

Ultrasound in a model of phonetic similarity

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This talk is part of an effort to quantify the phonetic similarity of speech sounds in order to compare phonetic similarity with phonological patterning. Data were generated by four linguists, who produced about 75 crosslinguistically-frequent consonants and vowels in multiple segmental contexts. In addition to audio recordings, three types of articulatory data were collected: airflow, electroglottography, and ultrasound. This presentation focuses on the ultrasound part. Reducing the information in the ultrasound video to something which provides an articulatory distance is non-trivial. Palatron (Mielke et al., 2005) and Palatoglossatron (Baker, 2005) algorithms were used to place tongue, palate, and lips in the same coordinate system, and realistic estimates of the location of the pharyngeal wall and teeth were included in order to approximate the entire vocal tract, resulting in about 60 cross-distances. We discuss various methods for dealing with these numbers, such as focusing on local minima and maxima (Mielke, 2005) and Principle Components Analysis (Lin and Mielke, 2006). We also examine the value of comparing one frame per token vs. using a series of frames for each token. The presentation concludes with the articulatory distance maps that are generated by various methods.

References

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