The ɨ deletion rule and phonologically conditioned allomorphy in Korean case markers

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1   Introduction

- Phonologically conditioned allomorphy (PCA): allomorphic alternation that is conditioned by the phonological properties of the environment

    - English plural *-s*: [kæts] vs. [dɔgz] vs. [dɹɪʃəz]

- Phonologically conditioned suppletive allomorphy (PCSA): when the phonological forms of two allomorphs are not related, even though the alternation is still conditioned by phonology

- Korean case markers have often been cited as examples of PCSA that are motivated to optimize syllable structures.

    - Nominative marker: *-i* ∼ *-ka*
      /pap-i/ [pa.bi] rice-NOM   /se-ka/ [se.ga] bird-NOM
    - The alternation between *-i* and *-ka* is phonologically conditioned: when the preceding syllable ends in a consonant, *-i* is selected, and when the preceding syllable ends in a vowel, *-ka* is selected.

- It is hard to draw a clear borderline between PCSA and morphophonological alternations. In some cases, the phonological forms of two alternants are clearly unrelated, or they are hard to be explained by phonology. However, in other cases, although two phonological forms look similar, the alternation may not be a part of the phonology of the language.

- In this study, I investigate the allomorphic distributions of five Korean case markers and the general phonology of Korean, and argue that while *-i* ∼ *-ka* is suppletive, the others are morphophonological alternations, whose distributions are mostly explained by a general phonological rule, the ɨ deletion rule. Also, I show that the allomorph selection of Korean PCA does not optimize phonological surface forms.

2   Data

- Basic Korean phonology

    - Only one onset and one coda are allowed. (No consonant cluster) The maximum syllable structure is C(G)VC. (Glides are usually considered as a part of diphthongs in the Korean phonology.)
    - /ŋ/ is not allowed as an onset consonant.

- The general pattern of PCA in the Korean case markers

  - C-initial allomorph after V-final nouns (ex: /se-nɨn/ 'bird-TOPIC')
  - V-initial allomorph after C-final nouns (ex: /kuk-ɨn/ 'soup-TOPIC')

(1) The five Korean case markers

	V-final /se/ 'bird'	C-final /kuk/ 'soup'	ŋ-final /saŋ/ 'prize'	l-final /sal/ 'flesh'
NOMINATIVE *-i ∼ -ka*	se-ka	kuk-i	saŋ-i	sal-i
ACCUSATIVE *-ɨl ∼ -lɨl (∼ -l)*	se-lɨl (∼ se-l)	kuk-ɨl	saŋ-ɨl	sal-ɨl
TOPIC *-ɨn ∼ -nɨn (∼ -n)*	se-nɨn (∼ se-n)	kuk-ɨn	saŋ-ɨn	sal-ɨn
INSTRUMENTAL *-ɨlo ∼ -lo*	se-lo	kuk-ɨlo	saŋ-ɨlo	sal-lo
COMITATIVE *-kwa ∼ -wa*	se-wa	kuk-kwa	saŋ-kwa	sal-kwa

3 Previous studies

3.1 Bonnet et al. (2007)

- Bonnet et al. (2007) states that *-ɨn* and *-nɨn* (TOPIC) are listed in the lexicon without any ordering (i.e., suppletive), and a candidate that minimally violates ONSET and NOCODA (i.e, a candidate with a less marked form) is selected.

(2) Bonnet et al. (2007, p. 905)

a.

c^ho {-ɨn, -nɨn}	DEP	MAX	ONSET	NOCODA
a. c^ho.ɨn			*	*!
☞ b. c^ho.nɨn				*

b.

kim {-ɨn, -nɨn}	DEP	MAX	ONSET	NOCODA
☞ a. ki.mɨn				*
b. kim.nɨn				**!

- However, their analysis fails to explain /ŋ/-final nouns, which behave like other C-final nouns, even though /ŋ/ is not a permissible onset consonant (resyllabification impossible). Moreover, their approach selects an ill-formed candidate over an actual surface form for an /ŋ/ final noun.

(3) /ŋ/-final word: /saŋ-ɨn/ 'prize-TOPIC'

saŋ {-ɨn, -nɨn}	DEP	MAX	ONSET	NOCODA
☺ a. saŋ.ɨn			*	**
☝ b. saŋ.nɨn				**

- Bonnet et al. assume that some allomorphs are listed in the lexicon with a certain ordering, and propose a constraint called PRIORITY, which state the allomorph ordering is respected whenever possible. However, even if their proposal on ordered allomorphy were considered, e.g., PRIORITY: *-ɨn > -nɨn*, it would be still problematic. That is, now /ŋ/-final nouns select *-ɨn*, but V-final nouns never select *-nɨn*.

(4) Ordered allomorphy: -ɨn > -nɨn

cʰo {-ɨn > -nɨn}	Dep	Max	Prior	Onset	NoCoda
☺ a. cʰo.nɨn			*!		*
☞ b. cʰo.ɨn				*	*

3.2 Lee (2009)

- Lee (2009) addresses the problem of /ŋ/-final words with a constraint, *ŋ/Onset. He also assumes that the alternation is motivated to optimize phonological surface forms. He proposes a constraint called *default*, which states that a phonologically simpler allomorph is preferred.

(5) Lee (2009, p. 476) 'king-nom'

waŋ {-i, -ka}	*ŋ/Ons	*VV	Default	NoCoda	Onset	Align-Stem
☞ a. waŋ.i				*	*	
b. waŋ.ga			*!	*		
c. wa.ŋi	*!					*

- However, his analysis of the nominative does not extend into the rest of the system. In fact, comitative *-wa* ~ *-kwa* poses a problem in all approaches, which address the alternation with the optimizing effect, because this distribution does not optimize phonological surface forms. An optimizing approach would expect *-kwa* to appear after V-final nouns, contrary to the fact:

  - /se-wa/ 'bird-com' /kuk-kwa/ 'soup-com'

- (6) shows what happens if Lee's proposal is extended to the comitative marker. Since in Lee's definition, a phonologically simpler alternant is a default form, *-wa* is the default in the *-wa* ~ *-kwa* alternation. Default penalizes the correct form /waŋ-kwa/ and selects an ill-formed candidate, */waŋ-wa/.

(6) *-wa* ~ *-kwa* in the Default analysis (Here, /w/ is considered as an onset consonant.)

waŋ {-wa, -kwa}	*ŋ/Ons	*VV	Default	NoCoda	Onset	Align-Stem
☞ a. waŋ.wa				*		
☺ b. waŋ.gwa			*!	*		
c. wa.ŋwa	*!					*

3.3 Interim

- General problems in OT-based approaches (Embick, 2010):

  - A set of constraints proposed for one alternation does not work for another alternation of the same language. Considering OT's assumption that the ranking of a set of constraints represents the grammar of a language, why does a constraint ranking that works for one alternation not work for another?

  - Also, a constraint such as Priority is basically not a phonological constraint but a morphological constraint, which suggests that even PCAs with relatively clear phonological distributions need a morphological constraint. (Default in Lee (2009) is basically similar to Priority that Bonnet et al. (2007) propose.)

  - Phonological constraints alone are not enough to explain the distribution of the Korean PCAs.

4　Proposal

- Theoretical framework

    - My proposal uses the framework of Distributed Morphology (Halle and Marantz 1993, Harley and Noyer 1999, Embick and Halle 2005), which does not require optimization.

    - In Distributed Morphology (DM), there are two types of basic elements that are used in word formation: roots and abstract morphemes.

    - Abstract morphemes are composed of non-phonetic features, and phonological exponents are added to abstract morphemes via Vocabulary Insertion.

    - In addition to Vocabulary Insertion, DM employs Readjustment Rules, which are phonological rules that change phonological forms of roots or the phonological exponents of abstract morphemes in a specific morphosyntactic environment.

    - DM uses Vocabulary Insertion to explain suppletion and Readjustment Rules to account for (morpho-)phonological alternations.

4.1　Nominative *-i* ∼ *-ka*

- Considering that the phonological forms of *-i* and *-ka* are not related and their distribution depends on the phonological environment, I agree that the alternation is suppletive and there must be two Vocabulary Items.[1]

(7)　[NOM] ↔ *-ka*/ V_____

　　　[NOM] ↔ *-i*

- Diachronic evidence for suppletion: In Early Middle Korean (around the 15th century), *-i* was the only nominative marker (Sohn 1999). After a C-final noun, an allophone of *-i*, /j/, was used instead of *-ka*. In 1572, *-ka* was first observed in the literature and it has been productively used since the 17th century. If *-ka* were somehow derived from the allophone *-j*, we would expect to find evidence of sound change from *-j* to *-ka* (at least in the nominative context). However, there is no such evidence and *-ka* is only attested at a later date in the language.

4.2　Accusative *-il* ∼ *-lil* and Topic *-in* ∼ *-nin*

- To a first approximation, the same solution that uses different Vocabulary Items seems to work for the accusative and topic markers like the following:

(8)　Accusative: *-il* ∼ *-lil*

　　　[ACC] ↔ *-lil*/ V_____

　　　[ACC] ↔ *-il*

(9)　Topic: *-in* ∼ *-nin*

　　　[TOP] ↔ *-nin*/ V_____

　　　[TOP] ↔ *-in*

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[1]Considering that *-i* was the only nominative marker in Middle Korean, *-i* is listed as a less specific Vocabulary Item, but they can be listed in the other way. Synchronically, there is no evidence that one should be listed before (or after) the other, as they are in complementary distribution.

- One problem in (8) and (9) is that they do not explain that the two alternants of each abstract morpheme are phonologically related. Given that suppletion is rare in natural languages (Embick and Halle 2005), it is preferred to treat these alternations as morphophonological than as suppletive. Therefore, the current analysis proposes one VI for each abstract morpheme and a Readjustment Rule to capture their phonological similarity.

- Readjustment rule: Onset deletion or Coda copying?

  - In -ɨC ∼ -CɨC, we could say that -CɨC (*-nɨn*, *-lɨl*) is the VI and the onset is deleted after a C-final noun, or -ɨC (*-ɨn*, *-ɨl*) is the VI and the onset is copied from the coda consonant after a V-final noun.

  - I argue that coda copy is better than onset deletion because it handles the other alternation found in these case markers.

    (10)   TOPIC: *-n* ∼ *-nɨn*

         a.   se-nɨn   se-n   'bird-TOP'

         b.   kuk-ɨn   *kuk-n   'soup-TOP'

    (11)   ACCUSATIVE: *-l* ∼ *-lɨl*

         a.   se-lɨl   se-l   'bird-ACC'

         b.   kuk-ɨl   *kuk-l   'soup-ACC'

  - The problem is that V-final nouns select both -CɨC and -C, whereas C-final nouns cannot select the -C form.

    (12)
-CɨC	∼	-ɨC	∼	-C
V-final		C-final		V-final

  - If we assumed -CɨC is the VI, we would need two deletion rules to explain the patterns.

    * C_1 deletion from -CɨC to -ɨC after **C-final** nouns
    * C_1ɨ deletion from -CɨC to -C after **V-final** nouns

  - In this scenario, C_1 is deleted in two different phonological environments. Making these rules is not impossible, but the rules are somewhat redundant.

- Thus, I propose one Vocabulary Item for each of the topic and accusative markers (13) and a coda copy rule (14):

  (13)   [ACC] ↔ *-ɨl*

         [TOP] ↔ *-ɨn*

  (14)   Coda copy

        ɨ C_2 → C   ɨ C_2 / V _____ [ACC, TOP]

- The topic or accusative markers after V-final nouns undergo either the coda copy rule in (14) or the ɨ deletion rule, as illustrated in (15). (The ɨ deletion rule is discussed in the next section in detail.)

  (15)

                C_2 copy

                          -nɨn, -lɨl

      V]$_N$ *-ɨn, -ɨl*

               ɨ deletion   *-n, -l*
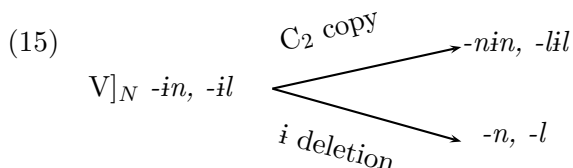
4.3 Instrumental *-ɨlo* ∼ *-lo*

- The distribution of the instrumental marker is more complicated than those of the others, because /l/-final nouns pattern with V-final nouns, selecting *-lo*, instead of *-ɨlo*.

  (16)   a.   se-lo   *se-ɨ.lo   'bird-INSTR'
            b.   kuk-ɨ.lo   *kuk-lo   'soup-INSTR'
            c.   pal-lo   *pal-ɨ.lo   'foot-INSTR'

- A challenge here is how to explain the phonological relationship of *-ɨlo* and *-lo* with making /l/-final nouns as an exception. There are three options to choose: i) one is to have three Vocabulary Items for each distribution, ii) another is to assume two Vocabulary Items and one phonological rule, and iii) the other is to assume one Vocabulary Item and one phonological rule in disjunctive environments.

  (17)   a.   Three VIs: [INSTR] ↔ *-lo* / l
                          [INSTR] ↔ *-lo* / V
                          [INSTR] ↔ *-ɨlo*
            b.   Two VIs: [INSTR] ↔ *-lo* / l _____
                        [INSTR] ↔ *-ɨlo*
              ɨ deletion rule: *ɨ* → ∅ / V _____
            c.   One VI: [INSTR] ↔ *-ɨlo*
              ɨ deletion rule: *ɨ* → ∅ / V _____
                                 ɨ → ∅ / l _____

- Among these three options, I suggest that (17c) is better than the others in that *-lo* after /l/-final nouns and *-lo* after V-final nouns are not treated as an accident (unlike (17a, b)), and the *ɨ* deletion rule in verb conjugations in Korean shows exactly the same distribution with the one in (17c). (The *ɨ* deletion rule in verb conjugation is well known and studied by several linguists. See Kim-Renaud 1982, Sohn 1986, Sohn 1999, and among others.)

  (18)   Conditional: *-ɨmjʌn* ∼ *-mjʌn*
            a.   C-final: mʌk-ɨ.mjʌn   *mʌk-mjʌn   'eat-if'
            b.   V-final: ka-mjʌn   *ka-ɨ.mjʌn   'go-if'
            c.   l-final: man.dɨl-mjʌn   *man.dɨl.-ɨ.mjʌn   'make-if'
  (19)   Nominalizer: *-ɨm* ∼ *-m*
            a.   C-final: mʌk-ɨm   *mʌk-m   'eating (n.)'
            b.   V-final: ka-m   *ka-ɨm   'going (n.)'
            c.   l-final: man.dɨl-m   *man.dɨl-ɨm   'making (n.)'

- Given that there are many similar alternations, *-ɨlo* ∼ *-lo* must be one example of the *ɨ* deletion rule as well and the rule applies not only to the case markers, but to any abstract morphemes.

- I propose one VI for the instrumental and the *ɨ* deletion rule:

  (20)   [INSTR] ↔ *-ɨlo*
  (21)   *ɨ* deletion: *ɨ* → ∅ / V] _____
                          / l] _____ [INSTR]

4.4 Comitative *-kwa* ∼ *-wa*

- The comitative marker in Korean is realized as either *-wa* or *-kwa*. The *-wa* form is found after a V-final noun, and the *-kwa* form is found after a C-final noun.

  (22) Comitative: *-kwa* ∼ *-wa*
      a. se-wa   *se-kwa   'bird-COM'
      b. kuk-kwa   *kuk-wa   'soup-COM'

- A question is which form (either *-kwa* or *-wa*) should be chosen as the phonological exponent of the comitative marker.

- Here, I assume *-kwa* is the VI for the comitative marker, and /k/ in the comitative marker is deleted after a V-final syllable, considering that the phonological environment of *-wa* was more specific than that of *-kwa* in Middle Korean.

- In Middle Korean, *-wa* was used after a V-final or a /l/-final noun, and *-kwa* was observed elsewhere (Sohn 1999), which is the same with the distribution of the *-lo* ∼ *-ilo* alternation (INSTR.) in Contemporary Korean.

  (23) [COM] ↔ *-kwa*
      k deletion: $k \rightarrow \emptyset$ / V] _____ [COM]

5 Conclusion

- This paper shows that the alternations found in the five Korean case markers are not motivated to optimize phonological surface forms.

- I use the framework of Distributed Morphology in explaining the alternations.

  – I agree that there must be two different Vocabulary Items for the *-i* ∼ *-ka* alternation, as their phonological forms are not related to each other.

  – However, I show that there should be only one Vocabulary Item for the other alternations, and they are not examples of PCSA.

(24) Summary

	Vocabulary Items	Readjustment Rules	Examples
NOMINATIVE	[NOM] ↔ *-ka* / V __ [NOM] ↔ *-i*		/se-ka/ 'bird-NOM' /kuk-i/ 'soup-NOM'
TOPIC	[TOP] ↔ *-ɨn*	Coda copy ɨ deletion	/kuk-ɨn/ 'soup-TOP' /se-nɨn/ 'bird-TOP' /se-n/ 'bird-TOP'
ACCUSATIVE	[ACC] ↔ *-ɨl*	Coda copy ɨ deletion	/kuk-ɨl 'soup-ACC' /se-lɨl/ 'bird-ACC' /se-l/ 'bird-ACC'
INSTRUMENTAL	[INSTR] ↔ *-ɨlo*	ɨ deletion	/kuk-ɨlo/ 'soup-INSTR' /se-lo/ 'bird-INSTR'
COMITATIVE	[COM] ↔ *-kwa*	k deletion	/kuk-kwa/ 'soup-COM' /se-wa/ 'bird-COM

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