

Effect of identity in the perception of laryngeal features in Korean stops

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This study investigates how segmental identity affects the perception of laryngeally marked stops in Korean, with the goal of shedding light on the motivation for dissimilatory patterns in the lexicon. Following [1], dissimilation arises from inherent phonological ambiguity in the acoustic signal, which can yield divergent percepts. Such divergence can enable perceptual reanalysis, a mechanism argued to underlie the sporadic and abrupt emergence of dissimilatory patterns [2]. We hypothesize that repetition deafness [3] contributes to this process: within short temporal windows, repeated segments are harder to recognize than non-repeated ones. In a previous study [4], 32 native Korean listeners judged the laryngeal category of C1 in C1VC2V non-words while the VOT of C1 was manipulated. The results showed that C1 was more often perceived as non-aspirated (tense) when followed by an aspirated C2, consistent with a perceptual bias against repeated aspiration. However, because C2 was limited to coronals, that study tested the effect of laryngeal features rather than full consonant identity.

In the present study, we included labial and dorsal stops in both C1 and C2 to test whether the dissimilatory perceptual bias is strengthened under conditions of full segmental identity. The VOT of C1 (/p^h/, /t^h/, and /k^h/) was manipulated from 10 to 60 ms in 10-ms increments, and C2 comprised ten consonants: lenis (/p/, /t/, /k/), aspirated (/p^h/, /t^h/, /k^h/), tense (/p'/, /t'/, /k'/), and the nasal /n/. Twenty-one native Korean listeners (16 female, 5 male; ages 19–26) participated in a categorization task in which they judged the laryngeal category of C1 (aspirated vs. tense) for each stimulus.

The results replicated the earlier finding that “tense” responses were more likely when C2 was aspirated or tense, and they provided overall support for an identity effect. However, the effect was not uniform; segmental identity influenced perception only in specific conditions. When C2 was aspirated, identity increased “tense” responses for coronal and labial stops, whereas dorsal stops showed the opposite pattern. When C2 was tense, coronal and dorsal stops increased “tense” responses, while labials showed no reliable identity effect. These patterns were also reflected in response times: aspirated and tense C2s slowed responses, whereas lenis C2s yielded faster responses.

The results suggest a perceptual bias against repeating similar auditory stimuli, and that this bias is strengthened by full identity, consistent with [3]. Despite this overall pattern, the effect was not consistent across places of articulation. One question, for example, is why dorsal stops showed the opposite pattern. We speculate that the VOT of aspirated C2 may have contributed to this result. Although dorsal aspirated stops typically have the longest VOT, we used the same VOT duration for all three aspirated stops (/p^h/, /t^h/, and /k^h/) in this experiment. This manipulation may not have been phonetically appropriate for /k^h/ for Korean listeners. Another open question is why a tense C2 facilitates “tense” responses, unlike an aspirated C2. This may be related to a distributional tendency in Korean for tense consonants to occur consecutively in onset position.

Table 1. Results of mixed-effect logistic regression

	Estimate	Std. Error	Z value	Pr(> z)	
(Intercept)	3.46	0.28	12.34	< 0.001	***
VOT	-0.12	0.00	-27.69	< 0.001	***
C1: dor	-0.49	0.14	-3.44	< 0.001	***
C1: lab	-2.06	0.16	-12.71	< 0.001	***
Identity	0.36	0.18	1.97	0.049	*
C2: lenis	-0.80	0.13	-5.99	< 0.001	***
C2: nasal	-0.48	0.19	-2.53	0.011	*
C2: tense	0.22	0.13	1.72	0.086	.
C1dor:Identity	-0.62	0.26	-2.41	0.016	*
C1lab:Identity	-0.19	0.28	-0.69	0.491	

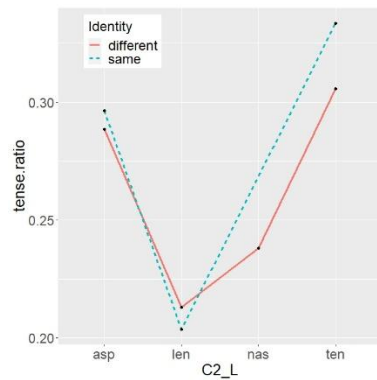


Fig 1. Ratio of tense response as a function of place of C2 and identity

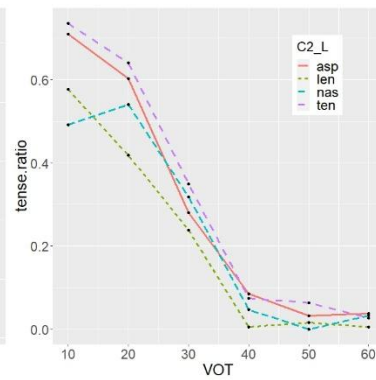


Fig 2. Ratio of tense response as a function of VOT duration and laryngeal feature of C2

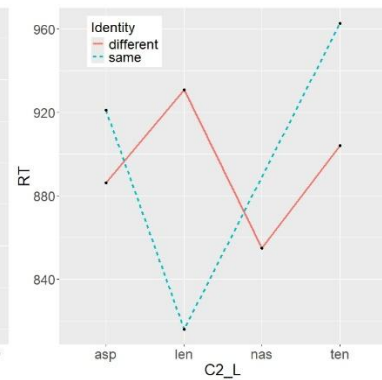


Fig 3. Response time as a function of laryngeal feature of C2 and identity

References

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- [4] Kang, H and Oh, M. (2024) A perception-based analysis of voice onset time dissimilation in Korean. *Phonetics and Speech Sciences* 16(1), 25-31.