Glottalization as a Higher-Order Cue to Prosodic Structure

Prosodic realization is often crucial for pragmatic and semantic interpretation of speech. Part of this involves signaling to the listener that one intonational phrase (IPU) has ended, and a new IPU is beginning, or that a word is of particular importance. To accomplish this, pragmatically prominent segments are sometimes strengthened via glottalization, or a partial closing of the glottis during articulation (Garrellek 2013). In certain speakers, vowel-initial words, for instance, have been shown to be glottalized frequently at the start of IPUs and intermediate phrases (ip), and on pitch-accented words (Dilley, Shattuck-Hufnagel, & Ostendorf 1996; Garrellek 2013; Pierrehumbert 1995). The degree to which glottalization is employed, however, has been suggested to vary significantly according to social factors, such as dialect, age, and gender, with Western U.S. speakers, and younger female speakers glottalizing at the highest rates (Eddington & Channer 2009). While much previous work has presented results as averages across speakers, this study examines each speaker's individual variation in corpus speech from a small region of the U.S. South, and proposes that there are measurable patterns of glottalization usage apparent in each individual's speech that supersede variation, and serve as higher-order cues to prosodic structure.

Building on previous work which has analyzed radio news speech recorded in Boston (Dilley et al. 1996; Garrellek 2013), and lab speech recorded in California (Garrelek 2013), this study utilizes the *Linguistic Atlas of the Gulf States (LAGS)*, an extensive sociolinguistic corpus recorded from 1968-1983 (Pederson et al. 1986), to determine how patterns of glottalization not only vary with regard to social factors within a small region of the U.S. South, but crucially, how patterns of glottalization occur universally across a population. The data examined here was produced in 1972 by 10 speakers (5 M; M=63.7 years; ~36 hours of speech first fully transcribed by Renwick & Olsen 2016) in one well-sampled *LAGS* speaker region consisting of five contiguous counties in southeast Georgia. Speakers varied according to such social factors as age, gender, education level, socioeconomic status, and ethnicity. This data additionally constitutes speech from a time preceding modern prosodic theory, meaning that speech from this era has not heretofore been examined with regard to acoustic correlates of prosody.

A preliminary set of commonly used vowel-initial words (n=200) was annotated for glottalization (+/-), as determined by examination of the waveform and spectrogram, as well as perceptually when necessary. Glottalization manifests as irregularity in the pitch period and a drop in f0 (Redi & Sattuck-Hugnagel 2001), and was analyzed according to these criteria. Words were also marked for prosodic phrase position (most prominent → least prominent: start of IPU, start of ip, and mid-phrase), and phrasal pitch accent (+/-). Much individual variation was observed, with speakers glottalizing at different rates ranging from glottalization in 25% of tokens to 56.25% of tokens. Overall, speakers glottalized vowel-initial words in 40% of tokens, with all but the youngest (age 23, F) speaker, not-glottalizing more frequently than they glottalized. Despite these individual differences, however, one clear pattern was observed in each speaker's glottalization patterns. Glottalization rates closely mirror prosodic phrase prominence for each speaker, with the highest rates always occurring at the start of IPUs, and the lowest commonly occurring on mid-phrase segments, thus indicating that the rate of glottalization of vowel-initial words serves as a cue to prosodic prominence across speakers.

References

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