Phonologically Conditioned Nominal Allomorph Selection in Korean*

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Seomun, Jung-suk & Seo, Hong-won. 2009. Phonologically Conditioned Nominal Allomorph Selection in Korean. *The Linguistic Association of Korean Journal*. 17(1). 27-46**.** This paper focuses on accounting for phonologically conditioned Korean nominal suffixes depending on the final segments of the preceding stem. This paper postulates that the basic forms for analysis of nominal suffixes are synchronically determined depending on the phonological environment. Secondly, when referring to the instrumental suffix consisting of /l/-final stem, we can explain allomorphs by adding two constraints, $*_\mu[l$ prohibiting the existence of /l/ in the non-moraic initial position, and I$_{DENT}$-IO (lateral), requiring that correspondent segments have identical values for the feature [lateral], without referring to the feature [vocalic] suggested by Kim (2006). Finally, some researchers have suggested that commitative and instrumental cases are the exceptional patterns. However, this paper shows all nominal suffixes can be included within a unitary constraint ranking.

Key Words: nominal suffix, allomorph, case marker, Optimality Theory

1. Introduction

Compared to several studies on Korean case markers conducted from semantic and syntactic perspectives, the attention to analyze and explain them based on the phonological theory has received less attempt (Oh (1996), Hong

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(2001), Lee (2003), Kim (2003, 2006), Park (2003), Sung (2005), etc.). Consequently, this study will examine the alternation of Korean case markers from a phonological point of view. The main purpose of this study is to work out some of the morphological and phonological aspects of allomorphs on Korean markers under the framework of Correspondence Theory (McCarthy & Prince 1995), which is set within Optimality Theory (henceforth OT) (Prince & Smolensky 1993, 2004).

Many researchers have had different ideas about the base forms in input and whether the suffix-initial vowel /ɨ/ is underlyingly represented or inserted afterward. In particular, previous researchers have dealt with that matter from either a diachronic or synchronic view. Oh (1996) chooses the base forms by the chronological order of their development. That is, she refers to the earlier formed case markers as the base forms. However, in case of absolutive case marker /ɨn/ and accusative /ɨl/, no basic phonological grounds are presented on why /n/ or /l/ is used as an unmarked consonant or on why they should be inserted. Accordingly, we will assume /nɨn, lɨl, ya, kwa/ as the base forms, not /ɨn, ɨl, a, wa/.

Another attribute we have to take into consideration is the exceptional behavior of the instrumental and commitative case markers. Kim (2006) tries to explain the inconsistent behavior of /l/-final stem in taking C-initial suffixes and V-initial suffixes with respect to morphological interpretation. She differs in this regard stating that the selection of allomorph showing C/V alternation is decided by the information each suffix has with regard to its input. In particular, in order to explain the exceptional pattern of the instrumental case marker, she adopts the idea argued by Chomsky & Halle (1968) that liquids and vowels have a [+vocalic] feature in common. However, the term of [vocalic] feature has been replaced by the feature [syllabic] because it seems that she uses the vocalic feature arbitrarily so as to explain the exceptional case.

In this study, we will show which allomorphs ought to be selected as the basic forms and how the optimal forms come out without re-ranking constraints under Optimality Theory.

This paper is presented as follows. In section 2, we will present the data for the distribution of case markers in Korean. Section 3 reviews some previous studies: Kim (2006)'s claim in the [+vocalic] feature in /l/ and Oh (1996)'s

assertion on the base form. In section 4, we will demonstrate how case markers are complementarily selected by the phonological condition, and how the optimal form will be chosen within the framework of OT, explaining apparently exceptional distribution. Finally, section 5 briefly summarizes the paper and some implications of this paper.

2. Data

According to Sohn (1999), nominal cases in Korean are largely divided into two groups: (i) those that mainly indicate syntactic functions of nominals, such as absolutive, nominative, accusative, and genitive, and (ii) those that mainly express semantic functions of nominals such as dative, goal, locative, instrumental, commitative, and vocative, etc. Let us consider some data presented below.

(1) Absolutive (or Topic) (/in/, /nin/)
    a. /pʰoto + nin/   pʰo.do.nin   'grape + ABS'
    b. /Su + nin/   Su.nin   'Su (given name) + ABS'
    c. /kam + nin/   ka.min   'persimmon + ABS'
    d. /Suk + nin/   Su.gin   'Suk (given name) + ABS'
(2) Nominative (/i/, /ka/)
    a. /pʰoto + ka/   pʰo.do.ga   'grape + NOM'
    b. /Su + ka/   Su.ga   'Su + NOM'
    c. /kam + I/   ka.mi   'persimmon + NOM'
    d. /Suk + I/   Su.gi   'Suk + NOM'
(3) Accusative (/il/, /lil/)
    a. /pʰoto + lil/   pʰo.do.ril   'grape + ACC'
    b. /Su + lil/   Su.ril   'Su + ACC'
    c. /kam + lil/   ka.mil   'persimmon + ACC'
    d. /Suk + lil/   Su.gil   'Suk + ACC'

Korean case markers are phonologically conditioned; when a suffix is attached to a stem, the form of the suffix depends on the finals of a preceding

stem. For example, in case of an absolutive case, if the final syllable ends in a vowel, the suffix /nɨn/ is selected whereas if the final one ends in a consonant the suffix /ɨn/ is chosen. This alternative allomorph selection is a kind of strategy to avoid vowel hiatus and preserve a crosslinguistically unmarked CV syllable structure form. Other case markers also seem to follow the same pattern when choosing allomorphs. When it comes to the nominal case, two forms, /ka/ and /i/, are presented in this paper because the phonetic similarity between them does not seem to be. However, the following cases such as instrumental and commitative suffixes seem to have the different patterns, so they have been dealt with as an exception to the rule.

(4) Instrumental (/lo/, /ɨlo/)
    a. /son + ɨlo/   so.nɨ.ɾo   'hand + INS'
    b. /kʰo + ɨlo/   kʰo.ɾo   'nose + INS'
    c. /pal + ɨlo/   pal.lo   'foot + INS'

The examples of (4a) and (4b) seem to follow the universal pattern of C/V alternation; (4a) selects /ɨɾo/ to preserve CV form and (4b) chooses /lo/. However, in (4c), even though the stem ends with a consonant, it is followed by the suffix /lo/, not /ɨlo/. This case has been considered as an exceptional pattern by many phonologists.

    In addition, many researchers have had some difficulties analyzing the following vocative and commitative cases due to the dual position of glides as they can be realized as either a consonant or a vowel depending on the environment.

(5) Vocative (/a/, /ya/)
    a. /Su + ya/   Su.ya   'Su + VOC'
    b. /Suk + ya/   Su.ga   'Suk + VOC'
(6) Commitative (or Conjunctive) (/wa/, /kwa/)
    a. /pʰoto + kwa/   pʰo.do.wa   'grape + COM'
    b. /Su + kwa/   Su.wa   'Su + COM'
    c. /kam + kwa/   kam.kwa   'persimmon + COM'
    d. /Suk + kwa/   Suk.kʼwa   'Suk + COM'

In traditional phonology, glides /y/ and /w/ have been considered as semi-vowels and /ya, yə, yo, yu, ye/ or /wa, wə, we, wi/ are regarded as diphthongs. However, according to Ladefoged (2001), he classifies /y/ as a vowel in a CGV sequence such as "hue, cued" while as a consonant in a GV position such as "yes, yet, yeast", and /w/ is considered as a consonant. Accordingly, as we can see in (5a), vowel final stem chooses /ya/, which means that /y/ is regarded as a consonant to fill the onset position. It is just like other case markers that have their own complementary allomorphs depending on stem's final segment. Accordingly, we can know that /y/ is sometimes used as a consonant. However, dealing with a commitative case is not simple; if a glide /w/ is used as a consonant, Cw can be an onset cluster which is not permitted in Korean; if it is used as a vowel, (6a) and (6b) would violate vowel hiatus, and in (6c) and (6d), commitative /wa/ should be selected as an output form for keeping the unmarked CV form.

We have two remaining problems identified from the data above. Firstly, the instrumental case shows an exceptional pattern in that the /l/ final stem does not take /ɨlo/ even though it ends with a consonant. Secondly, in the commitative case, we have to examine whether glides can be dealt with as vowels or consonants and endeavor to explain this case to choose the optimal form.

In the following section, we will review the previous analyses for allomorph selection in Korean.

3. Previous Studies on Allomorph Selection in Korean

Many researchers (Oh (1996) and Park (2003)) have considered an instrumental case as the exceptional case and have analyzed this case using the re-ranking strategies. On the other hand, Kim (2003) has tried to focus on the inconsistent behavior of /l/. That is, /l/ behaves like a vowel in (7), but sometimes acts like a consonant in (8).

(7) suffixes in /ɨ/ ~ ∅ alternation (Kim 2006: 267)
    a. verbal suffixes   I   II   III

stem	sa- 'to buy'	sal- 'to live'	mʼək- 'to eat'
Conditional	samyən	salmyən	məgɨmyən
Purposive	sarə	sallə	məgɨrə
Intentional	saryə	sallyə	məgɨryə
Perfective	san	san	məgɨn
Effective	sani	sani	məgɨni

b. nominal suffixes

stem	pata 'sea'	mul 'water'	san 'mountain'
Goal/ Instrumental	padaro	mullo	sanɨro

(8) nominal suffixes in C/V alternation

	I	II	III
Nominative	padaga	muri	sani
Accusative	padarɨl	murɨl	sanɨl
Topic	padanɨn	murɨn	sanɨn
Conjunctive	padawa	mulgwa	saŋgwa

Kim (2006) suggests that the reason why /l/ is deleted particularly in front of /ɨ/ and consonants /n/ and /s/ cannot be explained through a rule-based analysis and that exceptional case markers cannot fit in the same constraint ranking appropriate for other suffix allomorphs in OT. As a result, she endeavors to explain this exception using the distinctive feature classified by Chomsky & Halle (1965: 302). She argues that /l/ in /l/-final stem has two features, [+vocalic] and [+consonantal] at the same time, and the following suffix decides which of these features is to be employed.

However, Ladefoged (2001: 215) defines vocoids as the sounds that have no obstruction in the center of the mouth, and classifies vowels as syllabic vocoids and semivowels as nonsyllabic vocoids. In this regard, he defines semivowels as vocoids unlike Chomsky & Halle. When it comes to a liquid /l/, Ladefoged does not mention whether it is has vocalic feature or not, but he restricts vocoids only to vowels and semivowels. Another problem is whether the distinctive features of the lateral /l/ in English is equal to those of /l/ in

Korean. In Korean, /l/ is represented as [ɾ] in the initial position and [l] in the final position, while English /l/ dose not have allophone [ɾ] and [ɾ] is actually represented as the allophone of intervocalic /t/ or /d/. In addition, /l/ in Korean phonological situation does not show any vowel-like action unlike glide /y/. Consequently, it seems difficult to say that an unauthorized [+vocalic] feature of /l/ is a critical factor for selecting an allomorph, even though the feature of /l/ is classified as [+vocalic] and [+consonant] by Chomsky & Halle. It is much too arbitrary and unreasonable to adopt the [vocalic] feature so that Kim (2006) can deal with only the /l/ final stem.

Another property we have to consider is to determine the proper base form. Oh (1996) formulates the base form on the basis of the chronological order of production. She chooses /ɨn/, /ɨl/, /i/, /lo/, /a/, and /wa/ as the basic forms of nominal suffixes, but her suggestion does not explain why /n/, /l/ or /k/, which are not unmarked consonants, ought to be epenthesized instead of other consonants. In addition, she has analyzed nominal suffixes by re-ranking the constraint ALIGN in order to explain the seemingly exceptional commitative and instrumental cases. The constraint rankings suggested by Oh (1996) are as follows:

(9) Oh's analysis (1996)
   a. The basic forms of case markers: /ɨn/, /ɨl/, /i/, /lo/, /a/, /wa/
   b. Constraint rankings
      ⅰ. Universal ranking
      $Cf(s) \leqq Ci(s)$ $(S_{YLL}C_{ON})$ >> M_OP_{RE} >> N_OC_{ODA} >> O_{NSET} >> D_{EP}, M_{AX} >> $\mathbf{A_{LIGN}}$
      ⅱ. Exceptional ranking (Commitative and Instrumental)
      $Cf(s) \leqq Ci(s)$ $(S_{YLL}C_{ON})$ >> M_OP_{RE} >> $\mathbf{A_{LIGN}}$ >> N_OC_{ODA} >> O_{NSET} >> D_{EP}, M_{AX}

She tries to explain case markers based on the universal ranking, but the commitative and instrumental case markers can not be explained by this ranking order, as shown in both (10) and (11).

(10)

/pap+wa/	S$_{YLL}$C$_{ON}$	M$_O$P$_{RE}$	N$_O$C$_{ODA}$	O$_{NSET}$	D$_{EP}$	M$_{AX}$	A$_{LIGN}$
a. pap.wa	*!		*				
☞ b. pa.pwa							*
☜ c. pap.kwa			*!		*		

(11)

/mil+lo/	S$_{YLL}$C$_{ON}$	M$_O$P$_{RE}$	N$_O$C$_{ODA}$	O$_{NSET}$	D$_{EP}$	M$_{AX}$	A$_{LIGN}$
☜ a. mil.lo			*!				
b. mil.i.lo			*!	*	*		
☞ c. mi.li.lo					*		*

As shown in tableaux (10) and (11) above, the universal constraint ranking cannot explain instrumental and commitative cases. Thus, she uses an arbitrary re-ranking way in order to deal with exceptional cases. That is, she tries to analyze exceptional patterns by ranking the ALIGN constraint higher than that in the universal ranking. In this way, she manages to explain the seemingly exceptional instrumental and commitative cases as the following tableau shows.

(12)

/mil+lo/	S$_{YLL}$C$_{ON}$	M$_O$PRE	A$_{LIGN}$	N$_O$C$_{ODA}$	O$_{NSET}$	D$_{EP}$	M$_{AX}$
☞ a. mil.lo				*			
b. mil.i.lo				*	*!	*	
c. mi.li.lo			*!			*	

We can briefly summarize some remaining problems as follows: Firstly, liquids cannot be categorized as [+vocalic] and [+consonantal]. The [+vocalic] feature in liquids is not confirmed in other literature. Secondly, we have to consider how we should choose the base form as an input. Finally, when dealing with exceptional patterns, the strategy of re-ranking constraints is not the better alternative than explaining these problems with the unitary constraint ranking.

In the next section, we will present how case markers are complementarily selected by the phonological condition, and how the optimal form will be chosen within the framework of OT without re-ranking constraints.

4. An alternative Analysis for Allomorph Selection

In this section, we will provide a constraint-based analysis for allomorph selection in Korean with the single constraint ranking. The constraints that we will use are as follows:

(13) The constraints
   a. S$_{YLL}$C$_{ON}$: Rising sonority over a syllable boundary is prohibited.
   b. O$_{NSET}$: Syllables must have onsets.
   c. M$_{AX}$-S$_{TEM}$: Input segments in stem must have output correspondents.
   d. N$_O$C$_{ODA}$: Syllables must not have codas.
   f. A$_{LIGN}$-R: Align the right edge of the stem with the right edge of the syllable.
   g. M$_{AX}$: Input segments must have output correspondents.
   h. D$_{EP}$: Output segments must have input correspondents.

Among constraints, S$_{YLL}$C$_{ON}$ is to avoid rising sonority over a syllable boundary and it is one of the most marked constraints in Korean. O$_{NSET}$ constraint is also necessary because Korean has preference for CV-form as the unmarked syllable and it is available when avoiding vowel hiatus as well. Accordingly, it should also be highly ranked. Besides, when a stem connects with a suffix, it can be affected and phonologically changed by a neighboring sound. Yet a stem universally tends to keep the original form more than the affix, and it makes M$_{AX}$-S$_{TEM}$ be highly ranked. The rest of the constraints, N$_O$C$_{ODA}$, A$_{LIGN}$-R, M$_{AX}$ and D$_{EP}$, are needed as well.

(14) Constraint ranking
   S$_{YLL}$C$_{ON}$, O$_{NSET}$, M$_{AX}$-S$_{TEM}$ >> N$_O$C$_{ODA}$ >> A$_{LIGN}$-R >> M$_{AX}$ >> D$_{EP}$

Let us now examine how an appropriate candidate can be chosen as the optimal output with the ranking hierarchy given in (14). Before choosing the optimal output among candidates, we need to consider which base forms should be chosen as the input. Park (1989) and Oh (1996) argue that the basic forms of absolutive and accusative cases are   /n/ and /l/ respectively and /ɨ/ is

inserted in order to conform to the proper syllable structure after the closed syllable. On the other hand, they argue that allomorphs /nɨn/ and /lɨl/ are later produced by inserting /n/ and /l/ due to the grammatical function. However, unlike their proposals, we postulate /nɨn/ and /lɨl/ as the basic forms of those case particles. Because /n/ and /l/ are not unmarked consonants in Korean, there is no reason why they should be chosen as inserted segments. Thus, we propose that /n/ and /l/ are deleted after a closed syllable.

(15) Absolutive: /pʰoto + nɨn/

/pʰoto + nɨn/	$S_{YLL}C_{ON}$	O_{NSET}	M_{AX}-S_{TEM}	N_OC_{ODA}	A_{LIGN}-R	M_{AX}
a. pʰo.do.ɨn		*!		*		*
☞ b. pʰo.do.nɨn				*		
c. pʰo.don				*	*!	**
d. pʰo.dɨn			*!	*	*	**

In tableau (15), candidates (a) and (d) violate O_{NSET} and M_{AX}-S_{TEM} constraints respectively. As candidate (c) violates A_{LIGN}-R, it is ruled out. Accordingly, the remaining candidate (b) can be selected as an optimal form.

(16) Absolutive: /suk + nɨn/

/suk + nɨn/	$S_{YLL}C_{ON}$	O_{NSET}	M_{AX}-S_{TEM}	N_OC_{ODA}	A_{LIGN}-R	M_{AX}
a. suk.ɨn		*!		**		*
b. suk.nɨn	*!			**		
☞ c. su.gɨn				*	*	*
d. su.nɨn			*!	*	*	*
e. suŋ.nɨn				**!		

In the case of consonant-final stem, it selects /ɨn/ as its suffix, and then it is resyllabificated. Candidates (a), (b) and (d) critically violate $S_{YLL}C_{ON}$, O_{NSET}, and M_{AX}-S_{TEM} respectively. As candidate (e) violates N_OC_{ODA} twice, candidate (c) is selected as an optimal form despite violating A_{LIGN}-R and M_{AX}.

Now we will investigate how the nominative case can be accounted for within OT. Interestingly, it will be impossible to decide the basic form of the nominative case in that nominative suffixes /i/ and /ka/ do not have phonological similarity. In the case of nominative allomorphs, /i/ and /ka/,

they can be selected as the basic forms depending on the finals of the preceding stem.

The two following tableaux will provide how differently the nominative case marker can be selected as the basic forms.

(17) Nominative: /pʰoto + NOM/

/pʰoto + NOM/	S$_{YLL}$C$_{ON}$	O$_{NSET}$	M$_{AX}$-S$_{TEM}$	N$_O$C$_{ODA}$	A$_{LIGN}$-R	M$_{AX}$
a. pʰo.do.i		*!				
☞ b. pʰo.do.ga						

(18) Nominative: /kam + NOM/

/kam + NOM/	S$_{YLL}$C$_{ON}$	O$_{NSET}$	M$_{AX}$-S$_{TEM}$	N$_O$C$_{ODA}$	A$_{LIGN}$-R	M$_{AX}$
a. kam.i		*!		*		
☞ b. ka.mi					*	
c. kam.ka				*!		
d. ka.ga			*!		*	*

Accusative case markers are selected depending on the final segment of stem like being shown in absolutive case. However, Korean lateral /l/ can not appear in onset position except a part of geminate /l/, and /l/ changes into flap [ɾ] in that position. According to Lee (2001), lateral [l] is licensed in a moraic position, and [ɾ] appears in a non-moraic position. She suggests that liquid alternations in Korean occur depending on moraicity. She assumes that lateral [l] in the coda which is a moraic position and the geminate [l] do not violate *μ[l constraint. We will adopt her assumption in dealing with the matter related to laterals.

(19) *$_μ$[l[1]): Do not have [l] in a non-moraic position.

In Native Korean, no /l/ can appear in onset position of a syllable with the exception of the geminate /l/. As a result, constraint *$_μ$[l is strong enough to be ranked higher than N$_O$C$_{ODA}$. In the following tableaux, candidates (20c) and (21e) can be eliminated by *$_μ$[l. In tableau (20), the optimal output is candidate (b) by eliminating candidate (a) which violates the high ranked constraint O$_{NSET}$.

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1) Lee (2001) uses this constraint as *Non-moraic-l.

In tableau (21), candidates (b) and (e) violate S$_{\text{YLL}}$C$_{\text{ON}}$, and candidates (a) and (d) violate O$_{\text{NSET}}$ and M$_{\text{AX}}$-S$_{\text{TEM}}$ respectively. Therefore, candidate (c) becomes an optimal form.

(20) Accusative: /pʰoto + lil/

/pʰoto + lil/	S$_{\text{YLL}}$C$_{\text{ON}}$	O$_{\text{NSET}}$	M$_{\text{AX}}$-S$_{\text{TEM}}$	*$_μ$[l	N$_{\text{O}}$C$_{\text{ODA}}$	A$_{\text{LIGN}}$-R	M$_{\text{AX}}$
a. pʰo.do.il		*!			*		*
☞ b. pʰo.do. li					*		
c. pʰo.do.li				*!	*		

(21) Accusative: /kam + lil/

/kam + lil/	S$_{\text{YLL}}$C$_{\text{ON}}$	O$_{\text{NSET}}$	M$_{\text{AX}}$-S$_{\text{TEM}}$	*$_μ$[l	N$_{\text{O}}$C$_{\text{ODA}}$	A$_{\text{LIGN}}$-R	M$_{\text{AX}}$
a. kam.il		*!			**		*
b. kam.ɾil	*!				**		
☞ c. ka.mil					*	*	*
d. ka.ɾil			*!		*	*	*
e. kam.lil	*!			*	**		

Let us consider how instrumental suffixes are attached to the stem through tableaux (22) and (23).

(22) Instrumental: /son + ilo/

/son + lo/	S$_{\text{YLL}}$C$_{\text{ON}}$	O$_{\text{NSET}}$	M$_{\text{AX}}$-S$_{\text{TEM}}$	*$_μ$[l	N$_{\text{O}}$C$_{\text{ODA}}$	A$_{\text{LIGN}}$-R	M$_{\text{AX}}$	D$_{\text{EP}}$
a. son.ɾo	*!				*		*	
b. son.i.ɾo		*!			*			
☞ c. so.ni.ɾo						*		
d. so.ɾo			*!			*	**	
e. so.no						*	*!*	

(23) Instrumental: /kʰo + ilo/

/kʰo + lo/	S$_{\text{YLL}}$C$_{\text{ON}}$	O$_{\text{NSET}}$	M$_{\text{AX}}$-S$_{\text{TEM}}$	*$_μ$[l	N$_{\text{O}}$C$_{\text{ODA}}$	A$_{\text{LIGN}}$-R	M$_{\text{AX}}$	D$_{\text{EP}}$
☞ a. kʰo.ɾo							*	
b. kʰo.i.ɾo		*!						

The tableaux shown in (22) and (23) above are not subject to *$_μ$[l because [ɾ] is regarded as a non-lateral sound in Korean phonology. The instrumental suffix also seems to be affected by the final of the stem; if the stem ends with a

consonant, it selects /ɨlo/, and if the final syllable of the stem is an open syllable, an unmarked vowel /ɨ/ is deleted to avoid vowel hiatus. However, when the instrumental suffix is attached to the /l/ final stem on the grounds of these criteria, it is wrongly predicted to take the suffix /ɨlo/ as /l/ is a consonant. As a result, we need an additional constraint in order not to attach a suffix /ɨlo/ behind the final segment /l/ of the stem. We need the Iᴅᴇɴᴛ-IO (lateral) constraint requiring that correspondent segments have identical values for the feature [lateral].

(24) Iᴅᴇɴᴛ-IO (lateral): Correspondent segments have identical values for the feature [lateral].

(25) The constraint ranking
SʏʟʟCᴏɴ, Oɴsᴇᴛ, Mᴀx-Sᴛᴇᴍ >> *ᵤ[l >> NᴏCᴏᴅᴀ, Iᴅᴇɴᴛ-IO (lateral) >> Aʟɪɢɴ-R >> Mᴀx >> Dᴇᴘ

The constraint ranking in (25) can account for the exceptional pattern of instrumental suffixes, which contains /l/ on the stem final. The tableau (26) shows how the optimal output can be chosen. Some researchers including Oh (1996) have considered the instrumental suffix as an exceptional pattern and have tried to explain it by re-ranking constraints.

(26) Instrumental: /pal + ɨlo/[2)]

/pal + ɨlo/	SʏʟʟCᴏɴ	Oɴsᴇᴛ	Mᴀx-Sᴛᴇᴍ	*ᵤ[l	NᴏCᴏᴅᴀ	Iᴅᴇɴᴛ-IO (lateral)	Aʟɪɢɴ-R	Mᴀx	Dᴇᴘ
☞a. pal.lo					*			*	
b. pal.ɨ ɾo		*!			*				
c. pa.ɾɨ ɾo						*	*!		
d. pa.ɾo			*!			*	*	**	
e. pa.lɨ ɾo				*!			*		

In tableau (26), candidates (b) and (d) violate high ranked Oɴsᴇᴛ and Mᴀx-Sᴛᴇᴍ respectively and (e) also commits a fatal violation of *ᵤ[l. Between (a) and (c), (a) violates NᴏCᴏᴅᴀ and (c) violates Iᴅᴇɴᴛ-IO (lateral) equally, but candidate (c) does

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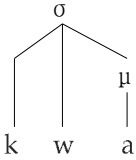
2) A reviewer indicates [pa.ɾo] does not violate Mᴀx-Sᴛᴇᴍ if a remaining segment /l/ is from the stem, not from the affix unlike candidate (d) given in (26). However, even in that case, we can select the optimal output using the constraint ranking.

not align the right edge of the stem with the right edge of the syllable. Thus, (c) is also ruled out and candidate (a) is selected as the optimal form without re-ranking constraints.

Before dealing with vocative and commitative cases, we must consider how to handle glide insertion. There are different points of view on the syllabification of glides. According to Jennifer (2003), there are two possible structures for a CGV syllable: a true onset forming part of an onset cluster (27a) and a nuclear onglide forming a rising diphthong preceded by an onset consonant as shown in (27b).

(27) Possible structures for CGV syllables (Jennifer 2003: 12)
     a. Glide as true onset   b. Glide as nuclear onglide
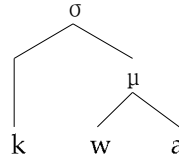
She predicts that glides are nuclear onglides because Korean bans rhotic onsets in an initial syllable, but glides appear as true onset and it allows [CGV...] syllables as demonstrated in the Iglesias dialect of Campidanian Sardinian. On the other hand, Oh (1996) classifies glides into either of two cases: one is the initially positioned glide considered as the onset, but the other postconsonantal glide is considered as a nuclear sound. However, as we see in the above data, vocative suffix is dependent on its final segment of the stem; the vowel final stem selects /ya/ and the consonant final stem chooses /a/. In other words, it means /y/ is used to avoid vowel hiatus and it is regarded as a consonant. Besides, the suffix /wa/ follows a vowel-final stem, so it is also considered as a consonant. Consequently we think of glides as consonants here.

We need additional constraints to account for glides. Korean has preference to avoid a cluster if possible, so a constraint avoiding a complex cluster is required. We need another constraint which avoids consecutive sonorant segments within a syllable, one that is needed especially for commitative /wa or kwa/. These constraints should be ranked higher than context free constraints,

but lower than the most marked constraints as presented in (29).

(28) Additional constraints
  a. *C_{OMPLEX}: Avoid a complex consonant cluster.
  b. *OCP[son-son]$_\delta$: Consecutive sonorant and sonorant in a syllable are
                not allowed.
(29) The constraint ranking
  $S_{YLL}C_{ON}$, O_{NSET}, M_{AX}-S_{TEM} >> *C_{OMPLEX}, *OCP[son-son]$_\delta$ >> $N_O C_{ODA}$ >>
  A_{LIGN}-R >> M_{AX} >> D_{EP}

The situation of vocative /ya/ is like tableaux (30) and (31); a vowel-final stem takes /ya/ and consonant-final stem deletes /y/ to avoid *C_{OMPLEX} constraint.

(30) Vocative: /Su + ya/

/su + ya/	$S_{YLL}C_{ON}$	O_{NSET}	M_{AX}-S_{TEM}	*C_{OMPLEX}	A_{LIGN}-R	M_{AX}	D_{EP}
a. su.a		*!				*	
☞ b. su.ya							

(31) Vocative: /Suk + ya/

/suk + ya/	$S_{YLL}C_{ON}$	O_{NSET}	M_{AX}-S_{TEM}	*C_{OMPLEX}	$N_O C_{ODA}$	A_{LIGN}-R	M_{AX}
a. suk.a		*!			*		*
☞ b. su.ga						*	*
c. suk.ya	*!				*		
d. su.gya				*!		*	
e. su.a		*!	*!			*	**

In (31), candidate (c), [suk.ya] has rising sonority and violates $S_{YLL}C_{ON}$. Although candidate (d) resyllabified from [suk.ya] meets $S_{YLL}C_{ON}$, it violates *C_{OMPLEX}. Candidates (a) and (e) violate O_{NSET} and are thus eliminated from the optimal form. Accordingly, after deleting /y/, the resyllabicated candidate [su.ga] becomes an optimal form.

Now, let us look into the commitative case, which looks different from other case markers. If we regard the glide /w/ as a vowel just like Oh's suggestion (1996)[3], *C_{OMPLEX} constraint is not available, which is not preferable in Korean;

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3) Oh (1996) refers to glide /w/ put on the syllable initial position as a consonant and /w/

the candidate with /kwa/ does not violate *C$_{OMPLEX}$ which is like the candidate with /wa/ because she argues that /w/ in /kwa/ is a vowel and /w/ in /wa/ is a consonant.

(32) Commitative: /p^{h}oto + kwa⁴⁾/

/p^{h}oto + kwa⁵⁾/	S$_{YLL}$C$_{ON}$	O$_{NSET}$	M$_{AX}$-S$_{TEM}$	*C$_{OMPLEX}$	*OCP [son-son]$_\delta$	N$_O$ C$_{ODA}$	A$_{LIGN}$-R	M$_{AX}$
☞a. p^{h}o.to.wa								*
b. p^{h}o.to.kwa				*!				
c. p^{h}o.tok.wa	*!					*	*	

In tableau (32), as candidate (c) violates highly ranked S$_{YLL}$C$_{ON}$ and (b) breaches *C$_{OMPLEX}$ constraint, candidate (a) deleting /k/ to avoid *C$_{OMPLEX}$ is chosen as an optimal form.

(33) Commitative: /kam + kwa/

/kam + kwa/	S$_{YLL}$C$_{ON}$	O$_{NSET}$	M$_{AX}$-S$_{TEM}$	*C$_{OMPLEX}$	*OCP [son-son]$_\delta$	N$_O$ C$_{ODA}$	A$_{LIGN}$-R	M$_{AX}$
a. kam.wa	*!					*		*
b. ka.mwa				*	*!		*	
☞ c. kam.kwa				*		*		
d. ka.kwa			*!	*			*	*

Candidates (a) and (d) violate critical S$_{YLL}$C$_{ON}$ and M$_{AX}$-S$_{TEM}$ constraint respectively. Even though candidates (b) and (c) equally violate *C$_{OMPLEX}$, candidate (b) also violates another constraint *OCP[son-son]$_\delta$ prohibiting two consecutive sonorants within the same syllable. Consequently, (c) becomes an optimal form, even though it looks like more marked form CVC · CCV than (b)'s CV · CCV. Oh (1996) argues that the diphthong on the second syllable

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behind a consonant as a vowel.

4) Oh (1996) argues that /k/ is inserted in order to get a semantic transparency. But, unlike her proposal we regard the basic form as /kwa/, in that as /k/ is not the unmarked consonant in Korean, there is no reason only the consonant should be inserted in front of the glide.

5) We will not consider some candidates, the allomorphs of which are realized as /a/ and /ka/ because of the difficulty to distinguish them from vocative and nominative case markers.

plays a relatively less important role in the semantic function than that of the initial syllable and is likely to be shortened into a monophthong for the purpose of lessening the speakers' phonological efforts. For example, it is likely to be pronounced as [kama] in case of [ka.mwa]. However, it causes the commitative case marker to be lost, in which the hearer has difficulty making a discrimination between the vocative case maker '-a' and commitative case marker. As a result, although it is in the opposition to the phonological economy, /k/ is inserted in order to get a semantic transparency.

In the next section, we will summarize and provide some implementations of this study.

5. Conclusion

Korean alternative nominal suffixes are phonologically conditioned depending on the final segments of preceding stem: V-final stem is followed by C-initial suffix and C-final stem by V-initial suffix. However, the distribution of the instrumental /ɨro/ shows different patterns. When instrumental /ɨro/ follows /l/-final stem, unlike our prediction, /lo/ not /ɨro/ is chosen. In addition, the commitative '-wa/ kwa' behavior seems to be asymmetric when compared to other suffix's complementary distribution because C-final stem unexpectedly takes /kwa/ and V-final stem allows /wa/ while in other case markers, C-final stem takes /ɨn, i, ɨl, a, ɨro/ and V-final stem does /nɨn, ka, lɨl, ya, lo/.

This current study attempts to raise and address some methodological problems from previous studies. Firstly, we considered how the base form should be established as an input form. There have been a few studies based on diachronic approaches. From this point of view, it is difficult to derive complementarily distributed alternative forms from basic morphemes which are dependent on the phonological environment. For example, if /wa/ is selected as a base form in the commitative case, we phonologically or phonetically have to explain the reason why only /k/ should be inserted instead of other segments. As a result, we chose the base forms of Korean case markers with respect to synchronical approaches.

Secondly, there appears to be a phonological exception in the instrumental suffix because C-final stem is followed by /iro/ suffix but /l/-final stem is attached by /lo/ just like V-final stem. Kim (2002) tries to use this pattern using the [+vocalic] feature of /l/ suggested by Chomsky & Halle (1991). However, this distinctive feature has not been authorized yet and the [-vocalic] feature of glides, which are considered as semi-vowels, is difficult to be accepted as well. We solved this problem by adding two constraints, $*_\mu[l$ prohibiting the existence of /l/ in the non-moraic initial position, and I$_{DENT}$-IO (lateral) requiring which correspondent segments have identical values for feature [lateral].

Finally, the problem is a partial reordering in the way it has been used in working through exceptional cases. Without the re-ranking constraints, this study was an attempt to explain the instrumental and commitative cases within a unitary constraint ranking by adding the constraints that can control the exceptions.

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