

Within- and Cross-Talker Variation in Acoustic Characteristics of American English Vowels

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Previous research investigating vowel production provides evidence of substantial within and cross-talker variation in acoustic characteristics. The current study is designed to investigate whether, potential shared acoustic-optical variation across tokens, as well as investigating whether similar within and cross-talker variation exists in the optical characteristics of American English vowels. Additionally, measures taken from three-dimensional motion data for a set of 13 markers positioned around the lips, cheeks, and chin sampled at 100 frames/s with millimeter spatial resolution along with simultaneous video (50 frames/s) and audio for each of ten repetitions of 11 vowels spoken by multiple talkers will be reported. Preliminary analysis of motion and acoustic data from 12 repetitions of 11 vowels spoken by one male talker provides evidence of substantial within vowel variation in both vertical and horizontal lip separations measured at the midpoint of the vowel as determined by analysis of the acoustic signal. Correlations were observed between horizontal lip separation and second formant frequency ($r = 0.48$) and third formant frequency ($r = 0.66$) at the vowel midpoint. No correlations were obtained with vertical lip separation measure. The results will be examined in order to assess the relationship between the acoustic and visual signals of the vowels.