The dynamics of variation and change in Manchester English back vowels

A striking pattern from sociophonetic literature is the prevalence of GOAT/GOOSE vowel fronting across English dialects (UK: Henton 1983, Hawkins & Midgley 2005, Watt & Tillotson 2001; N.Am: Fridland 2008; Australia: Cox 1999). However, recent work has revealed considerable acoustic and/or articulatory differences across speaker-groups as change has diffused (Koops 2010, Baranowski 2008). This paper describes additional between-group differences in dynamic acoustic patterns of GOAT/GOOSE in the northern English city of Manchester using innovative techniques for modelling formant curves.

Data consist of spontaneous speech from 16 participants (8 male) aged 18-21 (young) and 62-82 (older). Dynamic measurements were extracted at +10% steps of the first three formant trajectories (McDougall 2004). Modified Watt and Fabricius-normalised F1 and F2 values were fitted with quadratic polynomial curves ($y=ax^2+bx+c$), allowing for comparison of data relating to the whole trajectory, rather a single point. Movement within the normalised F1~F2 plane was calculated using the Euclidean distance between vowel onset and offset (Fabricius 2007). Results were analysed using mixed-effects linear models with random intercepts for speaker and lexical root.

Our results support three main findings. First, age-group differences suggest change toward higher F2 across GOAT/GOOSE. GOAT fronting was also correlated with sex, with young females displaying higher F2 trajectories than young males. Between-age-group comparisons of quadratic (ax^2) and linear (bx) coefficients indicate that GOAT/GOOSE fronting is combined with 'flattening' of the F2 trajectory, resulting in less movement within the F1~F2 plane. This contrasts with the pattern in York where GOAT fronting involves increased F1~F2 movement (Haddican et al 2011). Therefore, beyond Labov's (1994) generalisation that GOAT fronting is parasitic on GOOSE fronting, there is little evidence to suggest that fronting processes are constant across UK communities.

Secondly, our data suggest articulatory differences in the implementation of fronting. Raw F3 values and the proximity of raw F3 and F2 peaks (Stevens 1998: 292) indicate that higher GOAT F2 for young females is, in part, a consequence unrounding. Consistent with Harrington et al (2011), no marked differences in rounding between age-groups are indicated for GOOSE. Finally, our data reveals an effect of lexical competition (Hay et al 2010). Using the maximum F2 value, GOOSE/GOAT fronting was promoted in lexical items without a FLEECE/FACE competitor (thus fronting is inhibited for *goose,* with its competitor *geese*, compared with *spoon,* which has no competitor **speen*). One constraint on change therefore appears to be the maintenance of acoustic contrast between lexical sets.

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