

**Phonological variation in the modification of consonant-liquid sequences in Korean**

This study provides new empirical data of phonological variation in the modifications of word-medial consonant-liquid sequences in Korean, based on a large-scale production data of North and South Korean dialects. It is known that in South Korean (SK), the liquid /L/ is not allowed in post-consonantal onset position and undergoes phonological change (Iverson & Sohn 1994, Davis & Shin 1999, Seo 2003, 2005, Sohn 2006, 2008, a.o.). The homorganic /nL/ sequence undergoes lateralization in monomorphemic words (e.g., /nanLi/ → [nalli] ‘fuss’) and undergoes nasalization in polymorphemic words (e.g., /imun-Lon/ → [imunnon] ‘phonology’). The liquid in heterorganic cluster is nasalized not only after a nasal (e.g., /kimLi/ → [kimni] ‘interest’) but also after a stop, involving the nasalization of the stop (e.g., /sʌpLi/ → [sʌmni] ‘providence’). We investigate whether this holds (i) for Seoul Korean speakers who become familiar with the onset liquid through exposure to English and are reported to produce it (Seo 2004, Yun & Kang 2017) and (ii) for North Korean (NK) speakers who retain the onset liquid in their dialect (Yun & Kang 2017).

**Hypotheses.** The nasalization or lateralization of the word-medial consonant-liquid sequences in Korean has been explained that it originates from a ban on the onset liquid, \*<sub>o</sub>[L, sonority rise across syllable boundaries (Syllable Contact; Davis & Shin 1999) or segment-specific positional restrictions (Segment Contact; Seo 2003, 2005). In the Korean dialects that allow the onset /L/ with \*<sub>o</sub>[L inactive, we expect that /L/ may surface in post-consonantal position and the frequency of outputs with the surface /L/ will differ depending on the type of cluster (homorganic vs. heterorganic, nasal-liquid vs. stop-liquid). We will also test whether other previous descriptions on the word-medial consonant-liquid modifications hold true in the current data, including (i) nasalization more likely in Sino-Korean words than in loanwords, (ii) nasalization more likely before /i, j/ than before other vowels, and (iii) nasalization more likely in polymorphemic words than in monomorphemic words.

**Methods.** 35 NK speakers residing in Seoul who speak Northern Hamkyeong dialect (18 old (>40 y.o.) + 17 young) and 20 speakers of SK (10 old + 10 young) participated in a production experiment and read 246 Korean words including a nasal-liquid (/mL, nL, ŋL/) or a stop-liquid sequence (/pL, kL/) in (1). The test words included both monomorphemic and polymorphemic/compound words, and both Sino-Korean words and English loanwords, and were read both in frame sentences and in isolation, embedded in a larger list.

| (1)           | following vowel     |                            |                              |
|---------------|---------------------|----------------------------|------------------------------|
|               | /i/ (n=64)          | /j/ (n=87)                 | others (n=95)                |
| monomorphemic | /kwənLi/ ‘right’    | /kwənLjək/ ‘power’         | /konLanhata/ ‘awkward’       |
| polymorphemic | /cʰən-Li/ ‘1000-li’ | /sɛŋsan-Ljaŋ/ ‘production’ | /namtemun-Lo/ ‘Namdaemun-lo’ |

We have finished a preliminary acoustic analysis of 44 morphologically simplex Sino-Korean words (4828 tokens) and the major realizations of the consonant-liquid sequences include (i) nasalized outputs ([nn], [mn], [ŋn]), (ii) nasal-tap sequences ([nr], [mr], [ŋr]), (iii) nasal-lateral sequences ([ml], [ŋl]) and (iv) lateralized output [ll], as exemplified in Figure 1-4.

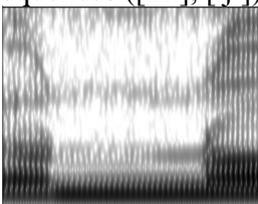


Figure 1. [nn]

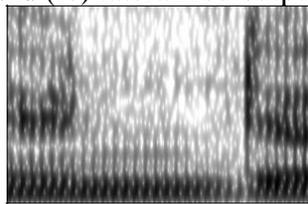


Figure 2. [nr]

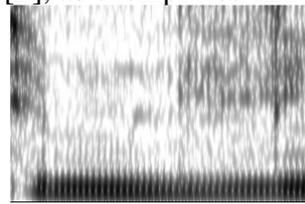


Figure 3. [ml]

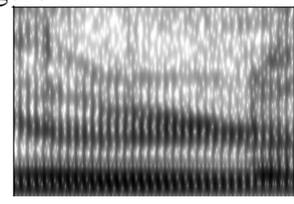


Figure 4. [ll]

**Results.** As shown in Figure 5, for homorganic clusters (“nl”), [l] occurs most frequently across dialect and age groups, while a mixed effects logistic regression model confirms that [l] is more frequent in SK speakers’ (“S”) speech than NK speakers’ (“H”) speech ( $p < .001$ ). For heterorganic clusters (“others”), older SK speakers almost always produce nasalized outputs, consistent with the previous descriptions. For NK speakers and younger SK speakers, expected to produce the liquid, the nasalized outputs are still the most frequent, but outputs with the surface /L/ are also observed. The surface post-consonantal liquid is mostly [r] for NK speakers and [l] for younger SK speakers. The previous description that nasalization is more frequent before /i, j/ only holds for the heterorganic clusters but not for homorganic clusters, as shown in Figure 6. Also, there is no significant difference depending on the type of pre-liquid consonant in heterorganic clusters, i.e., between nasal-liquid and stop-liquid clusters (Figure 7). Results by the morphological complexity and origin of words will be added as the acoustic analysis of the rest of the data is progressed.

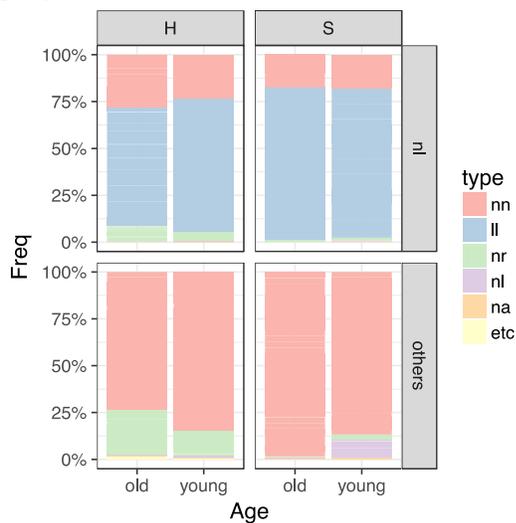


Figure 5. consonant-liquid realizations by dialect and age (n=nasal, r=tap, l=lateral)

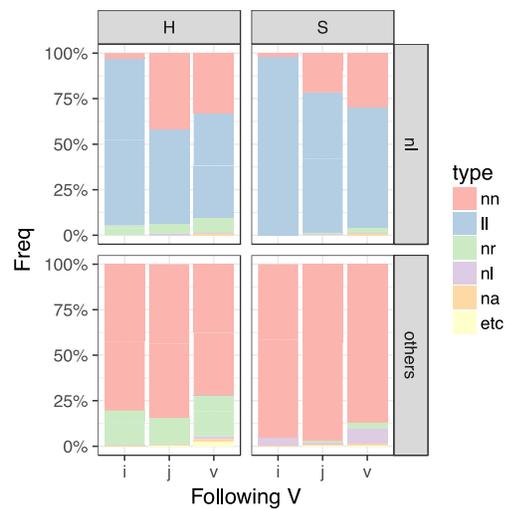


Figure 6. consonant-liquid realizations by following vowel type (n=nasal, r=tap, l=lateral)

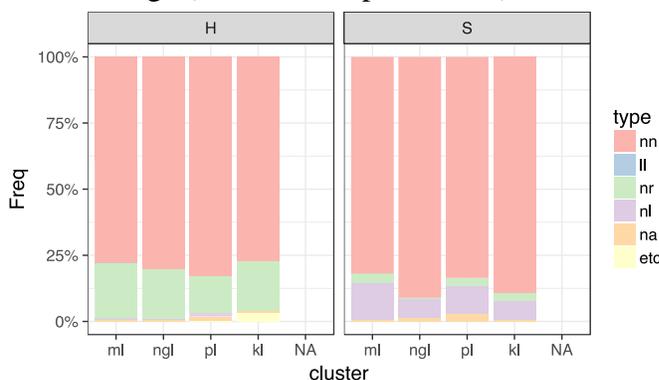


Figure 7. consonant-liquid realizations by cluster type (ml=/mL/, ngi=/ŋL/, pi=/pL/, kl=/kL/)

**Analysis.** The present results support the Segment Contact hypothesis over the Syllable Contact, showing that the phonological modification is more frequent in homorganic clusters than in heterorganic clusters. The data is analyzed by the interactions of several markedness constraints (e.g., \*homorganic C/L, \*heterorganic C/L) and faithfulness constraints (e.g., Max-[nasal]), and the constraints are assigned different weights by the stratum in the framework of noisy Harmonic Grammar (Coetzee & Kawahara 2013, Coetzee 2016).