A UTI and lip camera study of variation in the GOOSE vowel in the British Isles.

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Background

It is well known that fronting of GOOSE could result from a combination of tongue-body fronting, lip unrounding (Harrington et al., 2011). Traditional F2 by F1 plots can give the impression that varieties of English across the British Isles have GOOSE vowels with similar degrees of frontedness (e.g. see Ferragne and Pellegrino (2010)), despite there being very different diachronic trajectories for GOOSE fronting (Johnston, 1997). Our study presents a method for measurement of articulatory parameters of GOOSE using an audio-UTI and lip-video corpus of 18 British Isles speakers from Rep. Ireland, England, Scotland.

Method

We used an audio-UTI and lip-video corpus (recorded in 2012-14), comprising of 10 male and 10 female speakers aged 20-35 from England (7 speakers), the Republic of Ireland (3), and Scotland (8). We adapted tongue body measurement and normalization techniques from (Scobbie et al., 2012), measuring GOOSE relative to the FLEECE anchor vowel and normalizing using corner vowels FLEECE and TRAP and /w/ as the high-back corner “vowel”. Single UTI frames were annotated, located temporally at the midpoint of monophthongal GOOSE vowels, or the middle of the second element of diphthongal variants. Splines were fitted to the tongue surface using Articulate Assistant Advanced and exported as Cartesian coordinates for automatic measurement of height and backness using R. Lip protrusion was measured from profile lip video and normalised. For comparison, single-point acoustic measures were also taken normalised. Mean height and frontness of GOOSE for each speaker were plotted on acoustic and articulatory scatter plots.

Results

Results showed similar regional variation for tongue-body height and acoustic height, both showing the Scottish GOOSE vowel is lower. However, there was a mismatch between tongue-body frontness and acoustic frontness. While acoustic measures showed little difference between the regions, tongue body measures revealed a significantly backer tongue posture for Scottish speakers. Scottish speakers also had a significantly smaller degree of lip protrusion. It would appear that similar acoustic frontness results from different articulatory strategies: (England/Rep. Ireland) fronter tongue body and more protruded lips, (Scotland) backer tongue body and less protruded lips.

References

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