Oral–velum actions in the articulation of nasal juncture geminates and singletons

Miran Oh, Dani Byrd | Department of Linguistics, University of Southern California, USA | miranoh@usc.edu

INTRODUCTION

Articulatory studies on geminate and singleton consonants largely focus on oral gestures, without further attention to non-oral gestural actions (e.g., velum or larynx gesture).

We investigate spatiotemporal properties of both oral and velum gestures in nasal singletons and geminates to understand the dynamical mechanisms underlying these multi-gestural structures.

Q1. Oral & Velum gestures

- Given that under focus, articulation of consonants with a single oral gesture are generally larger and longer (e.g., [1]) ...
- Would focal prominence similarly enlarge and length the component velum gesture in nasals?

Q2. Singletons vs. Geminates

- Do (non-lexical/juncture) geminates exhibit similar focus effects as singletons, or does focus gesture modulates different articulatory aspects in geminates from singletons?

METHOD

Stimuli: Korean nasal singletons and geminates elicited by producing a noun + number classifier sequence in a sentence (7-8 repetitions) [hatp’a] ‘fishcake bar’ [silp’an] ‘chalkboard’ [naka] ‘four’ classifier

Data acquisition
- Real-time MRI data of the midsagittal vocal tract from two native Korean speakers
- Kinematic trajectories of Tongue Tip (TT) gestures & Velum (VEL) lowering gestures

Measurements
- TT magnitude: pixel intensity (red = ROI, [2])
- VEL magnitude: Vertical centroid displacement (blue = ROI, [3])
- TT closure duration
- VEL lowering duration
- Plateau durations

DISCUSSION & CONCLUSION

- Volum and oral components of nasal consonants may pattern distinctly in their spatial actions.
- Individuals may use different gestural components to distinguish nasal singletons from geminates.
- Subset of data shows negative correlations between TT and VEL magnitudes, suggesting that the two gestures are tightly linked to each other.
- Plateau, but not closure/lowering duration, distinguishes singletons from geminates.

- Focus—a prosodic modulation (μ-) gesture—does not uniformly enlarge and lengthen both TT and VEL gestural component actions across nasal geminates & singletons, though in many instances it does.
- Under focus, for S2, plateau lengthening is only seen for geminates.
- And for S1, VEL lowering is not lengthened, nor is TT plateau.
- Uniform prosodic transgestural action is not observed for multi-gestural segments.

- Do prosodic gestures apply at a more abstract level??

REFERENCES