

Some Asymmetrical Pre- Versus Post-focal Effects on Articulatory Realization of Prominence Distribution in Korean: A Preliminary Report

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In the present study, we investigate how CVC words are reduced in non-prominent (non-focal) contexts adjacent to the focal context in Korean, relative to when they are focused. That is, we explore how a language which does not employ lexical stress in the prominence system expresses prominence distribution in relative terms and how the results may compare to existing prominence-related data available in other languages such as English (e.g., [1, 2]) that uses a typologically different prominence system. Moreover, we use an Electromagnetic Articulograph, so that we can examine how reduction in non-focal contexts versus hyperarticulation in focal contexts are kinematically expressed in both spatial and temporal dimensions.

A specific question to be addressed is how articulatory reduction of pre-focal versus post-focal words may be similar to or different from each other, as compared to when the same words are focused. Both the pre- and post-focal conditions are expected to induce articulatory reduction, but given the directional asymmetry of pre- versus post-focal conditions, we expect that the degree of reduction will also be asymmetrical. It is hypothesized that the degree of articulatory reduction will be greater in the pre-focal than in the post-focal context, assuming that the auditory-perceptual impacts are likely to be greater when there is a drastic and rapid increase in articulatory force from a non-focal gesture on the following focal gesture rather than the other way around (e.g., [3]).

Twelve speakers of Seoul Korean participated in an articulatory experiment using an Electromagnetic Articulograph (Carstens AG501). The participants read provided written sentences on a computer screen in response to question sentences, which were designed to elicit corrective focus in the answer sentences on (a) the target word (focal condition), (b) the preceding word (pre-focal condition) and (c) the following word (post-focal condition). Movement duration (ms; DUR), displacement (mm; DISP), and peak velocity (cm/sec; PKVEL) were measured and were submitted to a linear mixed-effects model which was run for each movement (C1 closing, C-to-V opening, C2 closing) with Focus (focal, pre-focal, post-focal) and Word (/pap/, /pam/) as fixed factors including their interaction. The random structure included by-subject intercept and slope for all the fixed factors.

A basic finding was that non-focal gestures were much more reduced in both spatial and temporal dimensions than focal gestures that received a corrective contrastive focus (Figure 2). In other words, focal gestures were hyperarticulated (being larger, longer and faster than non-focal gestures), being ‘prominent’ above the surrounding non-focal words. This hyperarticulation pattern in Korean is largely consistent with the hyperarticulation pattern generally reported in English [1, 2, 4].

As for the specific research question of how pre-focal versus post-focal effects may differ from each other relative to focal effects, our results indicated that pre-focal gestures tended to be reduced more than post-focal gestures. This asymmetry was evident in two cases. For one thing, C1-closing gesture when in the pre-focal condition was reduced (in displacement and peak velocity) compared to when in the focal condition, whereas the same C1-closing gesture of the post-focal word showed no such reduction (Figure 1). For another, while C2-closing gesture was substantially reduced when in both pre- and post-focal conditions, it was the pre-focal C2-closing gesture that was reduced more (as evident in displacement and peak velocity), relative to the post-focal C2-closing gesture (Figure 3).

These results indicate that the nature of reduction differs depending on the directionality of prominence distribution—i.e., whether it occurs in the pre-focal or post-focal context. On the one hand, the pre-focal word was reduced as a whole from the beginning C1-onset gesture to the final C2-closing gesture which was immediately adjacent to the focal word. On the other hand, the post-focal word was reduced in a rather progressively gradient way.

The present study was the first to explore how prominence distribution would be reflected in kinematic terms in Korean, especially with respect to reduction patterns of pre-focal versus post-focal gestures as compared to focal gestures. The general differences in the focal versus the non-focal contexts illuminate that relative prominence is kinematically realized in a form of ‘hyperarticulation’ in much the same way across languages. Furthermore, the directional asymmetry of pre-focal versus post-focal effects further implies that although prominence may be defined differently in the phonology of a given language, articulation of prominence is fine-tuned by the production system of the language that optimizes prominence distribution taking into account both the listener-oriented auditory-perceptual saliency and the speaker-oriented motor efficiency.

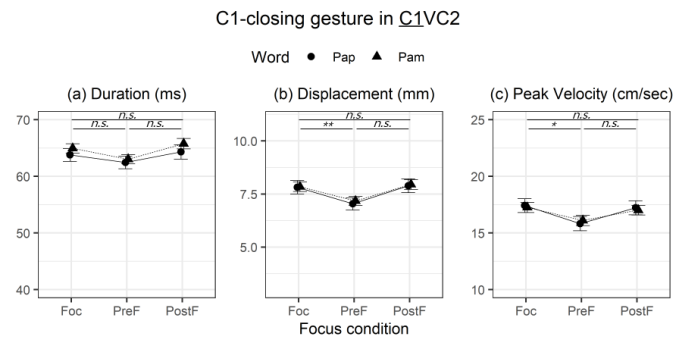


Figure 1. C1 lip-closing duration (left), displacement (middle), and peak velocity (right)

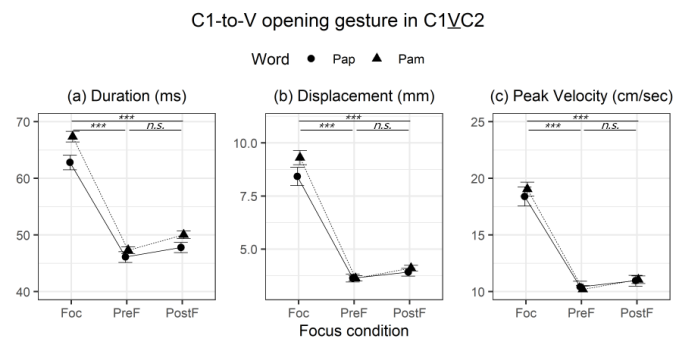


Figure 2. The V lip opening duration (left), displacement (middle), and peak velocity (right)

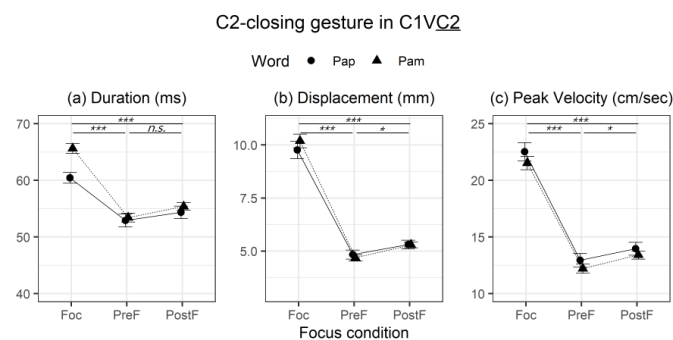


Figure 3. The C2 lip closing duration (left), displacement (middle), and peak velocity (right)

References

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