisfactory in terms of economy in the grammar.

Before we lay out a constraint-based analysis that could avoid such issues, let us start with some basic assumptions we accept. The starting point of our analysis is to adopt the lexeme-based lexicon. The basic lexical entries we need to specify in the lexicon, as hinted earlier, are just lexemes: all the stems are built up from appropriate constraints on types. We assume the verbal lexemes will minimally have the following information:

$$(27) \quad v\text{-}lexm \rightarrow \left[ \begin{array}{l} \text{HEAD} \mid \text{POS } verb \\ \text{ARG-ST } \langle \dots, [\text{GCASE } vcase], \dots \rangle \end{array} \right]$$

This means that any element in the ARG-ST gets the value *vcase* as its GCASE value: the *vcase* value can be either *nom* or *acc* in syntax.

The elements in the ARG-ST will be realized as SUBJ and COMPS in syntax in accordance with the Argument Realization Constraint (ARP):

(28) Argument Realization Constraint (ARP):

$$v\text{-}word \rightarrow \left[ \begin{array}{l} \text{VAL} \quad \left[ \begin{array}{l} \text{SUBJ} \quad \boxed{A} \\ \text{COMPS} \quad \boxed{B} \end{array} \right] \\ \text{ARG-ST} \quad \boxed{A} \oplus \boxed{B} \end{array} \right]$$

We assume that it is at the valence level that the case value is sensitive rather than at the argument structure level (different from the analysis of Przepiórkowski 1998). As an illustration of how this system works, let us consider one example. The lexical entry for the lexeme *ilk-* ‘read’ would be something like the following:

$$(29) \quad \left[ \begin{array}{l} v\text{-}lexm \\ \text{PHON } \langle ilk\text{-} \rangle \\ \text{ARG-ST } \langle \text{NP}[\text{GCASE } vcase], \text{NP}[\text{GCASE } vcase] \rangle \\ \text{SEM } read\text{-}rel \end{array} \right]$$

Note here that the arguments of the lexeme do not specify its GCASE value. By definition all the arguments of a lexical element get *vcase*. These arguments will be realized as SUBJ and COMPS in syntax:

$$(30) \quad \left[ \begin{array}{l} \langle ilk\text{-}ess\text{-}ta \text{ ‘read-PST-DECL’} \rangle \\ \text{SYN} \left[ \begin{array}{l} \text{HEAD} \mid \text{POS } verb \\ \text{VAL} \left[ \begin{array}{l} \text{SUBJ } \langle \boxed{1} \rangle \\ \text{COMPS } \langle \boxed{2} \rangle \end{array} \right] \end{array} \right] \\ \text{ARG-ST } \langle \boxed{1}\text{NP}[\text{GCASE } vcase], \boxed{2}\text{NP}[\text{GCASE } vcase] \rangle \\ \text{SEM } read\text{-}rel \end{array} \right]$$

With this declarative verb *ilk-ess-ta* ‘read-PST-DECL’, the SUBJ can be *nom* whereas the COMPS can be *acc*, but not the other grammatical case value as noted in (31):

- (31) John-i/\*ul            chayk-ul/\*i            ilk-ess-ta  
 John-NOM/ACC book-ACC/NOM read-PST-DECL  
 ‘John read a book.’

Then, the question is which part of the grammar makes sure the SUBJ is *nom* whereas COMPS is *acc*? The determination of case value in the VAL is not by a lexical process but imposed by syntactic rules. That is, we assume that Korean  $X'$  syntax includes at least the following two rules which includes the constraints on the realization of the case values:<sup>8</sup>

- (32) a. Head-Subject Rule

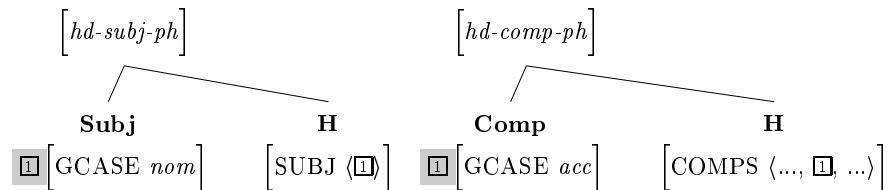
$$hd\text{-}subj\text{-}ph \Rightarrow \boxed{1}[\text{CASE} \mid \text{GCASE } nom], \mathbf{H}[\text{SUBJ} \langle \boxed{1} \rangle]$$

- b. Head-Complement Rule (To be revised)

$$hd\text{-}comp\text{-}ph \Rightarrow \boxed{2}[\text{CASE} \mid \text{GCASE } acc], \mathbf{H}[\text{COMPS} \langle \dots, \boxed{2}, \dots \rangle]$$

The rule in (32)a simply says that when a head combines with the SUBJ, the SUBJ element is *nom*. The rule (32)b specifies that when a head combines with a COMPS element, it gets *acc*. These can be represented in the following tree structure formats:

- (33)



These constraints in (32) can thus correctly capture canonical cases where the subject is NOM and the object is ACC.

This system would also easily capture the raising example in (25)b, repeated here:

<sup>8</sup>One thing to note here is that *hd-subj-ph* makes no reference to the COMPS value, unlike English where the COMPS value should be empty. Placing no restrictions on the COMPS value allows us to combine the predicate and the subject first before the complement(s). Also, the grammar combines the head with one complement at a time. This system allows only binary structures. One strong advantage of this approach is that it enables us to capture sentence internal scrambling with no additional mechanism. See Kim and Yang (2003) for a similar analysis.

- (34) John-un **Mary-ka/lul** ttokttokhata-ko sayngkakhayesta  
 John-TOP Mary-NOM/ACC smart-COMP thought  
 ‘John thought Mary is smart/Mary to be smart’

The verb *ttokttokhata-ko* ‘smart-COMP’ minimally have the following lexical information:

- (35)  $\left[ \begin{array}{l} \langle \text{ttokttokhata-ko ‘smart-COMP’} \rangle \\ \text{HEAD | FORM } ko \\ \text{ARG-ST } \langle \text{NP}[\text{GCASE } vcase] \rangle \\ \text{SEM } smart-rel \end{array} \right]$

The argument of the verb *ttokttokhata-ko* ‘smart-COMP’ in (35) can be either realized as the subject of this verb in the embedded clause as in (36)a or as the object of the raising verb, as hinted in the lexical entries of the verb *sayngkakhayesta* as in (36)b:

- (36) a.  $\left[ \begin{array}{l} \langle \text{sayngkakhayesta ‘think-PST-DECL’} \rangle \\ \text{ARG-ST } \langle \text{NP}[\text{GCASE } vcase], \text{S}[\text{FORM } ko] \rangle \\ \text{SEM } think-rel \end{array} \right]$
- b.  $\left[ \begin{array}{l} \langle \text{sayngkakhayesta ‘think-PST-DECL’} \rangle \\ \text{VAL} \left[ \begin{array}{l} \text{SUBJ } \langle \text{[1]} \rangle \\ \text{COMPS } \langle \text{[2], [3]} \rangle \end{array} \right] \\ \text{ARG-ST } \langle \text{[1]NP}[\text{GCASE } vcase], \text{[2]NP}[\text{GCASE } vcase], \text{[3]VP}[\text{FORM } ko] \rangle \\ \text{SEM } think-rel \end{array} \right]$

As noted in (36)b, when the semantic subject of the verb *ttokttokhata-ko* ‘smart-COMP’ is realized as the object here. This means that the ACC on this argument will satisfy the Head-Complement Rule in (32).

However, we could immediately observe that the Head-Complement Rule in (32) is violated in cases where the nonsubject argument appears to get a lexical case assignment. Observe the following predicative and psych constructions:

- (37) a. John-i uysa-ka toyesta  
 John-NOM doctor-NOM became  
 ‘John became a doctor.’  
 b. John-i nokcha-ka coh-ta  
 John-NOM green tea-NOM like  
 ‘John likes green tea.’

It has often been assumed that the nonsubject arguments *uysa-ka* ‘doctor-NOM’ and *nokcha-ka* ‘green.tea-NOM’ here are lexically assigned *nom* as represented in the following:

$$(38) \left[ \text{ARG-ST} \left\langle \text{NP}[\text{GCASE } vcase], \text{NP}[\text{GCASE } nom] \right\rangle \right]$$

The problem here is that this lexical entry directly conflicts with the Head-Complement Rule in (32): the rule specifies the complement's GCASE value to be *acc* whereas the lexical entry here requires its complement to be *nom*. This means even in such cases, if we want to accept the rule-based case assignment, we cannot lexically assign case to any argument.

The solution is, following Bratt (1996) and Yoo (2002), to adopt the head feature AGT (AGENTIVITY) and ramify Head-Complement Rule into two as the following:<sup>9</sup>

(39) a. Head-Complement Rule A:

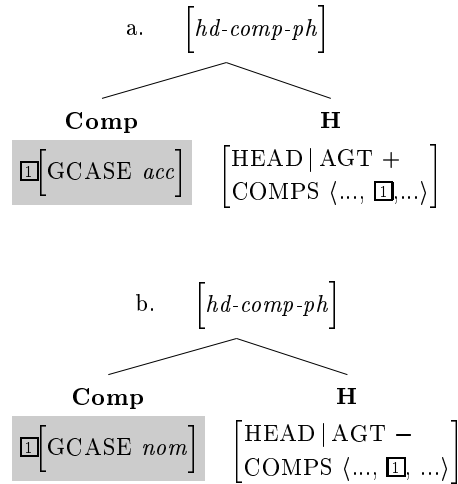
$$[hd-comp-ph] \Rightarrow \boxed{\text{CASE} | \text{GCASE } acc}, \mathbf{H} \left[ \begin{array}{l} \text{HEAD} | \text{AGT } + \\ \text{COMPS} \langle \dots, \boxed{\phantom{x}}, \dots \rangle \end{array} \right]$$

b. Head-Complement Rule B:

$$[hd-comp-ph] \Rightarrow \boxed{\text{CASE} | \text{GCASE } nom}, \mathbf{H} \left[ \begin{array}{l} \text{HEAD} | \text{AGT } - \\ \text{COMPS} \langle \dots, \boxed{\phantom{x}}, \dots \rangle \end{array} \right]$$

These rules say that when an agentive (phrasal or lexical) head combines with a complement element, the complement will get *acc* whereas when a nonagentive head combines with a complement, it gets *nom*. This difference is represented in the following structures:

(40)

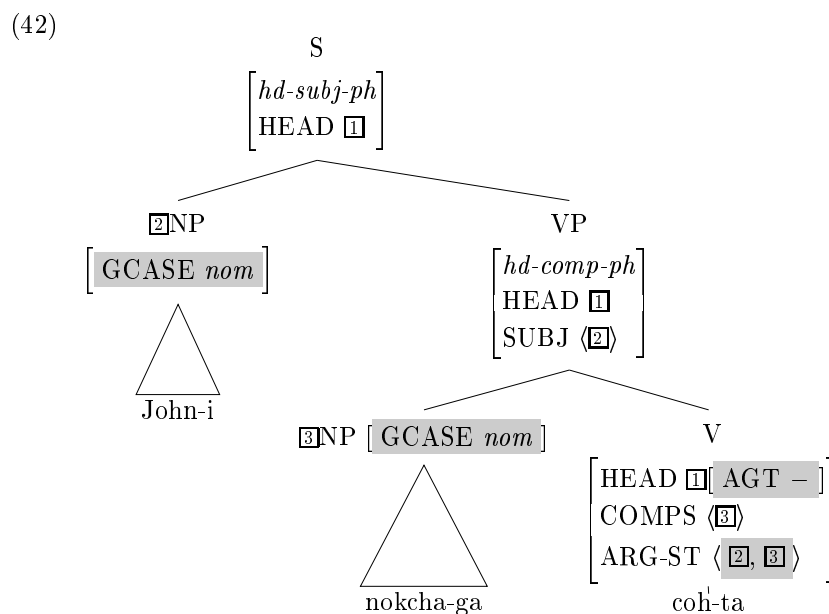


<sup>9</sup>The positive value of the AGT (AGENTIVITY), similar to STATIVITY, is assigned to the verbs that have an external argument whereas the negative value is assigned to those with no external argument. cf. Kang 1993, Kim 1990, Bratt 1996, Yoo 2002 and Choi 2003. The syntactic tests for agentivity include imperative formation, cooccurrence with adverbs like *deliberately* and verbs with *stop*, *start*.

Within this system, we then do not need to specify *nom* to the nonsubject complement of psych verbs, diverging from the traditional literature. Just like other verbs, the complement(s) of such psych verbs will bear just *vcase*, as a general constraint on verbal elements as represented in (41):

$$(41) \left[ \begin{array}{l} \langle \text{coh-ta 'like-DECL'} \rangle \\ \text{HEAD} \left[ \begin{array}{l} \text{POS } \textit{verb} \\ \text{AGT } - \end{array} \right] \\ \text{ARG-ST} \langle \text{NP}[\text{GCASE } \textit{vcase}], \text{NP}[\text{GCASE } \textit{vcase}] \rangle \\ \text{SEM } \textit{fond-of-rel} \end{array} \right]$$

This lexical information would then project the following structure:



As noted here, the verb *coh-ta* ‘like’ bears the head feature [AGT –]. This means that the complement of this verb will get NOM even though in its ARG-ST its case value is *vcase*. This is guaranteed by the Head-Complement Rule B in (39).

This would surely lessen the burden of lexical specifications: there is no need to lexically specify the case *nom* to the nonsubject complement of psych verbs or others: the value will be decided in syntax. More advantages of this system will be discussed in what follows, e.g., in Section 5. The rule-based analysis thus systematically constrain the case value on the subject and complement(s) whose case value is undetermined in the lexicon.

## 4 Some Merits of the Feature Unification

### 4.1 Case Omission and Delimiters

One immediate consequence of the present analysis in which the unification and subsumption operations of feature structures play key roles in the grammar comes from phenomena where case markers are not realized or replaced by delimiters. One main property of case markers is, as noted in (7), that they can be omitted or can be replaced by delimiters in proper context:

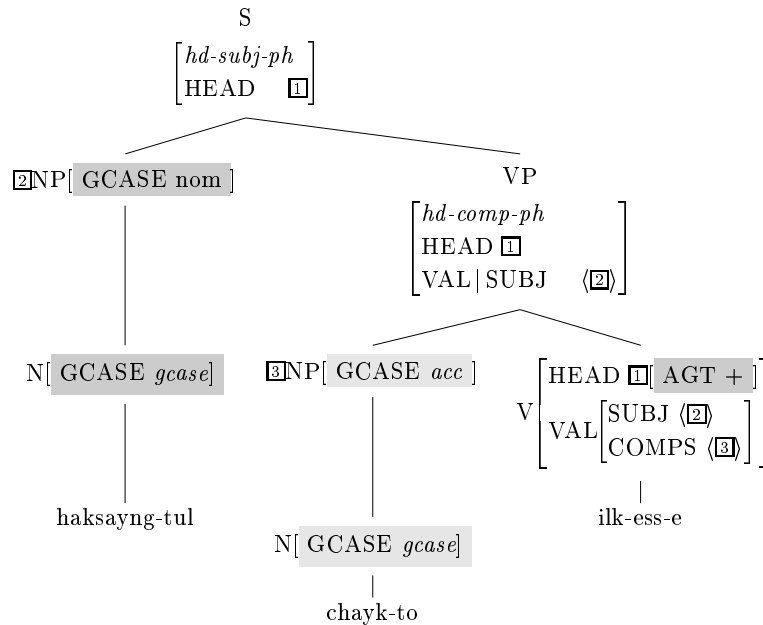
- (43) haksayng-(tul) chayk-(to) ill-ess-e  
 student-PL book-even read  
 ‘Students even read a book.’

The basic lexical entries for the words in (43) would be something like the following:

- (44) 
$$\left[ \begin{array}{l} \langle \text{ilk-ess-e 'read-PST-DECL'} \rangle \\ \text{HEAD} \mid \text{AGT} + \\ \text{a. ARG-ST} \langle \text{NP}[\text{GCASE } vcase], \text{NP}[\text{GCASE } vcase] \rangle \\ \text{SEM } read-rel \end{array} \right]$$
- $$\left[ \begin{array}{l} \langle \text{haksayng-tul 'student-PL'} \rangle \\ \text{b. HEAD} \left[ \begin{array}{l} \text{POS } noun \\ \text{CASE} [\text{GCASE } gcase] \end{array} \right] \\ \text{SEM } student-rel \end{array} \right]$$
- $$\left[ \begin{array}{l} \langle \text{chayk-to 'book-also'} \rangle \\ \text{c. HEAD} \left[ \begin{array}{l} \text{POS } noun \\ \text{CASE} [\text{GCASE } gcase] \end{array} \right] \\ \text{SEM } book-rel \end{array} \right]$$

Notice here that the nouns here, projected to NPs, are not specified with any grammatical case value even though they may have semantic information coming from the delimiters. The present analysis assign the following structure to the sentence (43):

(45)



Since *gcase* is supertypes of *nom* and *acc* as represented in (3), there is no unification failure between the case information on the lexical element and the case requirement imposed by the Head-Subject and Head-Complement Rule. For example, in accordance with the Head-Complement Rule A, the complement of the agentive head must be *acc*, but the complement itself bears *gcase*. Since *gcase* is the supertype of *acc*, there is no feature clash. The case hierarchy, together with the feature unification and subsumption, thus allows us to capture no realization of the case markers in a straightforward manner.

## 4.2 Two Nominative Cases

As noted by Sells (1995) and Yoon (2004), one tricky issue is the double occurrence of nominative markers:

- (46) *sensayngnim-kkeyse-man-i o-si-ess-ta*  
 teacher-HON.NOM-only-NOM came  
 ‘Only the honorable teacher came.’

The marker *-kkeyse* here functions as a honorific subject marker and falls the same morphological slot as the postposition marker. This marker cannot mark nominative objects or adjuncts: It marks only honorable nominative subjects. This implies that the stem produced by the attachment of *kkeyse* carries at least the following information:

$$(47) \left[ \left\langle \text{sensayngnim-kkeyse 'teacher-HON.NOM'} \right\rangle \right. \\ \left. \text{HEAD} \left[ \begin{array}{l} \text{POS noun} \\ \text{HON +} \\ \text{CASE | GCASE } \mathit{nom} \end{array} \right] \right]$$

The HON(ORIFIC) specification explains why it is odd to attach *kkeyse* to a non-honorable noun:

$$(48) \text{*haksayng-kkeyse 'student-HON.NOM'}, \text{*ai-kkeyse 'child-HON.NOM'}$$

The [GCASE *nom*] value accounts for what this stem can combine only with the nominative marker. If we attach an accusative marker there will be a clash between [GCASE *acc*] and [GCASE *nom*]. This is not a possible feature unification:

$$(49) \text{sensayngnim-kkeyse-man-ul 'teacher-HON.NOM-DEL-ACC'}$$

$$\left[ \left[ \text{* HEAD} \left[ \begin{array}{l} \text{POS noun} \\ \text{HON +} \\ \text{CASE} \left[ \begin{array}{l} \text{GCASE } \mathit{nom} \\ \text{GCASE } \mathit{acc} \end{array} \right] \end{array} \right] \right] \right]$$

However, nothing is wrong to have a delimiter or topic marker since such a marker only adds a discourse function:

$$(50) \text{sensayngnim-kkeyse-man-un 'teacher-HON.NOM-DEL-TOP'}$$

$$\left[ \left[ \text{HEAD} \left[ \begin{array}{l} \text{POS noun} \\ \text{HON +} \\ \text{CASE | GCASE } \mathit{nom} \\ \text{TOPIC +} \end{array} \right] \right] \right]$$

### 4.3 Dative Cases, Case Stacking, and Alternation

Benefactive constructions such as the following have also been an important issue in case theory:

$$(51) \text{John-i chayk-ul Mary-eykey cwuessta}$$

John-NOM book-ACC Mary-DAT gave

‘John gave a book to Mary.’

Traditionally, it has been assumed that the dative here is assigned by the lexical predicate *cwuessta* ‘gave’. Within a system that has no distinction between grammatical and semantic case, assigning *dat* to the benefactive argument is no surprising. However, our system, in which *dat* is a kind of semantic case, different from grammatical cases, calls upon no such lexical specification. The present system also assigns *vcase* to the benefactive argument in the lexicon:

$$(52) \left[ \begin{array}{l} \text{SYN} \mid \text{POS } \textit{verb} \\ \text{ARG-ST} \left\langle \text{NP}[\text{GCASE } \textit{vcase}], \text{NP}[\text{GCASE } \textit{vcase}], \text{NP}[\text{GCASE } \textit{vcase}] \right\rangle \\ \text{SEM } \textit{give-rel} \end{array} \right]$$

The case value on the beneficiary is determined from the interactions with semantics. For example, we could posit constraints like (53) that associate a right semantic role to a right semantic case (cf. Bratt 1996, Choi 2003):<sup>10</sup>

$$(53) \begin{array}{l} \text{a. } \textit{v-lxm} \rightarrow \left[ \begin{array}{l} \text{ARG-ST} \left\langle \dots, [\text{SCASE } \textit{dat}]_i, \dots \right\rangle \\ \text{SEM} \left[ \begin{array}{l} \textit{predication} \\ \text{GOAL } i \end{array} \right] \end{array} \right] \\ \text{b. } \textit{v-lxm} \rightarrow \left[ \begin{array}{l} \text{ARG-ST} \left\langle \dots, [\text{SCASE } \textit{loc}]_i, \dots \right\rangle \\ \text{SEM} \left[ \begin{array}{l} \textit{predication} \\ \text{LOC } i \end{array} \right] \end{array} \right] \end{array}$$

Given such constraints, the lexical information in (52) could be expanded as following (cf. Choi 2003):

$$(54) \left[ \begin{array}{l} \text{SYN} \mid \text{HEAD} \left[ \begin{array}{l} \text{POS } \textit{verb} \\ \text{AGT } + \end{array} \right] \\ \text{ARG-ST} \left\langle \text{NP}_i, \text{NP}_j, \text{NP}_k \left[ \begin{array}{l} \text{GCASE } \textit{vcase} \\ \text{SCASE } \textit{dat} \end{array} \right] \right\rangle \\ \text{SEM} \left[ \begin{array}{l} \text{RELATION } \textit{give} \\ \text{AGENT } i \\ \text{THEME } j \\ \text{GOAL } k \end{array} \right] \end{array} \right]$$

One immediate welcoming prediction of this analysis is the co-occurrence of this semantic case together with a grammatical case. As noted in the following, the benefactive argument can occur either with or without the accusative marker (cf. Gerdts and Youn 1999, Choi 2003):<sup>11</sup>

<sup>10</sup>As pointed out by O'Grady (1991) and others, the dative case can function various semantic roles such as possessor, experiencer, goal, source, etc. This does not necessarily mean that we have to treat dative as a structural case: we believe that different semantic roles can be realized into the same morphological case form, dative.

<sup>11</sup>There exist other cases where a semantic case cooccur with the nominative case or genitive, too (cf. Yang 1999, Choi 2003):

- (i) a. *yeki-kkaci-ka mwuncey-i-ta*  
 here-to-NOM problem-COP-DECL  
 'The problem is up to this point.'

- (55) John-i chayk-ul Mary-(eykey)-(lul) cwuessta  
 John-NOM book-ACC Mary-DAT-ACC gave  
 ‘John gave a book to Mary.’

Such cases are also allowed in our system. The phrase *yeki-kkaci* is the grammatical subject and hence gets *nom* as its GCASE value. The noun head also assigns *gen* to its specifier.

Remember that the Head-Complement Rule A assigns *acc* to all the complements of an agentive verb.<sup>12</sup>

This would then allow us to assign *acc* to the benefactive argument in (54). The appearance of the semantic case is licensed by an independent semantic constraint such as (53). Though there exist more complicated cases that allow case alternation between *dat* and grammatical cases, and that require a more fine-grained theory of semantic roles (cf. Choi 2003), the present analysis could provide a firm base for such puzzling case alternation.<sup>13</sup>

## 5 Case in Auxiliary Constructions

### 5.1 Change in the Case Value

Another welcoming consequence of this analysis comes from the treatment of case alternation in auxiliary verbs in (26), repeated here:

- (56) a. John-i nokcha-ka/\*lul coh-ta  
 John-NOM green.tea-NOM/\*ACC like  
 ‘John is fond of green tea.’

- 
- b. hakkyo-ese-uy il  
 school-LOC-GEN happening  
 ‘the happening at the school’

<sup>12</sup>One main difference between semantic cases and grammatical cases is that the former cannot be dropped in general:

- (i) John-i chayk-ul chakysang-\*(ey) nehessta  
 John-NOM book-ACC desk-LOC put  
 ‘John put the book in the desk.’

The possibility of dropping the dative case in (55) may then hint the dative case is a semantic case. However, as noted in O’Grady (1991) and can be seen here, such a dropping is possible only when we allow DAT-ACC alternation. We thus could assume that the case dropping here is caused by the accusative case rather than the dative.

<sup>13</sup>Dative arguments cannot always occur with nominative or accusative:

- (i) Na-nun John-eykey-(\*lul) chayk-ul pat-ass-ta  
 I-TOP John-DAT-ACC book-ACC received  
 ‘I received a book from John.’

As noticed, in such examples the dative argument is not a benefactive argument: it functions as a source. There could be two solutions to capture this contrast: one is to take the source argument as an adjunct, and the source thus does not get a grammatical case. The other is to specify that the argument gets no GCASE value in such cases. See Choi (2003) for further discussion.

b. John-i      nokcha-lul/\*ka      coh-a      hanta  
 John-NOM green.tea-ACC/\*NOM like-COMP do  
 ‘John likes green tea.’

As noted in Section 3, the psych verb *coh-ta* is [AGT –]. This allows its complement to get ACC. Then, why does the same theme argument in the auxiliary verb construction in (56)b get *acc* rather than *nom*? This is due to the agentive auxiliary verb *ha-n-ta* ‘do-PRES-DECL’, whose brief lexeme information is given in (57):<sup>14</sup>

$$(57) \left[ \begin{array}{l} \langle \text{ha- ‘do’} \rangle \\ \text{HEAD} \left[ \begin{array}{l} \text{AUX +} \\ \text{AGT +} \end{array} \right] \\ \text{ARG-ST} \left\langle \left[ \text{INP}, \left[ \begin{array}{l} \text{LEX +} \\ \text{SUBJ} \quad \langle \square \rangle \end{array} \right] \right] \right\rangle \end{array} \right]$$

This lexical information tells us that the auxiliary verb selects one subject argument and a lexical element whose subject is identical with its own subject.

Adopting Bratt (1996), Chung (1998), Kim (2002), we thus assume that such an auxiliary verb forms a complex predicate with a preceding verb.<sup>15</sup> Adopting Kim and Yang (2004), we assume that Korean has the Head-Lex Rule whose constraints are given in (58):<sup>16</sup>

$$(58) \text{Head-Lex Rule(to be revised):}$$

$$\left[ \begin{array}{l} \textit{hd-lex-ph} \\ \text{COMPS L} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{LEX +} \\ \text{COMPS L} \end{array} \right], \text{H} \left[ \begin{array}{l} \text{AUX +} \\ \text{COMPS} \langle \square \rangle \end{array} \right]$$

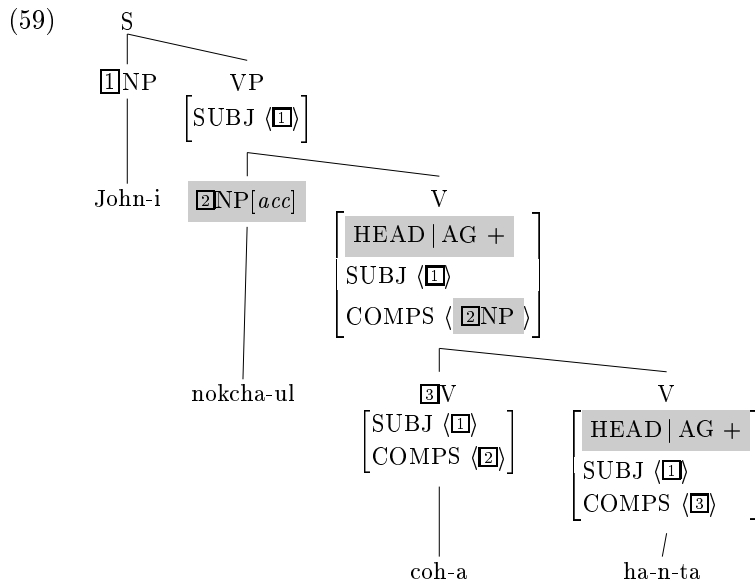
The rule specifies that the auxiliary head combines with a lexical complement, and that the COMPS value (L) of this lexical complement is passed up to the resulting mother. This argument composition is different from the previous analyses (cf. Bratt 1996, Chung 1998, Kim 2002), in that the argument composition in a sense happens in syntax rather than in the lexicon.

Given these basic assumptions, the sentence (56)b would have the following structure:

<sup>14</sup>The HEAD feature LEX distinguishes a phrasal element from a lexical element. We take a complex predicate to be [LEX +] rather than [LEX –].

<sup>15</sup>See Bratt (1996), Chung (1996), Kim (2002a), Sells (1995) for concrete evidence to treat auxiliary verb constructions as complex predicates.

<sup>16</sup>The value ‘L’ represents a variable over a list.



The psych verb lexeme *coh-* ‘like’ takes two arguments: one realized as subject (experiencer) and the other as a complement (theme). The auxiliary verb *ha-n-ta* ‘do-PRES-DECL’, selecting the main verb *coh-a* ‘like-COMP’ as well as the subject, forms a complex predicate with the verb. When the auxiliary combines with the main verb, the result inherits the main verb’s COMPS value in accordance to the rule in (58). The complex predicate inherits the head feature [AGT +] from its head auxiliary verb. The Head-Complement Rule A requires the complement of this agentive complex predicate to be *acc*, rather than *nom*.

## 5.2 Free Case Alternation in Auxiliary Constructions

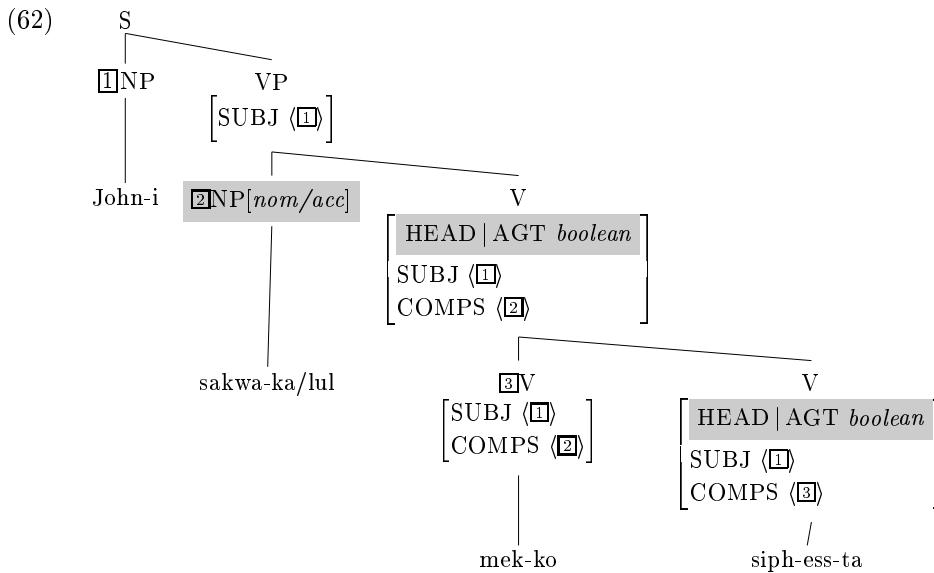
Though the cases discussed in the previous section allow only one case value, constructions with auxiliary verbs like *siph-* ‘would-like’ allow both, as noted in (25), whose example is repeated here:

- (60) John-i sakwa-ka/lul mek-ko siph-ess-ta  
 John-NOM apple-NOM/ACC eat-COMP would-like  
 ‘John would like to eat apples.’

The simple solution for such cases comes from the lexical information of the auxiliary *siph-ess-ta* ‘would.like-PST-DECL’:

$$(61) \left[ \begin{array}{l} \langle \text{siph-ess-ta 'like-PST-DECL'} \rangle \\ \text{HEAD} \left[ \begin{array}{l} \text{AUX } + \\ \text{AGT } \textit{boolean} \end{array} \right] \\ \text{VAL} \left[ \begin{array}{l} \text{SUBJ } \langle \text{[1]} \rangle \\ \text{COMPS } \left\langle \begin{array}{l} \text{[2]} \left[ \begin{array}{l} \text{LEX } + \\ \text{SUBJ } \langle \text{[1]} \rangle \end{array} \right] \end{array} \right\rangle \end{array} \right] \end{array} \right]$$

Unlike agentive auxiliary verbs like *ha-*, this kind of auxiliary verb underspecifies its AGT value. This implies that its complement can be either *nom* or *acc*, as represented in the following:



The feature value *boolean* can be either positive (+) or negative (-). This would then mean that the complement of the complex predicate can get either *nom* or *acc* as its case value in accordance with the Head-Complement Rule A and B in (39).

### 5.3 Case Determination by the Nonhead

As noted by Yoo (2002), cases in auxiliary constructions are more complicated when they involve auxiliary verbs like *ha-* ‘do’ and *siph-* ‘like’ together:

- (63) a. John-i     Mary-lul/\*ka     coh-a     ha-ko     siph-ta  
 John-NOM Mary-ACC/NOM like-COMP do-COMP like  
 ‘John would like to be fond of Mary.’

- b. John-un cip-ul/\*i phal-ci anh-ko siph-ta  
 John-TOP house-ACC sell-COMP not-COMP like  
 ‘John doesn’t want to sell the house.’
- c. John-i sachang-i/\*ul toy-ko siph-ess-ta  
 John-NOM head-NOM become-COMP like  
 ‘John would like to be the company head.’

This is unexpected if the auxiliary verb *siph-ta* ‘like-DECL’ is underspecified with respect to its AGT feature as in the previous section: its complement can be either *nom* or *acc*. As noted here, *siph-ta* is preceded by the agentive auxiliary verb *ha-* or the negative auxiliary verb *anh-*, the complement can get only *acc*, whereas when it is preceded by the predicative verb *toy-* ‘become’, it gets only *nom*.

Why do we have this difference? Intuitively this means that auxiliary verbs like *ha-ta* in a sense determines the AGT value of the following auxiliary verb. This could be solved by one simple head feature, HTYPE (head-type), adopted from Cho and Sells’s (1995) TYPE feature.<sup>17</sup> This head feature on the non-headed daughter places a restriction on what kind of element can serve as its head. To reflect this, we first revise the constraints on the *hd-lex-ph* as following:

(64) Head-Lex Rule (revised):

$$\left[ \begin{array}{l} \textit{hd-lex-ph} \\ \text{COMPS L} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{LEX +} \\ \text{HTYPE } \langle \boxed{2} \rangle \\ \text{COMPS L} \end{array} \right], \boxed{2}\mathbf{H} \left[ \begin{array}{l} \text{AUX +} \\ \text{COMPS } \langle \boxed{1} \rangle \end{array} \right]$$

This rule says that the nonhead daughter in *hd-lex-ph* will bear the head feature HTYPE whose value is the head itself in the phrase.<sup>18</sup>

Dependent auxiliary verbs like *ha-ko* will be specified with this value, as represented in the following:<sup>19</sup>

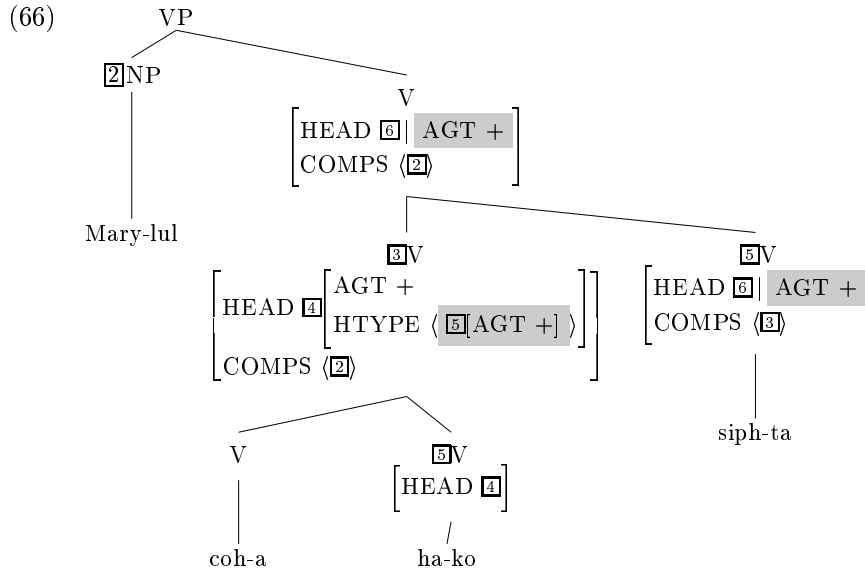
$$(65) \left[ \begin{array}{l} \langle \textit{ha-ko} \rangle \\ \text{HEAD} \left[ \begin{array}{l} \text{AGT +} \\ \text{HTYPE } \langle [\text{AGT +}] \rangle \end{array} \right] \\ \text{VAL} \left[ \begin{array}{l} \text{SUBJ } \langle \boxed{1} \rangle \\ \text{COMPS } \left\langle \boxed{2} \left[ \begin{array}{l} \text{LEX +} \\ \text{SUBJ } \langle \boxed{1} \rangle \end{array} \right] \right\rangle \end{array} \right] \end{array} \right]$$

<sup>17</sup>Another construction where the head feature HTYPE could be of use is the so-called bound-noun construction. Certain bound nouns like *li* needs the verb *eps-* ‘not.exist’ to be followed whereas those like *swu* need to be followed by *iss-* ‘exist’ and *eps-* ‘exist’. In the sense that no other verbs can be followed, the bound nouns places restrictions on the type of heads to be followed.

<sup>18</sup>The nonagentive stative verb, when functioning as a nonhead-daughter, requires its head to be nonagentive ([AGT -]).

<sup>19</sup>We thus classify auxiliary verbs at least into two types: those with a specific HTYPE feature and those with no constraints on the HTYPE. Most of the dependent auxiliary verbs belong to the second type.

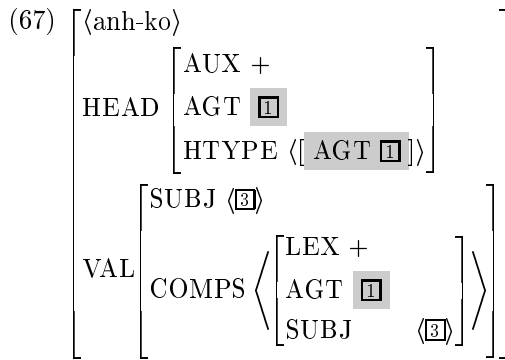
What this lexical entry says is that when this auxiliary verb serves as a nonhead element, the head that selects this auxiliary verb as its argument must be [AGT +]. This is in a sense a selection by the nonhead, as represented in the following structure.<sup>20</sup>



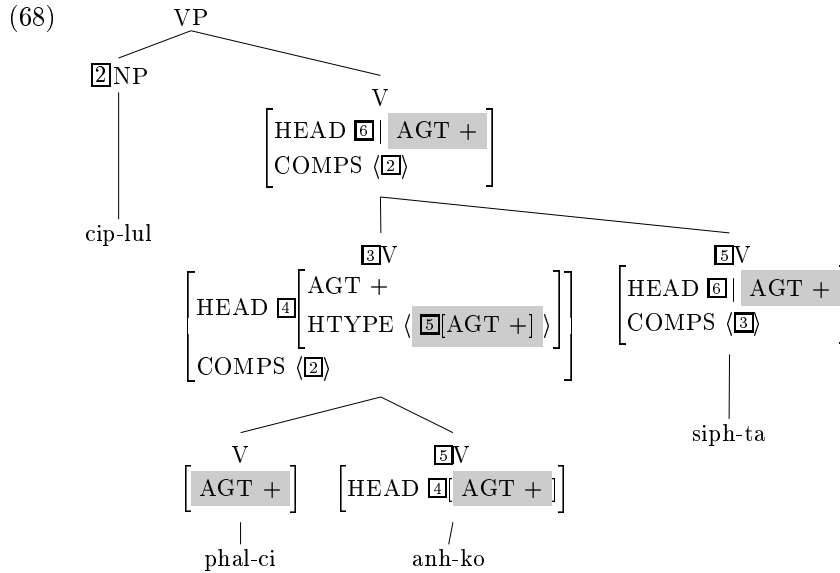
As seen from the above structure, though the auxiliary verb *siph-ta* is lexically [AGT *boolean*], its value must be positive (+) because of the restriction on the HTYPE feature imposed by the nonhead element *ha-ko* ‘do-COMP’. This AGT value will be passed up to the final complex predicate, requiring its COMPS value to be *acc*.

The dependent negative auxiliary verb *anh-ko*, whose AGT value is identical with the preceding verb, requires the head to have the identical AGT value when it is used as a dependent verb. For example, *anh-ko*, will have the following information:

<sup>20</sup>Yoo (2002) classifies the value of AGT as in *agentive* and *nonagentive* which again are classified into four types: *inherently agentive* and *noninherently agentive* and *inherently nonagentive* and *noninherently nonagentive*. In addition to these classifications, her analysis posits two different lexical entries for *ha-* and *siph-*, respectively. Compared to this analysis, the present analysis introduces the head feature HTYPE with only one lexical entry for the auxiliary verbs.



Thus, when this verb combines with an agentive verb *phal-ci* ‘sell-COMP’ in (63)b, its AGT value will be also positive. As a dependent verb, *anh-ko* places the restriction on the following head *siph-ta*. Such a lexical entry will project the following structure for the sentence (63)b:



In accordance with the lexical entry of *anh-ko* in (67), the AGT value of the element in HTYPE must be positive too. This finally assigns the head feature [AGT +] to the head verb *siph-ta*. Then the final verbal complex [*phal-ci anh-ko siph-ta*] ‘sell-COMP not-COMP like-DECL’ is also [AGT +]. This is why the grammar allows only *acc* to the complement *cip-ul* ‘house-ACC’ in (63)b.<sup>21</sup>

<sup>21</sup>Some speakers allow NOM to this complement. The present analysis can also easily account for this variation. To these speakers, the negative auxiliary verb *anh-ko* does not specify any HTYPE value.

## 5.4 Case on the Main Verbs

Another interesting case system in auxiliary complex predicate constructions concerns case assignment on the main verb that bears a specific COMPS form required by the auxiliary verb. The first type of auxiliary verbs allow only ACC to the preceding main verb:

- (69) a. John-i Tom-ul tow-a-(lul/\*ka) cwu-ess-ta  
 John-i Tom-ACC help-COMP-ACC/NOM give-PST-DECL  
 ‘John helped John out.’
- b. John-i sakwa-lul mek-ko-lul/\*ka iss-ta  
 John-NOM apple-ACC eat-COMP-ACC is-DECL  
 ‘John is eating an apple.’
- c. John-i sakwa-lul mek-e-lul/\*ka po-ass-ta  
 John-NOM apple-ACC eat-COMP-ACC/NOM try-PST-DECL  
 ‘John tried to eat an apple.’

The fact that these verbs can serve as the head of an imperative verb indicates that they are agentive. The main verb in the auxiliary verb of course can get only a *vcase* value, NOM or ACC, but not GEN. In incorporating this fact in the grammar, we just need to assume that the *vcase* value NOM and ACC can be attached to any word element with the feature [NOMINAL +] which includes all nouns and dependent verbal elements. Dependent verbal elements include those verbs whose presence is required by another element such as an auxiliary verb. In the present grammar, the verbal elements that can occur in syntax can be classified into two main types as following:<sup>22</sup>

- (70) a. *v-ind*: mek-ess-ta ‘eat-PST-DECL’, mek-ela ‘eat-IMP’, mek-ca ‘eat-SUG’, etc  
 b. *v-dep*: mek-e ‘eat-COMP’, mek-ko ‘eat-COMP’, mek-key ‘eat-COMP’, mek-ci ‘eat-COMP’, etc

This NOMINAL feature is assigned only to the type *v-dep*, but not to independent words. Once we allow such dependent verbal elements to have a verbal case value, the grammar then just needs to constrain where such cased dependent verbs can occur. In the treatment of complex predicates, as noted earlier, an auxiliary verb selects a main verb as its lexical argument. This then implies that this main verb complement with a specific FORM value will also observe the Head-Complement Rule in (39). For example, the auxiliary verb *cwu-ess-ta* ‘give-PST-DECL’ in (69) will minimally have the following lexical specification:

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<sup>22</sup>See Kim and Yang 2004 for the feature NOMINAL and VERBAL and the relevant hierarchy for these two types.

$$(71) \left[ \begin{array}{l} \text{HEAD} \left[ \begin{array}{l} \text{AUX } + \\ \text{AGT } + \end{array} \right] \\ \text{ARG-ST} \left\langle \left[ \text{INP}[\text{GCASE } vcase], \left[ \begin{array}{l} \text{NOMINAL } + \\ \text{LEX } + \\ \text{GCASE } vcase \\ \text{SUBJ } \langle \mathbb{E} \rangle \end{array} \right] \right\rangle \right. \end{array} \right]$$

This auxiliary verb is agentive verb. It then implies that its lexical complement, when realized as a COMPS element, can get ACC in accordance with the Head-Complement Rule A.

Our system also predicts that when the auxiliary verb is underspecified with respect to the feature AGT value, it will in a sense allow either NOM or ACC on its main verb complement. This prediction is born out with the auxiliary verb *sip-ta* or the negative auxiliary verb *anh-ta*:

- (72) a. John-i sakwa-lul mek-ko-lul/ka sip-ess-ta  
 John-NOM apple-ACC eat-COMP-ACC/NOM like-PST-DECL  
 ‘John would like to eat an apple.’  
 b. Mary-ka yeppu-ci-ka/lul anh-ass-ta  
 Mary-NOM pretty-COMP-NOM/ACC not  
 ‘Mary isn’t pretty.’

However, one complication arises in the negative auxiliary construction when the main verb is agentive:

- (73) Mary-ka ka-ci-lul/\*ka anh-ass-ta  
 Mary-NOM go-COMP-ACC not  
 ‘Mary didn’t go.’

As noted here, in such a case the case alternation is not permitted. One solution we can resort to is that unlike nonagentive verbs, the agentive dependent verbs with the COMPS for value *-ci* have the HTYPE feature that enforces its head to be agentive too as represented in the following:

$$(74) \left[ \left\langle \text{ka-ci ‘go-COMP’} \right. \right. \left. \left. \text{HEAD} \left[ \begin{array}{l} \text{AGT } + \\ \text{VFORM } ci \\ \text{HTYPE } \langle [\text{AGT } +] \rangle \end{array} \right] \right. \right. \left. \left. \right] \right]$$

This general restriction on the *-ci* form verb will then require the following negative auxiliary verb to be [AGT +], and thus allows the main verb complement to have ACC.

## 6 Case on Adverbial Elements

Duration and frequency adverbials can also get case (cf. Wechsler and Lee 1996):

- (75) a. John-i cacenke-lul han sikan-ul/\*-i sinnakey tha-ass-ta  
 John-NOM bike-ACC one hour-ACC/\*i happily rode  
 ‘John happily rode the bike for one hour.’  
 b. John-i han sikan-i/\*ul aphassta  
 John-NOM one hour-NOM sick  
 ‘John was sick for one hour.’

The basic observation here is that the agentivity of the main predicate also influences the case value on the adverbial element. In (75)a the adverbial element *han sikan-ul* modifies an agentive verb *tha-ss-ta* whereas in (76) the adverbial element *han sikan-i* modifies the nonagentive adverb. The only thing we need to do is to add case constraints on the Head-Modifier Rules:<sup>23</sup>

(76) Head-Modifier Rule A:

$$[hd-mod-ph] \Rightarrow \left[ \begin{array}{l} \text{MOD } \langle \square \rangle \\ \text{CASE } | \text{GCASE } acc \end{array} \right], \square \mathbf{H}[\text{HEAD} | \text{AGT } +]$$

(77) Head-Modifier Rule Rule B:

$$[hd-mod-ph] \Rightarrow \left[ \begin{array}{l} \text{MOD } \langle \square \rangle \\ \text{CASE } | \text{GCASE } nom \end{array} \right], \square \mathbf{H}[\text{HEAD} | \text{AGT } -]$$

These rules mean that when an adverbial (frequency and duration) modifies an agentive head, it can get *acc*, and when it modifies a nonagentive head, it can get *nom*.

This direction could easily account for the cases where such an adverbial appears in different positions. For example, the adverbial *han sikan-ul* in (76)a can be scrambled into different positions:

- (78) a. John-i [han sikan-ul [cacenke-lul sinnakey tha-ass-ta]]  
 b. [han sikan-ul [John-i cacenke-lul sinnakey tha-assta]]  
 c. John-i cacenke-lul sinnakey [han sikan-ul [tha-assta]]

All these examples are expected since the adverbial element *han sikan-ul* ‘one hour-ACC’ is modifying the agentive head whose feature is inherited from the agentive verb *tha-ass-ta* ‘rode’.

<sup>23</sup>Of course, not all adverbs can get case. As noted by Wechsler and Lee (1996), we need a further semantic restriction on the types of adverbs that allow a grammatical case marker to be attached.

## 7 Conclusion

Korean case marking system is of extraordinary intricacy, displaying many different patterns. This paper has developed a Korean case system that can capture all these in a systematic way.

The analysis started with the process of building up nominals with case markers. This building up process step-by-step assigns enriched lexical information to lexemes and word level elements. The paper then presented the basic constraints for case realization on the syntactic formation rules, the Head-Subject Rule, Head-Complement Rule, and Head-Modifier Rule, based on the head feature AGENTIVITY. This feature decides the syntactic case value on the grammatical function SUBJ and COMPS element.

We have seen that such a rule-based system can explain the complex case phenomena such case stacking, case omission, case alternation, case in auxiliary constructions, case on adverbial elements with no extra mechanisms. The case system developed here provides answers to how Korean sentences are formed, implying a high possibility of computational implementation, too.

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