The Role of Gestural Overlap in Perceptual Place Assimilation: Evidence from Korean

Minjung Son*‡, Alexei Kochetov*† & Marianne PouplierΘ*
Yale University‡, Haskins Laboratories*, Simon Fraser University† and University of MarylandΘ

The question of the origins of place assimilation has been a subject of increasing interest and controversy [1, 2, 4, 7, 8, 9, 11]. While researchers disagree on specific factors that cause perceptual place assimilation, it is commonly regarded as an important source of phonological assimilation [1, 8]. In particular, there are opposing views on whether perceptual assimilation is exclusively attributable to gestural reduction [5, 6] or can be triggered by gestural overlap as well [1, 3, 12]. The present study investigates whether perceptual place assimilation is uniquely attributable to either gestural reduction or overlap.

As an argument for the gestural reduction hypothesis, Jun [5, 6] presented data on regressive place assimilation in Korean /pk/ clusters. Investigating changes of oral pressure during the production of /pk/, Jun found that some tokens displayed gradient gestural reduction but no overlap, while other tokens showed gestural overlap without any reduction. In a follow-up perceptual study with Korean and English listeners he found that partially reduced tokens of /pk/ were overwhelmingly perceived as assimilated [kk], while overlapped tokens did not undergo perceptual assimilation. However, Jun's methodology did not allow him to distinguish between a partially and a fully reduced lip gesture. His assumption that Korean assimilation is a gradient, postlexical process was based largely on theoretical grounds. Additionally, all the tokens he identified to be partially reduced contained the sequence /pkw/. The small changes in oral pressure observed during these tokens can thus not uniquely be attributed to a potentially reduced /p/ or coarticulation of the velar labial-glide sequence.

The present study reports articulatory movement data recorded with an EMMA system [10] during the production of /pk/ clusters by a single Seoul Korean speaker. Stimuli consisted of real words with /pk/ clusters word-medially and at word boundaries, produced at two speaking rates; nonwords with word-medial /pk/ clusters were also collected. The results show that in word-medial /pk/ clusters the lip gesture was either fully present (with varying degrees of overlap) or completely absent, regardless of speech rate. Notably /pk/ clusters across word boundaries and word-medially in nonwords exhibited substantial overlap, but no reduction of C1. Contrary to Jun's hypothesis, the results indicate that word-medial lip reduction during /pk/ in Korean is a categorical rather than a gradient, postlexical process (though its occurrence is optional, or stochastic). Crucially, Jun's listeners failed to identify a /p/ in reduced /pk/ clusters not because of perceptual place assimilation, but likely because it was not articulated by his speakers.

Using the production data obtained in the EMMA experiment, we conducted a phoneme identification experiment with Korean and English listeners, presenting them with VC and VCCV stimuli that exhibited either overlap or categorical reduction of the lip gesture. Data from 10 subjects show that listeners often failed to recover the lip gesture in overlapped tokens and perceived [kk]. This was observed in up to 39% of the cases for Korean listeners and in up to 36% for English listeners. Unsurprisingly, a fully reduced lip gesture in /pk/ was not recovered by listeners, but perceived as [kk]. While the results allow us to conclude that overlap does play a role in perceptual place assimilation independent of reduction, any unique contribution of reduction cannot be investigated on the basis of Korean. The results suggest that gestural overlap
can be regarded as an important factor in the evolution of language-particular patterns of assimilation [3, 8].

References