Korean postpositions as weak syntactic heads

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Abstract

This paper deals with Korean postpositions. They are treated as suffixes in recent lexicalist works. But they differ syntactically from suffixes and we will propose to treat them as clitics, i.e. words combining with a phrase in the syntax and attaching to its last lexical item in the phonology. We treat them as weak syntactic heads, taking into account their head properties and the syntactic similarity between the mother phrase and the host phrase. They take the latter as complement and share most of its syntactic properties. Revising the traditional classification, we divide postpositions into three subtypes: marking, oblique and semantic postpositions, based on their distributional properties, such as optionality, non-nominal marking and stacking, *etc*. Finally we show how our analysis can be described in the HPSG model.

1 Introduction

This paper deals with Korean postpositions (henceforth P). They are usually subdivided in (at least) 7 subclasses[1][2]:

(1)

examples	in the traditional grammar
-i/ga 'nom', *-(l)eul* 'acc', *-ui* 'gen'	grammatical case-marking P
-e 'loc', *-ege* 'dat', *-(eu)lo* 'to, by', *etc*.	semantic case-marking P
-jocha 'even', *-kkaji* 'up to', *etc*.	spectific P
-(n)eun 'top'	topic marker
-do 'too', *-man* 'only'	additive/restrictive P
-(g)wa 'and', *-(i)na* 'or', *etc*.	conjunctive P
-(y)a 'voc'	vocative P

They attach to lexical items but determine the function of phrases: *-eul* in the following example is attached to the N *dongsaeng* but marks the whole NP *Mary-ui dongsaeng* as direct object.

(2) Paul-i Mary-ui dongsaeng-eul manna-ss-da.
Paul-*nom* Mary-*gen* brother-*acc* meet-*past-decl*.
Paul met Mary's brother.

† We wish to thank Anne Abeillé, Jean-Marie Marandin and Jesse Tseng for comments and suggestions. We are also grateful to the HPSG2008 reviewers and audience for questions and comments. All remaining errors and unclarities are of course our own.

[1] The transcription follows "the Romanization of Korean" issued by the Korean Ministry of Culture and Tourism and does not take into account the phonetic variations.

[2] Cf. P are divided into 2 or 3 subclasses in syntactic works. See the following section.

P are analyzed as suffixes in recent lexicalist works, based on their suffix-like behaviours: morpho-phonological variations, idiosyncratic host forms and strict ordering restrictions, *etc*. (Sells 1995, Kim & Choi 2005, Yoo 2002, *etc*.).

We propose to analyze P as words and show that they differ syntactically from suffixes. We treat them as clitics, in order to account for their morpho-phonological dependency. We propose also to analyze P as weak syntactic heads. They take the host phrase as complement but share its HEAD feature values. Consequently the mother phrase and the host phrase show similar syntactic behaviours. We propose to divide postpositions into 3 subtypes: marking, oblique and semantic P. They have different restrictions for stacking and contribute differently to the mother phrase's syntax. We will adopt previous analyses of weak syntactic heads and use features like CL, MARKING and CASE to describe P's grammar within HPSG.

2 Previous analyses

P are analyzed as words or suffixes in previous works. The first analysis is motivated by the phrasal scope (Yoon 1995, Chae & No 1998, *etc*.): for example, *-eul* in (2) combines with the NP *Mary-ui dongsaeng* affected by it. Some P are syntactic heads determining the mother phrase's function while others are not:

(3) Paul-gwa Mary-neun jib-eseo-do il-eul ha-n-da.
Paul-and Mary-*top* home-*loc*-also work-*acc* do-*prog*-*decl*.
Paul and Mary works at home too.

-eseo is a head forming an NP adjunct (Choi 1997, O'Grady 1991, *etc*.), while *-(n)eun* and *-do* is not, because they don't change the phrase's function. *-eul* is considered as a functional head (Im 1999, *etc*.) or a case marker (Han 2003, *etc*.): it marks the object but can be omitted.

The second analysis is supported by suffix-like behaviours (Kim & Choi 2005, *etc*.). Certain P show morpho-phonological variation (4); Certain pronouns appear in an idiosyncratic form before *-i/ga* '*nom*' (5) (Bratt 1996); P are stacked in a strictly restricted order (6).

(4)

after consonants	*-i*, *-eul*, *-eun*, *-eulo*, *-gwa*, *-ina*, …
after vowels	*-ga*, *-leul*, *-neun*, *-lo*, *-wa*, *-na*, …

(5) a. *na/nae-ga vs. na/*nae-{leul,neun,ege} 'I-{*acc*,*top*,*dat*}'
b. ??jeo/je-ga vs. jeo/*je-{leul,neun,ege} 'I-{*acc*,*top*,*dat*}'
c. ??neo/ne-ga vs. neo/*ne-{leul,neun,ege} 'you-{*acc*,*top*,*dat*}'
d. *nugu/nu-ga vs. nugu/*nu-{leul,neun,ege} 'who-{*acc*,*top*,*dat*}'

(6) a. Paul-{man,kkaji,jocha}-{i,eul,ui,eun,do}
Paul-{only,up to,even}-{*nom*,*acc*,*gen*,*top*,also}
a'. *Paul-{i,eul,ui,eun,do}-{man,kkaji,jocha}
b. haggyo-{e,lo,eseo}-{man,kkaji,jocha}
school-{*loc*,to,at}-{only,up to,even}
b'. *haggyo-{man,kkaji,jocha}-{e,lo,eseo}

P attach to lexical roots or bases in the morphology. So they neither appear alone (7) nor can be separated from their lexical host (8):

(7) - Paul-i Mary-do manna-ss-ni?
Paul-*nom* Mary-also met?
Did Paul met Mary too?
- ani, *(Mary)-man manna-ss-da.
No, *(Mary)-only met.

(8) a. Paul(*amado)-i Mary(*amado)-ege chaeg(*amado)-man
Paul(*perhaps)-*nom* Mary(*perhaps)-*dat* book(*perhaps)-*only*
bonae-gess-ji.
send-may-decl.
Paul may send to Mary only a/the book.
b. Paul(*#)-i Mary(*#)-ege chaeg(*#)-man bonae-ss-da.
Paul(*#)-*nom* Mary(*#)-*dat* book(*#)-*only* sent.
Paul sent to Mary only a/the book.

The phrasal scope is achieved by incorporating P's properties into lexical hosts, which percolate them up to the mother phrase (Kim & Choi 2005). This analysis does not take into account the fact that most P combine with various categories: nominal, adverbial and verbal. This is unexpected for suffixes.

3 Our proposals

This section presents 3 proposals with justifications: to treat P as clitics in 3.1 and as weak syntactic heads in 3.2 and to divide them into 3 subtypes in 3.3.

3.1 P are clitics

In spite of morpho-phonological similarity, P contrast with suffixes in two syntactic facts. 1) Syntactic rules move suffixes with their host but not P (Nam 1996, Zwicky & Pullum 1983). In fact, the latter disappear:

(9) a. chingu-deul-eul manna-ass-da.
friend-*plur-acc* met.
(I) met friends.

b. [__ manna-n] chingu-*(deul)-(*eul)-i manh-da.
[__ meet-*rel*] friend-*(*plur*)-(*acc*)-*nom* be many.
lit. friends I met are numerous.

-*deul* in (9b) is not obligatory and can be omitted. But if it is omitted, the host is interpreted as singular or plural, whereas it is always plural N with it.

2) P and suffixes have different distribution in the coordination. P have restricted distribution: some can't appear at the first conjunct (10a) while others can't be omitted at the last conjunct (10b).

(10) a. Paul-(*eul)-gwa Mary(-leul) manna-ss-da.
Paul-(**acc*)-and Mary-(*acc*) met.
I met Paul and Mary.
b. gabang-eul bang-(e)-na geosil-*(e) du-geola!
sack-*acc* school-(loc)-or library-*(loc) put!
Put your sack in the room or in the living room!

But suffixes don't show such restrictions and appear freely at each conjunct.

(11) a. namu-(kkun)-gwa sanyang-(kkun)-eul gugyeongha-da.
tree-(person)-and hunting-(person)-*acc* watch.
watch a woodcutter/tree and a hunter/hunting.
b. ai-(deul)-gwa seonsaeng-(deul)-eul manna-da.
child-(*plur*)-and teacher-(*plur*)-*acc* meet.
meet a child/children and a teacher/teachers.

The interpretation reveals another difference. P at the last conjunct take the whole coordination in their scope, as shown in (10a). But suffixes affect only the conjunct to which they are attached. The first conjunct, if we delete the suffix, denotes a tree or trees in (11a) and can be singular NP modified by a quantifier conveying singularity in (11b):

(12) a. namu-wa sanyang-kkun-eul gugyeongha-da.
tree-and hunting-person-*acc* watch.
watch a tree/trees and a hunter.
b. han ai-wa yeoleo seonsaeng-deul-eul manna-da.
one child-and several teacher-*plur-acc* meet.
meet a child and several teachers.

Note also that P differ from both derivational and inflectional suffixes. In contrast to derivational ones, they attach to lexical hosts in a regular way and

they don't change their category[3]. They can't be inflectional suffixes, in that they are compatible with non flectional categories, such as adverb.

We then treat P as words. But they are dependant to their hosts, as illustrated in (7) and (8):

(7) - Paul-i Mary-do manna-ss-ni?
Paul-*nom* Mary-also met?
Did Paul met Mary too?
- ani, *(Mary)-man manna-ss-da.
No, *(Mary)-only met.

(8) a. Paul(*amado)-i Mary(*amado)-ege chaeg(*amado)-man
Paul(*perhaps)-*nom* Mary(*perhaps)-*dat* book(*perhaps)-*only*
bonae-gess-ji.
send-may-decl.
Paul may send to Mary only a/the book.

b. Paul(*#)-i Mary(*#)-ege chaeg(*#)-man bonae-ss-da.
Paul(*#)-*nom* Mary(*#)-*dat* book(*#)-*only* sent.
Paul sent to Mary only a/the book.

The fact can be accounted for, if we treat P as clitics, i.e. phonologically dependant words attaching to a lexical host in the phonology. The host can't be omitted in (7), because *-man* needs a non-empty host. The adverb *amado* in (8a) is a verbal adjunct and its embedding between a P and its host is ruled out in the syntax. And to insert a pause between them in (8b) will be rejected by the attachment in the phonology.

It is also possible to account for the allomorphy in (4) and (5). As for P's variation, we can introduce in the phonology a rule (or function) determining their form according to the host's final phoneme or register all variants in the lexicon with a restriction on it[4]. For example, the variation between *-i* and *ga* '*nom*' in (13) can be described by a rule (14) or two lexical entries (15):

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[3] Cf. semantic case-marking P are often treated as forming a PP or KP and grammatical case-marking P as forming a KP in the literature.

[4] There are also non phonological variations. The dative complement is marked by *-ege* '*dat*' if it is an animate NP or by *-e* '*loc*'. *-i/ga* '*nom*' is replaced by *-kkeseo*, if the subject refers to a person socially superior to the speaker:

i. a. chaeg-eul chingu-{ege,*e} bonae-ss-da.
book-*acc* friend-*dat* sent.
(I) sent a/the book to a/the friend.

b. chaeg-eul haggyo-{*ege,e} bonae-ss-da.
book-*acc* school-*dat* sent.
(I) sent a/the book to a/the school.

ii. a. ai-{ga,*kkeseo} o-ass-da.
child-*nom* came.
A child came.

(13) a. {Paul,*Mary}-i
b. {*Paul,Mary}-ga
(14) '*nom*' → *-i* after a consonant, but *-ga* after a vowel
(15) a. *-i*: the host terminates with a consonant[5]
b. *-ga*: the host terminates with a vowel

Idiosyncratic host forms can be explained in the same way: change their form in the phonology by a rule or register in the lexicon all host forms with a constraint on P, as follows.

(16) a. nae/*na-ga 'I-*nom*'
b. *nae/na-{leul,ui,neun,do,ege,*etc.*} 'I-{*acc*,*gen*,*top*,also,*dat*,*etc.*}'
(17) 'I' → *nae* before *-i/ga*, but *na* before other P
(18) a. *nae*: it combines only with *-i/ga*.
b. *na*: it combines with all P except *-i/ga*.

It seems also possible to treat idiosyncratic forms and *-i/ga* as complexes words, in that they are not numerous and appear only before *-i/ga* as illustrated in (5). Then, *nae* in (18a) will be replaced by *nae-ga* 'I-*nom*' with a constraint that it doesn't combine with any P.

Ordering restrictions in (6) can be summarized into two constraints, if we revise P's classification: oblique case P come first and marking P come last (see 3.3 for the detail).

We then treat P as clitics combining with a phrase in the syntax and attaching to a non-empty lexical item in the phonology.

3.2 P are weak syntactic heads

The next issue is to decide P's syntactic status. They are given different status in previous works, as mentioned in 2. But they have head properties:
1) Korean is a head-final language and P always follow their host phrase:

(19) a. [yeoleo salam]-{i,ege,eun} '[several man]-{*nom*,*dat*,*top*}'
b. *yeoleo-{i,ege,eun} salam
c. *{i,ege,eun}-yeoleo salam

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b. abeonim-{*i,kkeseo} o-si-eoss-da.
father-*nom* come-*hon-past-decl*.
(My) father came.

[5] This restriction can be described by the edge feature (Tseng 2002, *etc.*): *-i*[COMPS <[EDGE|RIGHT *C*]>] vs. *-ga*[COMPS <[EDGE|RIGHT *V*]>]

2) *-i/ga*, *-(l)eul*, and *-ui* restrict the function and the distribution of the phrase (20), though they can be omitted. And certain contexts forbid their omission (21).

(20) Paul-{i,*eul,*ui} Mary-{*ga,*leul,ui} sagwa-{*ga,leul,*ui}
Paul-{*nom*,*acc*,*gen*} Mary-{*nom*,*acc*,*gen*} apple-{*nom*,*acc*,*gen*}
meog-eoss-da.
ate.
Paul ate Mary's apple(s).

(21) a. gongbuha-gi-neun doseogwan-eseo-*(ga) joh-da.
study-nominalizer-*top* library-*loc*-*(*nom*) is good.
the library is a good place to study in.
b. [oegug-eseo-*(ui) saenghwal]-edaehae mud-da.
[foreign country-*loc*-*(*gen*) life]-about ask.

3) Other P are semantic heads taking the host phrase as argument, though they don't change its syntactic function:

(22) seonmul-eul Paul-ege-{neun,do,man,kkaji,jocha} bonae-ss-da.
gift-*acc* Paul-*dat*-{*top*,also,only,till,even} sent
(I) sent a gift only/also/up/even to Paul.

4) *-(n)eun* and *-do* can replace *-i/ga* in (21a) and they can't be omitted:

(23) gongbuha-gi-neun doseogwan-eseo-{<u>neun,do</u>} joh-da.
study-nominalizer-*top* library-loc-{*top*,also} is good.
the library is a good place for study.

5) Some P restrict the host's semantic property:

(24) a. *NP-dat*: [+animate]-{*e,ege} vs. [-animate]-{e,*ege}
b. *NP-nom*: [-hon]-{i/ga,*kkeseo} vs. [+hon]-{*i/ga,kkeseo}

We then treat P as heads and their host phrase as complement. But it is also true that some P can be omitted (25a) and that others are compatible with all syntactic functions (25b), unlike ordinary heads:

(25) a. Paul-(<u>i</u>) Mary-(<u>ui</u>) dongsaeng-(<u>eul</u>) manna-ss-da.
Paul-*nom* Mary-*gen* brother-*acc* met.
Paul met Mary's brother.
b. Paul-{eun,do,man,jocha} sul-{eun,do,man,jocha}
Paul-{*top*,also,only,even} wine-{*top*,also,only,even}
ppalli-{neun,do,man,jocha} masi-eoss-da.
fast-{*top*,also,only,even} drank.
Paul drank wine fast.

The data can be accounted for, if we treat these P as weak syntactic heads having underspecified syntactic properties and sharing those of the complement (Tseng 2002, Abeillé *et al*. 2005). They share syntactic properties of the host phrase and percolate them to the mother phrase. Then the latter inherits the properties of the host phrase. This means that these P have no effect on the syntax of the phrase and that they can appear or be omitted freely.

In our analysis, *sul-man* and *ppalli-man* in (25b) are a direct NP and an AdvP respectively. *-man* shares the category and case values in the first case, and the category value in the second case. If the complement is a VP, it shares and percolates the VFORM value, which may be checked by another verb:

(26) a. Paul-i ja-{ji,*go}-man anh-ass-da.
Paul-*nom* sleep-*Comp*-only didn't.
Paul didn't sleep only.
b. Paul-i ja-{*ji,go}-man sipeoha-yeoss-da.
Paul-*nom* sleep-*Comp*-only wanted.
Paul wanted only to sleep.

P in (25a) share also the complement's syntactic properties. They form an NP after an NP and an AdvP after an AdvP, *etc*. But the mother phrase has a more restricted distribution than the host phrase. For example, *Paul-i* and *Paul-eul* appear in different positions: one can't be direct object and the other can't appear as subject, as illustrated in (20), whereas *Paul* is compatible with both functions. We will treat them as marking elements and as being checked by the verb (see 3.3 for the detail).

We treat P of oblique complements and NP adjuncts as sharing syntactic properties of the complement too. But, unlike other P, they can't be omitted (27a) and forbid a phrase to appear in direct positions (27b-c):

(27) a. Paul-i doseogwan-*(eseo) jam-eul ja-n-da.
Paul-*nom* library-(*loc*) sleep-*acc* sleep-*prog-decl*.
Paul sleeps at the library.
b. dali-*{e,eseo,lo}-ga muneoji-eoss-da.
bridge-{*loc*,*loc*,by}-*nom* broke
the bridge broke.
c. Paul-eun uija-*{e,eseo,lo}-leul mandeul-eoss-da.
Paul-*top* chair-{*loc*,*loc*,by}-*acc* made.
Paul made a chair.

-eseo in (27a) forms an NP adjunct and oblique P in (27b-c) restricts the phrase's function. We treat them as having a specified case value, oblique in our analysis. They share the host phrase's syntactic properties, except the

case value. They select only an NP complement, which is the only category compatible with a case value, and constitute an oblique NP.

3.3 P's subtypes and syntactic features

Previous works use only one syntactic feature: CASE. They divide P into 2 subtypes: case P and non case P, or into 3, if they differentiate case assigning P and case marking P. But we propose to use 2 syntactic features: MARKING and CASE, and to divide P into 3 subtypes: marking P, oblique P and semantic P, based on the following properties:

(28) a. marking P are optional and attach to various categories.
b. oblique P are not optional and attach only to NP.
c. semantic P are not optional and attach to various categories.

We treat grammatical case-marking P (*-i/ga*, *-(l)eul*, *-ui*) and two non case P (*-(n)eun*, *-do*) as marking P. They belong to different subtypes in previous works, but they have similar behaviours:

(6) a. Paul-{man,kkaji,jocha}-{i,eul,ui,eun,do}
Paul-{only,up to,even}-{*nom*,*acc*,*gen*,*top*,also}
a'. *Paul-{i,eul,ui,eun,do}-{man,kkaji,jocha}
b. haggyo-{e,lo,eseo}-{man,kkaji,jocha}
school-{*loc*,to,at}-{only,up to,even}
b'. *haggyo-{man,kkaji,jocha}-{e,lo,eseo}

(29) *Paul-{i,eul,ui,eun,do}-{i,eul,ui,eun,do}
Paul-{*nom*,*acc*,*gen*,*top*,also}-{*nom*,*acc*,*gen*,*top*,also}

(21) a. gongbuha-gi-neun doseogwan-eseo-*(ga) joh-da.
study-nominalizer-*top* library-*loc*-*(*nom*) is good.
the library is a good place to study in.
b. [oegug-eseo-*(ui) saenghwal]-edaehae mud-da.
[foreign country-*loc*-*(*gen*) life]-about ask.

(23) gongbuha-gi-neun doseogwan-eseo-{neun,do} joh-da.
study-nominalizer-*top* library-loc-{*top*,also} is good.
the library is a good place for study.

They can't precede other P (6); they can't appear together (29); they have in common the capacity to allow a phrase to appear in inaccessible positions (21 and 23).

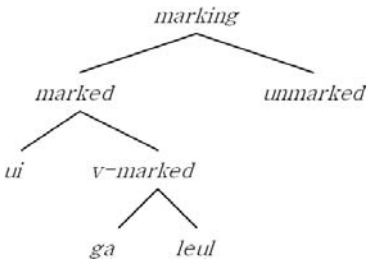
It is necessary then to define this group as a subtype and to find out a syntactic property or more characterizing its members. The CASE feature is not available, because *-(n)eun* and *-do* are non case P compatible with an AdvP or a VP, as illustrated in (25b) and (26). Recall that *-i/ga* and *-(l)eul* also can be omitted (25a) and appear after non case categories:

(30) a. bi-ga manhi-{ga,leul} naeli-eoss-da.
rain-*nom* much-{*nom*,*acc*} fell.
It rained much.

b. Paul-i bab-eul ppalli-eul meog-eoss-da.
Paul-*nom* meal-*acc* much-*acc* ate.
Paul ate much.

So we introduce the MARKING feature to P and attribute a *marked* value to marking P. The feature doesn't control the syntactic function of the phrase and marking P can be omitted. But MARKING is a syntactic feature and its value works in the syntax: it may restrict P's distribution inside the phrase and modify the mother phrase's distribution in the sentence. As for its value, we introduce more specified values to account for *-ui*, *-i/ga* and *-(l)eul*:

(31)



v-marked is for *-(n)eun* and *-do* and indicates that the mother phrase can't appear inside an NP, for example as a genitive complement. *-ui* 'gen' has the *ui* value forbidding its attachment to a verbal constituent. *unmarked* is attributed to non marking P.

Oblique P in our analysis correspond with semantic case-marking P in previous works. They have CASE feature and percolate an oblique value to the mother phrase. They select an NP complement and form an oblique NP. The latter appears as oblique complement or as NP adjunct. They can't be omitted because the phrase loses the oblique case value offered by them. As for the case value, we assume only 2 specified values: direct and oblique.

(32)

The first value is for the NP appearing in one of the direct argument positions. We don't use more specified values like *nom*, *acc*, *etc.*, because our analysis has no grammatical case-marking P and consequently no P assigning these values. We assume that the direct case value is introduced directly by nominal items, because an NP without a P can appear in direct positions. The oblique case value is attributed to all oblique P. It is percolated to the mother phrase and the latter can't appear in direct argument positions.

All remaining P are treated as semantic P. They add usually a contextual meaning to the phrase and contribute to its semantics. Hence they can't be omitted. They don't have the CASE feature but convey the MARKING feature with an *unmarked* value. Their appearance has no effect on the syntax of the phrase.

The following table shows the subtypes in our analysis and in the traditional grammar of P illustrated in (1):

(33)

examples	marking P	oblique P	semantic P	in the traditional grammar
-i/ga 'nom', *-(l)eul* 'acc', *-ui* 'gen'	X			grammatical case-marking P
-e 'loc', *-ege* 'dat', *-(eu)lo* 'to, by', *etc*.		X		semantic case-marking P
-jocha 'even', *-kkaji* 'up to', *etc*.			X	spectific P
-(n)eun 'top'	X			topic marker
-do 'too'	X			additive P
-man 'only'[6]			X	restrictive P
-(g)wa 'and', *-(i)na* 'or', *etc*.		X		conjunctive P
-(y)a 'voc'	X			vocative P

4 Descriptions within HPSG

We use the CL feature (Monachesi 1998) and the notion of weak head introduced by Tseng 2002 and applied to French prepositions *à* and *de* by

[6] Lim, Donghoon pointed out to me that there are 2 *-man*: one attaches directly to the lexical item and the other attaches after oblique P:

i.	ileum-man-eulo	salam-eul	chaj-da.
	name-only-by	person-*acc*	find.
	find a person by only his name.		
ii.	ileum-eulo-man	salam-eul	chaj-da.
	Name-by-only	person-*acc*	find.
	find a person only by the name (we don't .		

(i) means that we look for a person about whom we know only his name whereas, in (ii), we look for a person by his name but not by his age, address, *etc*. *-man* in (ii) is a semantic P that comes between an oblique P and a marking P. But its type is not clear in (i), because it comes before oblique P but it is not an oblique P.

Abeillé *et al.* 2005, in order to describe our analysis within HPSG (Pollard & Sag 1994, Sag *et al.* 2003, *etc.*).

4.1 P's description

Let's start by summarizing our proposals. P are clitics attaching to non-empty lexical hosts in the phonology and weak heads sharing syntactic properties of their complement, i.e. the phrase constituted by the lexical host. And there are 3 types of P: marking P, oblique P and non marking non oblique (or semantic) P.

If we introduce the feature CL to note phonological dependency, P have a following feature structure in the lexicon:

(34) P → $\begin{bmatrix} \text{HEAD} / [1] \\ \text{CL} + \\ \text{MARKING } \textit{marking} \\ \text{COMPS} < \begin{bmatrix} \textit{canonical} \\ \text{HEAD } [1] \\ \text{MARKING } \textit{unmarked} \\ \text{COMPS} < > \end{bmatrix} > \end{bmatrix}$

P are clitics and have a + value for CL. They have an underspecified value for MARKING (see the value set in (31)). COMPS is a list indicating their complement with restrictions: it is a canonical, i.e. non-empty, sign and an unmarked phrase. The same notation between two HEAD features indicates that P and the complement have in common the HEAD feature values. / means sharing by default: P share the value but they override it by their own value, if there is one.

P's subtypes inherit the feature structure in (34) and add to it feature-values appropriate to each type, as follows:

(35) a. marking P→ P & [MARKING *marked*]
b. oblique P→P & $\begin{bmatrix} \text{HEAD} \mid \text{CASE } \textit{oblique} \\ \text{MARKING } \textit{unmarked} \end{bmatrix}$
c. semantic P→ P & [MARKING *unmarked*]

A final description of P items can be formed by completing those in (35) with values defined by each of them, as follows:

(36) a. *-i/ga* → marking P & [MARKING *ga*]
b. *-(l)eul* → marking P & [MARKING *leul*]
c. *-ege* → oblique P
d. *-(n)eun* → marking P& [MARKING *v-marked*]

e. *-kkaji* → semantic P

4.2 Combination of P and their host

P are heads and the host phrase is their complement in our analysis. Their combination is described following the syntactic rule HEAD-COMPLEMENT[7]:

(37) $\begin{bmatrix}\text{HEAD}[2]\\ \text{COMPS}<\ >\end{bmatrix} \rightarrow [\text{SYNSEM}[1]]\ ,\ \begin{bmatrix}\text{HEAD}[2]\\ \text{COMPS}<[\text{SYNSEM}[1]]>\end{bmatrix}$

The mother phrase inherits the HEAD value from P according to the Head Feature Principle. So, all 3 parts are given the same HEAD value:

(38) $\begin{bmatrix}\text{HEAD}/[2]\\ \text{COMPS}<\ >\end{bmatrix} \rightarrow [\text{HEAD}[2]]\ ,\ \begin{bmatrix}\text{HEAD}/[2]\\ \text{COMPS}<[\text{SYNSEM}[1][\text{HEAD}[2]]]>\end{bmatrix}$

Now let's see some examples. With an NP complement, P constitute a direct or oblique NP with a specified MARKING value, as follows:

(39) a. Paul-i 'Paul-*nom*' $\begin{bmatrix}\text{HEAD}[2]\\ \text{MARKING } ga\end{bmatrix} \rightarrow$

Paul [1] $\begin{bmatrix}\text{HEAD}[2]\begin{bmatrix}noun\\ \text{CAS } direct\end{bmatrix}\end{bmatrix}$, -i $\begin{bmatrix}\text{HEAD}[2]\\ \text{MARKING } ga\\ \text{COMPS}<[1]>\end{bmatrix}$

b. doseogwan-eseo 'library-*loc*' $\begin{bmatrix}\text{HEAD}\begin{bmatrix}noun\\ \text{CASE } oblique\end{bmatrix}\\ \text{MARKING } unmarked\end{bmatrix} \rightarrow$

doseogwan [1] $\begin{bmatrix}\text{HEAD}[2]\begin{bmatrix}noun\\ \text{CAS } direct\end{bmatrix}\end{bmatrix}$, -eseo $\begin{bmatrix}\text{HEAD}[\text{CASE } oblique]/[2]\\ \text{MARKING } unmarked\\ \text{COMPS}<[1]>\end{bmatrix}$

-i in (39a) share the HEAD value and constitute a direct NP. It percolates also its MARKING value to the mother phrase. *-eseo* in (39b) doesn't share the CASE value and gives an oblique NP.

P gives an AdvP or a VP in the same way, if the complement is an AdvP or a VP:

(40) a. ppalli-man 'fast-only' $\begin{bmatrix}\text{HEAD}[2]\\ \text{MARKING } unmarked\end{bmatrix} \rightarrow$

ppalli [1] $[\text{HEAD}[2][adverb]]$, -man $\begin{bmatrix}\text{HEAD}[2]\\ \text{MARKING } unmarked\\ \text{COMPS}<[1]>\end{bmatrix}$

[7] The rule places the complement before the head, reflecting the order in Korean.

b. ga-ji-neun ‘go-*Comp-top*’ $\begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{VFORM } \textit{ji} \end{bmatrix} \\ \text{MARKING } \textit{v – marked} \end{bmatrix}$ →

ga-ji [1] $\begin{bmatrix} \text{HEAD} [2] \begin{bmatrix} \textit{verb} \\ \text{VFORM } \textit{ji} \end{bmatrix} \end{bmatrix}$, -neun $\begin{bmatrix} \text{HEAD} [2] \\ \text{MARKING } \textit{v – marked} \\ \text{COMPS} < [1] > \end{bmatrix}$

-man in (40a) select an AdvP complement and forms an unmarked AdvP while a v-marked VP is composed by *-neun* in (40b).

When a phrase has 2 or more P, it is constructed by successive combinations activated by the HEAD-COMPLEMENT rule, as follows:

(41) a. doseogwan-eseo [1] $\begin{bmatrix} \text{HEAD} [2] \begin{bmatrix} \textit{noun} \\ \text{CASE } \textit{oblique} \end{bmatrix} \\ \text{MARKING } \textit{unmarked} \end{bmatrix}$, -man $\begin{bmatrix} \text{HEAD} [2] \\ \text{MARKING } \textit{unmarked} \\ \text{COMPS} < [1] > \end{bmatrix}$

→ doseogwan-eseo-man $\begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{CASE } \textit{oblique} \end{bmatrix} \\ \text{MARKING } \textit{unmarked} \end{bmatrix}$

b. doseogwan-eseo-man [3] $\begin{bmatrix} \text{HEAD} [4] \begin{bmatrix} \textit{noun} \\ \text{CASE } \textit{oblique} \end{bmatrix} \\ \text{MARKING } \textit{unmarked} \end{bmatrix}$, -i $\begin{bmatrix} \text{HEAD} [4] \\ \text{MARKING } \textit{ga} \\ \text{COMPS} < [3] > \end{bmatrix}$

→ doseogwan-eseo-man-i $\begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{CASE } \textit{oblique} \end{bmatrix} \\ \text{MARKING } \textit{ga} \end{bmatrix}$

The NP *doseogwan-eseo-man-i* is constructed by 3 combinations: the second and the third ones are given in (41) and the first one in (39b).

When several P appear together, there are 2 ordering restrictions, as mentioned in 3.2: oblique P come first and marking P come last (see also the example (6)).

(42) a. doseogwan-eseo-man-i ‘library-*loc*-only-*nom*’
b. *doseogwan-man-eseo-i ‘library-only-*loc-nom*’
c. *doseogwan-eseo-i-man ‘library-*loc-nom*-only’
d. *doseogwan-i-eseo-man ‘library-*nom-loc*-only’

(42b-d) are ruled out, because P are arranged in a bad order. For example, (42d) has 2 violations: an oblique P *-eseo* doesn’t come first and a marking P *-i* doesn’t come last. These restrictions can be represented as follows:

(43) a. $\begin{bmatrix} \text{HEAD} [\text{CASE } \textit{oblique}] / [1] \\ \text{COMPS} < [\text{HEAD} [1]] > \end{bmatrix} < \begin{bmatrix} \text{HEAD} / [1] \\ \text{COMPS} < [\text{HEAD} [1]] > \end{bmatrix}$

b. $[\text{MARKING } \textit{unmarked}] \quad < \quad [\text{MARKING } \textit{marked}]$

And the second restriction may be redefined as "P select an unmarked complement", because only the combination of marking P is strictly ruled out, if we look at the data:

(44) a. 2 unmarked P:
Paul-ege-{lo,man,kkaji} 'Paul-*dat*-{to,only,even}', *etc*.
b. unmarked P + marked P:
Paul-man-{ga,leul,ui,neun,do} 'Paul-only-{*nom*,*acc*,*gen*,*top*,also}',
jib-e-{ga,leul,ui,neun,do} 'house-*loc*-{*nom*,*acc*,*gen*,*top*,also}', *etc*.
c. 2 marked P:
*Paul-{ga,leul,ui,neun,do}-{ga,leul,ui,neun,do}

The redefined restriction is integrated to the description of P by adding the feature [MARKING *unmarked*] in their COMPS value (see the feature structure in (34)).

4.3 Descriptions of the verb

Finally, we show how phrases headed by P are described in the verb, when they appear in a larger context. Let's start by the basic case that they appear as an argument of a verb:

(45) Paul-i sagwa-leul Mary-ege bonae-ss-da.
Paul-*nom* apple-*acc* Mary-*dat* sent.
Paul sent apples to Mary.

The verb selects 3 arguments. 2 are direct NP appearing as subject and direct object respectively and the third argument is an oblique NP. And the subject and the direct object are followed by different marking P: *-i* and *-eul*.

(46) bonae-ss-da 'sent'

$$\begin{bmatrix} \text{SUBJ} < \text{NP}\begin{bmatrix} \text{HEAD}\vert\text{CASE}\ \textit{direct} \\ \text{MARKING}\ \textit{ga} \end{bmatrix} > \\ \text{COMPS} < \text{NP}\begin{bmatrix} \text{HEAD}\vert\text{CASE}\ \textit{direct} \\ \text{MARKING}\ \textit{leul} \end{bmatrix}, \text{NP}[\text{CASE}\ \textit{oblique}] > \end{bmatrix}$$

These marking P can be omitted and be replaced by *-(n)eun* or *-do*. But they can't replace each other. The oblique object accepts also some marking P:

(47) a. Paul-(i) sagwa-(leul) Mary-ege bonae-ss-da.
b. Paul-{i,*eul,neun,do} sagwa-{*i,leul,neun,do}
Paul-{*nom*,**acc*,*top*,also} apple-{**nom*,*acc*,*top*,also}
Mary-ege-{*ga,leul,neun,do} bonae-ss-da.
Mary-*dat*-{**nom*,*acc*,*top*,also} sent.

The fact requires to correct the MARKING values in (46) and to add a new MARKING value to the oblique object:

(48)
$$\left[\begin{array}{l}\text{SUBJ} < \text{NP}\left[\begin{array}{l}\text{HEAD}\,|\,\text{CASE}\ \textit{direct}\\ \text{MARKING}\,[1]:[1]\leq \textit{ga}\ \text{or}\ \textit{unmarked}\end{array}\right] > \\ \text{COMPS}\left\langle \text{NP}\left[\begin{array}{l}\text{HEAD}\,|\,\text{CASE}\ \textit{direct}\\ \text{MARKING}\,[2]:[2]\leq \textit{leul}\ \text{or}\ \textit{unmarked}\end{array}\right], \text{NP}\left[\begin{array}{l}\text{HEAD}\,|\,\text{CASE}\ \textit{oblique}\\ \text{MARKING}\,[3]:[3]\leq \textit{leul}\ \text{or}\ \textit{unmarked}\end{array}\right]\right\rangle\end{array}\right]$$

It is the description of the verb *bonae-ss-da* concerning its arguments and the syntactic restrictions imposed on them. The MARKING values described in a complex form show the range of possible values on the value set for the MARKING feature in (31). For example, "[1]:[1]≤*ga* or *unmarked*" in (48) means: [1] is the subject's MARKING value ; [1] is a value equal or superior to *ga*, (i.e. *ga* ou its supertype) or a value that is *unmarked*.

The restrictions on the arguments vary according to each verb. Let's put in (45) another verb *ju-eoss-da* selecting also 3 arguments:

(49) a. Paul-(i) sagwa-(leul) Mary-(ege) ju-eoss-da.
Paul-*nom* apple-*acc* Mary-*dat* gave.
Paul gave an/the apple to Mary.
b. Paul-{i,*eul,eun,do} sagwa-{*ga,leul,neun,do}
Mary-ege-{*ga,leul,neun,do} ju-eoss-da.
c. Paul-i sagwa-leul Mary-{*ga,leul,neun,do} ju-eoss-da.

The subject and the direct object have the same restrictions: their marking P can be omitted and replaced by *-(n)eun* and *-do*. But the restrictions on the oblique object are different: the verb accepts now the omission of the oblique P. So the verb has a different description for the oblique complement[8]:

(50) ju-eoss-da
$$\left[\begin{array}{l}\text{SUBJ} < \text{NP}\left[\begin{array}{l}\text{HEAD}\,|\,\text{CASE}\ \textit{direct}\\ \text{MARKING}\ [1]:[1]\leq \textit{ga}\ \text{or}\ \textit{unmarked}\end{array}\right] > \\ \text{COMPS}\left\langle \text{NP}\left[\begin{array}{l}\text{HEAD}\,|\,\text{CASE}\ \textit{direct}\\ \text{MARKING}\ [2]:[2]\leq \textit{leul}\ \text{or}\ \textit{unmarked}\end{array}\right], \text{NP}\left[\begin{array}{l}\text{HEAD}\,|\,\text{CASE}\ \textit{direct}\ \text{or}\ \textit{oblique}\\ \text{MARKING}\ [3]:[3]\leq \textit{leul}\ \text{or}\ \textit{unmarked}\end{array}\right]\right\rangle\end{array}\right]$$

[8] It is of course possible to give 2 descriptions to the verb: one containing an oblique complement and the other containing 2 direct complements.

The second case is the AdvP followed by a P that appears as adjunct:

(51) Paul-i bab-eul manhi-{*ga,leul,neun,do} meog-eoss-da.
Paul-*nom* meal-*acc* much-{*nom*,*acc*,*top*,also} ate.
Paul ate the meal much.

The adjunct may be followed by several marking P but not by *-i/ga* in (51), whereas the adverb can appear with it in other contexts:

(52) bi-ga manhi-ga naeli-eoss-da.
rain-*nom* much-*nom* fell.
It rained much.

So it is the verb and not the adverb that rejects *-i/ga* in (51). In other words, the verb imposes restrictions on the adjunct's MARKING value. Then it must include the adjunct in its description, even though it is not argument. We put it in its COMPS and the adverb in (53) is noted as follows:

(53) meog-eoss-da

$$\left[\begin{array}{l}\text{SUBJ} < \text{NP}\left[\begin{array}{l}\text{HEAD}\vert\text{CASE } \textit{direct}\\ \text{MARKING}\,[1]:[1] \leq \textit{ga} \text{ or } \textit{unmarked}\end{array}\right] > \\ \text{COMPS}\left\langle \begin{array}{l}\text{NP}\left[\begin{array}{l}\text{HEAD}\vert\text{CASE } \textit{direct}\\ \text{MARKING}\,[2]:[2] \leq \textit{leul} \text{ or } \textit{unmarked}\end{array}\right], \\ \text{AdvP}[\text{MARKING}\,[3]:[3] \leq \textit{leul} \text{ or } \textit{unmarked}]\end{array}\right\rangle\end{array}\right]$$

The verb in (52) allows all marking P except *-ui* to the adverb, so it includes a description: COMPS < AdvP[MARKING [1]:[1]≥*v-marked* or *unmarked*] >.

The final case is the following example, repeated from (21a):

(54) gongbuha-gi-neun doseogwan-eseo-*(ga) joh-da.
study-nominalizer-*top* library-*loc*-*(*nom*) is good.
the library is a good place to study in.

-i/ga after the oblique NP is not optional. It may be replaced by *-(n)eun* and *-do*, as shown in (23), while the verb refuses *-(l)eul*. *-i/ga* become optional again, if the oblique NP is replaced by a direct NP:

(55) gongbuha-gi-neun doseogwan-(i) joh-da.
study-nominalizer-*top* library-(*nom*) is good.
the library is a good place to study.

From the observation can be drawn following 2 descriptions:

(56) joh-da

a. $\left[\begin{array}{l}\text{SUBJ} < \text{NP}\left[\begin{array}{l}\text{HEAD}\vert\text{CASE } \textit{oblique} \\ \text{MARKING}\,[1]:[1] \leq \textit{ga}\end{array}\right] > \\ \text{COMPS} < \text{NP}\left[\begin{array}{l}\text{HEAD}\vert\text{CASE } \textit{direct} \\ \text{MARKING}\,[2]:[2] \leq \textit{ga} \text{ or } \textit{unmarked}\end{array}\right] >\end{array}\right]$

b. $\left[\begin{array}{l}\text{SUBJ} < \text{NP}\left[\begin{array}{l}\text{HEAD}\vert\text{CASE } \textit{direct} \\ \text{MARKING}\,[1]:[1] \leq \textit{ga} \text{ or } \textit{unmarked}\end{array}\right] > \\ \text{COMPS} < \text{NP}\left[\begin{array}{l}\text{HEAD}\vert\text{CASE } \textit{direct} \\ \text{MARKING}\,[2]:[2] \leq \textit{ga} \text{ or } \textit{unmarked}\end{array}\right] >\end{array}\right]$

The verb in (56a) takes an oblique NP subject and doesn't accept an unmarked NP as subject. In contrast, it selects a direct NP subject and accepts an unmarked NP as subject in (56b).

Now it seems more comprehensible why marking P may not be omitted in (54). The verb selects a direct NP for subject but the subject in (54) is not a direct NP. In other words, *joh-da* requires that the subject have a *direct* value for the CASE feature. If this requirement is not satisfied, like in (54), the verb imposes on the subject a second condition that it should have a *marked* value for the MARKING feature. Therefore, an unmarked NP can't appear as its subject. A similar reasoning seems also possible to account for the following example:

(57) gongbuha-gi-neun honja-*(ga) joh-da.
study-nominalizer-*top* alone-*(*nom*) is good.
Being alone is good to study.

An AdvP appears as subject but doesn't satisfy the verb's first condition. Then it needs a *marked* value required by the verb as second condition and hence it must be an AdvP constituted by a marking P.

5 Conclusion

We proposed an analysis of Korean P and showed its description with HPSG.

Our analysis is based on two main ideas: Korean P are clitics attaching to the preceding lexical item in the phonology and weak syntactic heads sharing syntactic feature values of the complement phrase. To justify these ideas, we tried to show differences between P and suffixes, possible accounts for P's suffix-like behaviours, P's qualifications for syntactic heads and similarities between the mother phrase and P's host phrase.

Our analysis is described within HPSG via a feature [CL +] and feature structure sharing within P and their complement. Then P percolate not only shared feature values but also their own feature values, if there are any, up to

the mother phrase. So the latter has similar properties to the complement and shows different behaviours also.

During the discussion, we redefined also certain factors. We assumed only two values for CASE: *direct* and *oblique* and introduced MARKING feature to P. This helped us to revise P's classification into 3 subtypes: marking P, oblique P and semantic P. The first P has the MARKING feature with a marked or more specified value. The second P has the CASE feature with an oblique value. The third P don't have specified values for syntactic features. So they are heads but the mother phrase has the same syntactic properties as the complement, while the other two types give rise to syntactic differences between the mother phrase and the complement.

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