

Decay of ungrounded rules: the residual vowel harmony of Middle Korean in Contemporary Korean

In this paper, I argue that the direction of decay of Korean vowel harmony is not the unification of suffix-initial vowels. In Contemporary Korean, we cannot find any proper phonetic/phonological motivation for the rule which is called as vowel harmony just following a custom. For this reason, I will use the term allomorph selection for the phenomenon in this paper. In the experimental results, variations of the allomorph selections are observed with all kinds of stem-final vowels. This shows that speakers try to make their own criteria for the ungrounded rules having weak evidence only. It is expected that the results will help to answer the critical questions on acquisitions and applications of variations and ungrounded rules.

In Korean, vowel-initial suffixes following closed verbal or adjectival stems show the initial-vowel alternation between /a/ and /ə/ depending on stem-final vowels. When /a/ or /o/ is a stem-final vowel, the initial vowel of the following suffix becomes /a/ as in (1a). With other kinds of stem-final vowels, the following vowel-initial suffix starts with /ə/ as in (1b).

- (1) a. *mak-a* 'block-declarative/imperative/interrogative<sub>informal,sentence-final</sub>'  
*mol-a* 'drive-declarative/imperative/interrogative<sub>informal,sentence-final</sub>'  
 b. *mak-ə* 'eat-declarative/imperative/interrogative<sub>informal,sentence-final</sub>'  
*mil-ə* 'push-declarative/imperative/interrogative<sub>informal,sentence-final</sub>'  
*mul-ə* 'bite-declarative/imperative/interrogative<sub>informal,sentence-final</sub>'  
*ilp<sup>h</sup>-ə* 'recite-declarative/imperative/interrogative<sub>informal,sentence-final</sub>'  
*maete-ə* 'tie-declarative/imperative/interrogative<sub>informal,sentence-final</sub>'

Previous literature has been focused only on variations of the allomorph selection observed with /a, o/-final stems. Since /a/-final existing stems and /a, o/-final nonce stems frequently allow disharmonic /ə/-initial suffixes in the corpus, production experiments, and natural speech (Kang 2012, Kang and Ryu 2015), the unification of suffix-initial vowels to /ə/ has been argued.

The allomorph selection is the residual vowel harmony of Middle Korean (10~16th century) which has a different vowel system including [RTR] contrasts (Ko 2012). Since the Korean vowel system changed, in Contemporary Korean it is hard to find any proper phonetic or phonological criteria of the allomorph selection. The harmonic feature [RTR] used in Middle Korean is opaque in Contemporary Korean (Kang and Ryu 2015). Then we can expect that stems with other final vowels than /a, o/ might allow disharmonic /a/-initial suffixes, especially with nonce stems. If there is no robust motivation for the allomorph selection rule, there is no clear reason that the rule is weakened only with /a, o/-final stems.

I conducted production experiments with systematically controlled stimuli in order to compare all of the stem-final vowels except for /æ/, because the number of /æ/-final existing stems is really low. Stimuli were 38 closed monosyllabic stems (C<sub>1</sub>V<sub>lex</sub>C<sub>2</sub>-). Independent variables were stem-final vowels V<sub>lex</sub> (/a, o, ə, u, i, ɨ/), word types (existing vs. nonce words), intervening consonants C<sub>2</sub> between V<sub>lex</sub> and suffix-initial vowels V<sub>alt</sub> (sonorant /m/ vs. obstruent /p, p<sup>h</sup>, t, t<sup>h</sup>/ vs. sonorant+obstruent /lp/), and suffixation frames (sentence-final vs. non-final followed by /a/ vs. non-final followed by /ə/). For each final vowel, two or three existing stems and four nonce stems were used. Nonce stems' consonant conditions are controlled (pVm-, pVp-, pVp<sup>h</sup>-, p'Vlp-). For measuring vowel formants properly, consonants are limited to bilabial stops as much as possible. If there is no proper existing stem for a specific stem-final vowel with bilabial stops, coronal stops /t, t<sup>h</sup>/ were selected instead. Serial verb construction was used as non-final suffixation frames. In order to look at the following vowel's effect, the selected second verb stems are the same except for their vowels (/a/ vs. /ə/).

Participants are asked to produce a verbal conjugation form in a natural way using the given stem and suffixation frame on the screen. On each screen, a verbal stem with the declarative suffix *-ta* and a suffixation frame using the verb *ha-* 'do'. Every response will include an inserted /a/ or /ə/ in the V<sub>alt</sub> position as in (2).

- (2) a. *pam-ta* + *~hae* 'do<sub>sentence-final</sub>' → response: *pam-V<sub>alt</sub>*  
 b. *pam-ta* + *~hae bat-ta* 'do<sub>non-final</sub> receive<sub>including /a/</sub>' → response: *pam-V<sub>alt</sub> bat-ta*  
 c. *pam-ta* + *~hae bət-ta* 'do<sub>non-final</sub> take-off<sub>including /ə/</sub>' → response: *pam-V<sub>alt</sub> bət-ta*

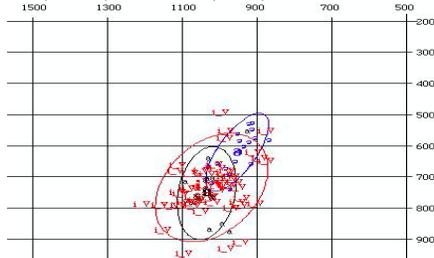
In total, 114 stimuli (38 stems \* 3 suffixation frames) are presented to each participants in pseudo-random orders. None of  $V_{lex}$ ,  $C_2$ , and suffixation frames is repeated in a row. In order to properly measure formant values, all of the answers is produced three times.

The production experiment was conducted in the Phonetic Laboratory (a recording room with soundproof facilities) of Department of Linguistics at Seoul National University, from 28th June to 13th July 2016. Participants sat in front of the laptop, and wore a headset microphone (AKG Acoustics, C 520 vocal condenser microphone). In total, 17 participants participated in the production experiment (9 females and 8 males). They all were Seoul dialect speakers who have been living in Seoul for most of their lives, and their average age was 26.7. All of the participants voluntarily participated in the experiment, and they were rewarded by cash 10,000 KRW per an hour. The duration of the experiment was 40 minutes in average.

The results of 15 participants (7 females and 8 males) are analyzed. Responses of 2 participants who wrongly understood the examples and consistently used only one vowel as suffix-initial vowels for every stimulus are excluded. Responses using other kinds of suffixation form than  $V_{alt}$  are excluded in the analysis.

Similar to results of previous studies, /a, o/-final stems frequently allow disharmonic forms with suffix-initial /ə/. In the case of /o/-final stems, existing stems also allow disharmonic forms. Furthermore, it is observed that 7 participants produce disharmonic forms after stem-final vowels /ə, u, i, i/ too. Among their responses for /ə, u, i, i/-final stems, 10% was disharmonic forms with suffix-initial /a/. For other 8% of responses, it is hard to categorize a suffix-initial vowel into /a/ or /ə/. The measured formants show continuous values of the alternating vowels between /a, ə/ as shown in Figure 1.

Figure 1. formant values of  $V_{lex}$  /a/ (black),  $V_{lex}$  /ə/ (blue), and  $V_{alt}$  after stem-final /i/ (red) of participant 7



There is 1 participant who used /o, u/ in the  $V_{alt}$  position instead of /a, ə/ for some stimuli. Here I will mention results classified disharmonic forms with /a/ clearly (two native Korean speakers annotated and agreed with them). Nonce stems show more disharmonic forms with these stem-final stems (existing stems 3% vs. nonce stems 14%). Among intervening consonant conditions, sonorant consonants allow the most disharmonic forms (sonorant 16% vs. obstruent 7% vs. sonorant+obstruent 12%). Non-final suffixation frames show more disharmonic forms than sentence-final ones (sentence-final 6% vs. non-final with /a/ 12% vs. non-final with /ə/ 12%).

Through artificial language learning experiments, Finley (2008) argues that phonetic naturalness plays a role in learning. Learners can learn any patterns including really weird and unnatural ones, but they are biased to learn patterns that are frequently occurring and phonetically natural. The experimental results show that speakers try to make their own criteria for the allomorph selection which shows variations in the learning input and has no proper phonetic/phonological ground in Contemporary Korean. How do speakers use weak evidence like variations without proper motivation in their learning? Which phonetic or phonological factors could be the relatively robust criteria for ungrounded rules? In order to answer the questions, the formant values should be analyzed in detail. It will be the follow-up study.

#### Reference

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