ABSTRACT

JESSICA HATCHER. Spectral Measures of Stop Affrication: The Case of /du/ Affrication in Raleigh. (Under the direction of Professor Jeff Mielke.)

In variationist linguistics, automated tools for studying vowel formants are well-established. These readily-available tools have prompted a wealth a research on vowel variation. Consonantal variation is often more difficult to study as researchers often have to create new measurement techniques. Developing automated consonant measurement schemes that are reliable in spontaneous speech is necessary for developing a clear picture of the range of segmental variation.

This paper examines affrication of /d/ before /u/, which is recognized as a common pronunciation in American English, especially in high frequency words in English, such as dream (Cruttenden 2014, Sung 2013). Little research has examined this feature (for exceptions see Magloughlin 2018, Mielke et al. 2018, and Smith 2018), and thus far no acoustic measurements have been effective enough to study this phenomenon in spontaneous speech.

Several measurements were developed using information from center of gravity and multitaper spectra. The most informative of these measurements were found to be the maximum center of gravity during the /d/+/u/ interval and the frequency and amplitude of the highest spectral peak in a spectral slice taken at the time of the maximum center of gravity.

The measurements were applied to a subset of the Raleigh corpus (Dodsworth & Kohn 2012; Dodsworth 2014) tested using auditory impressionistic judgements from Mielke et al. (2018). Word initial tokens of /d/, /dz/, and /du/ were automatically extracted, resulting in 1491 non-sibilant-adjacent /du/ tokens from 135 speakers.

The acoustic measurements were trained on a subset of the data in which the auditory judgements agreed using a Support Vector Machine, and then applied to the entirety of the data. Results reveal a significant change over time in Raleigh in which /du/ becomes more affricated.