1. The Effects of Glottal Source Characteristics on Speech Perception
Student Investigator: Shaina Stasi
Mentor: Jonathan Brumberg, Jeremy Burnison, Kevin Pitt

Purpose: To produce vocalized speech, there must be a source of airflow, acoustic energy, and a filter to modify the air. The larynx is a primary component of the voice source and creates an unfiltered tone with complex acoustic characteristics. As air flows through the glottis and moves superiorly through the vocal tract, the air is shaped by the speech articulators. It is then filtered and modified to create a unique sound that is perceived as a voice. The glottal source signal can be defined by two major components, fundamental frequency and higher-frequency harmonics. In this study, we examined the importance of the harmonic characteristics of the glottal source on speech perception of one’s own productions.

Methods: 11 human subjects that participated in this speech perception study were presented with stimuli of natural and manipulated speech that vary only in glottal source harmonics with identical fundamental frequency and filter characteristics. Behavioral performance of human subjects were tested to determine the effect of model-based synthesized glottal sources on speech perception, and to confirm the suitability of each stimulus for a follow-up EEG study of self-speech perception.

Results: There is not a significant difference in perception between natural glottal sources and modeled glottal sources versus synthesized sources and modeled sources. Conclusions: There are no differences to perception of ones own self when utterances are resynthesized using a natural glottal source waveform, but there are differences when a model, with altered harmonics, are used. This indicates that humans are sensitive to the harmonic content of speech signals for the purposes of perception.