Preliminary UK Population Data on Laryngeal Voice Quality

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1. Introduction

Measures of laryngeal voice quality (VQ) have been shown to be useful in forensic phonetics, particularly in forensic speaker comparison (Nolan et al. 2006; San Segundo, Alves, & Trinidad 2013). However, VQ in British English has largely remained unexplored for the past 10 to 15 years. Laryngeal voice qualities lie on a continuum according to the constriction of the glottis (Ladefoged 1971, 2001):

Figure 1. Continuum of laryngeal voice qualities.

Central question: What is the status of laryngeal VQ in modern British English?

2. Methods

Data were collected using the English Dialect App (Leemann et al. 2016). Users recorded 10 sentences from *The Boy Who Cried Wolf* and reported demographic information such as their age, gender, and location. The utterance-final "while" was extracted from the sentence below, and was used for three VQ measurements:

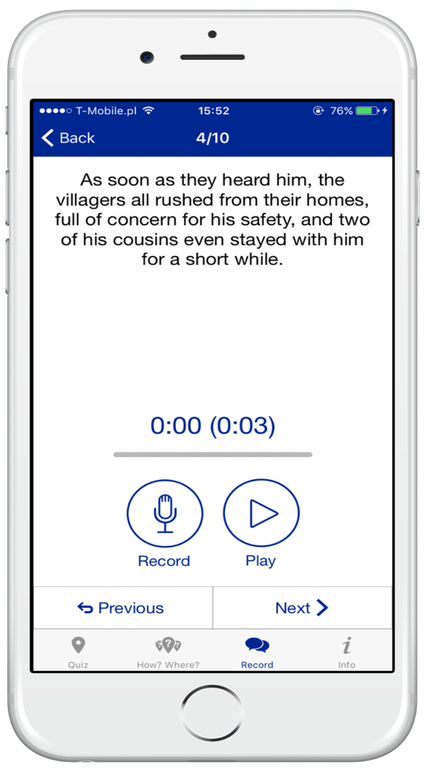

Figure 2. Recording interface prompt.

- **Material**: one token per speaker (fully sonorant "while")
- **Speakers**: 2,009 speakers using the English Dialect App across the United Kingdom (916 male/1,093 female)
- **Voice quality measures:** H1*-H2* and H1-A1 are both indicators of spectral tilt (Keating & Esposito 2006). CPP measures the periodicity of a speech sound and distinguishes between modal and breathy voice (Hillenbrand et al. 1994).

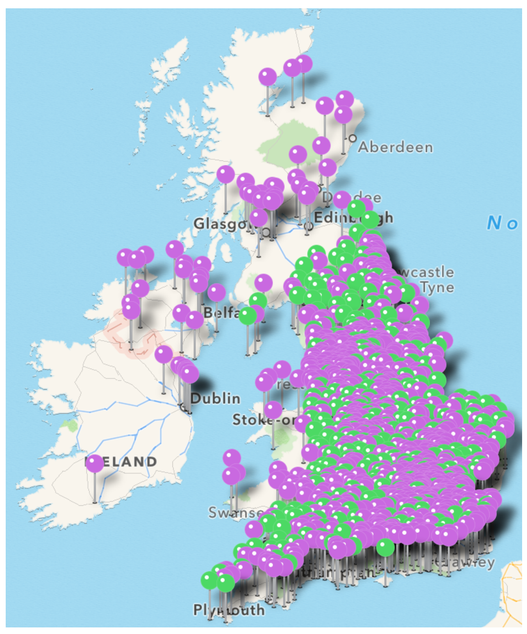

Figure 3. Locations of speakers within the United Kingdom.

•**Procedure:** Recordings were automatically segmented with WebMAUS (Kisler et al. 2016). VQ measurements were taken using VoiceSauce (Shue 2011).

3. Results and Discussion

The measures of spectral tilt showed that men used more creaky voice/less breathy voice than women, as seen below, where more negative values indicate increased creakiness:

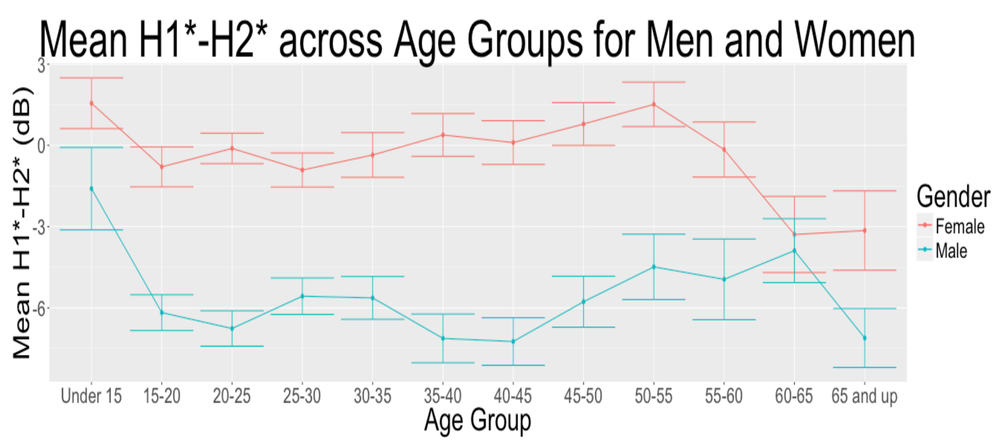

Figure 4. H1*-H2* plot. The vertical bars represent 95 per cent confidence intervals.

This difference was not evident from the CPP values:

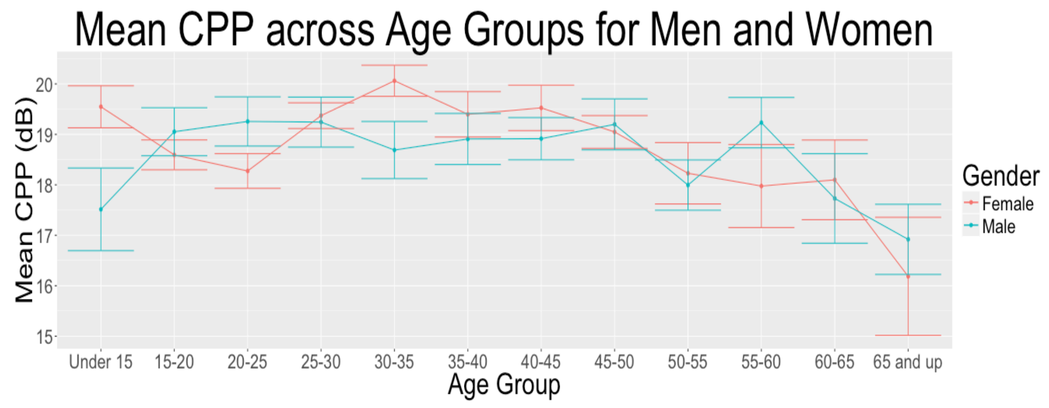

Figure 5. CPP plot. The vertical bars represent 95 per cent confidence intervals.

- No clear support for any geographic trends in the VQ measures.
- Linear regressions showed gender and education-related variables to be the best predictors of H1*-H2* and H1-A1.
- This is one of the first investigations of large-scale VQ population data; further work could consider other linguistic environments and different automatic methods of VQ measurement.