

Vowel Duration Variation in Hong Kong Cantonese

Manson Chun Man Wong¹ Márton Sóskuthy²
The Chinese University of Hong Kong¹ The University of British Columbia^{1,2}

Objective

This study investigates how sociolinguistic and structural factors influence vowel duration variation in Hong Kong Cantonese. Previous research on vowel duration across languages has often been limited to a narrow set of variables, resulting in inconsistent findings due to the interrelated nature of these factors. Studies specifically focused on Cantonese, moreover, have been scarce and methodologically limited, typically involving small sample sizes, uneven gender ratios, neglect of geolinguistic influence, and limited phonetic environments for production. This study aims to overcome these limitations by examining multiple sociolinguistic and structural factors simultaneously, employing a larger set of data, and controlling for confounding variables.

Method

Using a corpus-based approach, Hong Kong Cantonese speech data from 22 native speakers was used for analysis. Participants were asked to record themselves reading a passage as well as engaging in a free conversation. Audio recordings were transcribed in Praat and time-aligned with the orthographic transcriptions on a phone level using Montreal Forced Aligner. Vowel durations of the monophthongs were extracted and processed in R. Using a linear mixed model with random intercepts (speaker and word), this study examined two sociolinguistic factors (age and sex), and seven structural factors (vowel length, vowel height, manner of articulation of the following consonant, tone, utterance position, speech style, and speech rate).

Results and Discussion

The study showed that the structural factors had significant effects on the Hong Kong Cantonese monophthongs. Consistent with previous studies across languages, vowels in open syllables were the longest, followed by those closed by nasals, and the shortest when followed by stops. Besides, vowels in utterance-final positions were significantly longer than those in utterance-initial or medial positions. Vowels in the read speech were also significantly longer than those in spontaneous speech. Furthermore, mid and low vowels were significantly longer than high vowels, although no significant difference was found between mid and low vowels. Tone was another an influencing factor, with vowels in rising and level tones longer than those in falling tone. Regarding the effect of sex, in view of the mixed findings in previous research, the absence of a significant effect in this study might reflect language-specific characteristics.

As for the effects of speech rate and age, these two factors are often associated with each other. Further analyses were conducted to explore their effects and interactions.

Conclusion

This acoustic-phonetic study revealed the impact of both structural and sociolinguistic factors in accounting for vowel duration variation in Hong Kong Cantonese. By simultaneously examining multiple factors, this study further revealed that the effect of age might be influenced by taking speech rate into consideration, highlighting the importance of adopting a comprehensive multivariate approach.