Using ultrasound tongue imaging to study variation in the GOOSE vowel across accents of English

ELEANOR LAWSON
LYDIA MILLS
Queen Margaret University

We undertook a preliminary study of GOOSE-vowel fronting and lowering using an ultrasound tongue imaging (UTI) corpus of mainly British English, collected between 2011 and 2014. The study aims to quantify regional differences in GOOSE fronting and lowering from an articulatory perspective using the *highest point of the tongue* method developed by Daniel Jones. The method of UTI analysis is adapted from (Scobbie et al. 2012) and involves automatic identification of the highest point of the tongue arch, in order to calculate retraction and lowering of the GOOSE vowel in relation to the FLEECE anchor vowel. Inter-speaker comparison is improved by obtaining a trace of each speaker's occlusal (bite) plane, rotating it to horizontal and likewise adjusting all vowel tongue surface traces before identification and measurement of the highest point of the tongue. Normalisation of raw measures relative to each speaker's vowel space is also carried out. Acoustic measures of F1 and F2 were used to check the validity of this articulatory method of GOOSE vowel analysis.

Preliminary results show a clear distinction between Scottish productions of the GOOSE vowel and other English productions (English, N. Irish, Rep. Irish, Canadian and New Zealand) in the open-close dimension. Scottish /u/ tends to have a much lower tongue body position than other productions of /u/, with speakers from Central Scotland producing variants with greater degrees of tongue body lowering than speakers from other parts of Scotland (Aberdeen, Inverness, Orkney). Statistical tests showed a significant correlation between a normalised F1 measure and the articulatory tongue-lowering measure. Articulatory results for GOOSE fronting are more complicated with no clear regional fronting pattern emerging. A nonsignificant result was also obtained from a correlation test using normalised F2 and normalised tongue-retraction measures. I will discuss the usefulness of the traditional single-point measurement in accurately capturing tongue body position.