

The dynamics of variation and change in Manchester English back vowels

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A striking pattern emerging from sociophonetic literature of the last three decades is the prevalence of GOAT/GOOSE vowel fronting across different English dialects globally (UK: Henton 1983, Hawkins & Midgley 2005, Kerswill and Williams 1999, 2005, Watt & Tillotson 2001; N.Am: Clarke et al 1995, Fridland 2008; Australia: Cox 1999). However, much 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), recorded in peer-group pairs. Tokens were segmented, and dynamic formant measurements extracted at +10% steps of the first three trajectories (McDougall 2004). Modified Watt and Fabricius-normalised F1 and F2 values were fitted with quadratic polynomial curves ($y=ax^2+bx+c$). This characterises the overall magnitude (c), movement between the onset and offset (bx), and deviation from a straight line (ax^2) of each formant with a single coefficient, allowing for comparison of data relating to the whole trajectory, rather than values at a single point. Quadratic polynomials were favoured over higher order fittings since there was no expectation for formant curves more complex than parabolas. 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 both lexical sets. GOAT fronting was also correlated with sex with young females displaying higher F2 trajectories than young males. Between-age-group comparisons of quadratic (a) and linear (b) coefficients reveal dynamic acoustic differences, indicating 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 found for another northern dialect, York, in which GOAT fronting involves increasing diphthongisation (Haddican et al 2011). Contrary to Watt (2000), these findings obey Labov’s (1994) broad generalisation that GOAT fronting is parasitic on GOOSE fronting. However, beyond this there is little evidence to suggest that processes of fronting are constant across UK communities.

Secondly, our data indicate articulatory differences in the implementation of fronting. Raw F3 and the proximity of raw F3 and F2 peaks (Stevens 1998: 292) suggest that higher GOAT F2 for young females is, in part, a consequence lip-unrounding. Consistent with Harrington et al (2011), no marked differences in rounding between age groups are indicated for GOOSE. Finally, variation in our data reveals an effect of lexical competition consistent with 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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