

## Variation in articulation causing instability in the phonetic realization of syllable structure

Sarah Mahmood

University of Manchester

sarah.mahmood@postgrad.manchester.ac.uk

Glide-like articulations in C\_V environments present a tough analytical challenge, as they can realize no fewer than three different phonological structures (Pulleyblank 1983; Duanmu 2000). In present-day Mandarin Chinese, for example, a syllable such as /piŋ/ may be analysed as [p<sup>h</sup>iəŋ] with the glide treated as palatalization of the onset, [p<sup>h</sup>jəŋ] with the glide treated as a segmental phoneme possibly making up a consonant cluster, or [p<sup>h</sup>iəŋ] treated as part of the nucleus or as an onglide to the vowel. In this paper I address this using simultaneous acoustic and ultrasound data which can offer us a more precise description of the articulations which make up a syllable.

An extensive survey was carried out (30 subjects) from a variety of regions across China. Formant movement (and F2 slope of change), height, and duration were chosen as the main variables of investigation. Data was analysed using a novel adapted bi-polar co-ordinate system to generate accurate distance means between normalized splines (inspired by work by Stone et al 1983 and Zharkova & Hewlett 2009). Using this method for regions 3 and 4 (roughly equating to the hard palate), results showed both vowel lowering in [i], and more frontal articulations for the glide [j]. The acoustic results revealed gradience in steepness of the F2 slope (steeper for northerners (N), followed by central speakers (C), than for southerners (S)). Furthermore, a duration analysis for various syllable measures also revealed a significant duration increase when glides were present in the C\_V environment (ANOVA (F (1, 88) = 11.42, p < .05) + Pearson's at 95% (cor. 0.338, t = 3.379, df = 88, p < .05)). Finally, to understand more about categoricity and obligatoriness a Mixed effects with Bayesian parameter revealed a categorical distinction in glide realization between groups N and S, with gradience in glide realization observed in group C (LMER = est. 0.0016, std.err. 0.0005, p < .05)).

This paper reports that glide-like articulations in the C\_V environment are subject to dialectal variation corresponding to a range of diachronic pathways. Additionally, a 'distinction enhancing' motivation for this variation can be understood from both the UTI and formant results: where tongue height was dependent on Mandarin variety. For example, [j] articulated higher in the vocal tract is more distinct from [i] (only undergoing lowering when preceded by a glide), than [i]. Finally, evidence from Old and Middle Chinese sources places this work in context by tracing back some of the observed changes, and helps us understand the complexities behind C\_V glides.

### References

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