having your cake and eating it:
An articulatory perspective on vernacular variation and change in a socially-stratified corpus

James M. Scobbie*, Jane Stuart-Smith and Eleanor Lawson*
*Queen Margaret University, Edinburgh, University of Glasgow
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Changes in Scottish English rhoticity
Scottish English is often cited as a rhotic dialect of English. However, in the late 1970s and early 80s, researchers started to notice that postvocalic /r/ was in attrition in working-class varieties of urban Scottish English; notably in the two most populous cities Glasgow (Macaldee 1963), (Stuart-Smith 2003) and Edinburgh (Romaine, 1978); (Speitel and Johnston, 1993). (Johnston. 1997).

Qualitative changes
The t-less and crotec variants were apparently the result of a dialect-internal vernacular sound change and not due to external Anglo-English Influa. Two phenomena were noted:

Using ultrasound to look at derhotisation
Derhotisation is a process that is not easily studied from an auditory or acoustic perspective only. It is well known that /r/ is acoustically complex: different lingua gestures can produce similar acoustic outputs. (See Delattre and Freeman’s 1968 cinematographic study of bunched and tip-up American /r/ and more recently Guenther et al. 1996, and Alwan and Narayanan (1996), using EPG and MRI.)

Articulatory information is clearly required if we are to understand the phonetic and social processes involved in Scottish derhotisation. The relatively young phonetic technique of ultrasound tongue imaging (UTI) seemed very suitable as a technique.

The ECB08 UTI corpus: spontaneous discourse and experimental word list speech

15 Informants aged 12-13
Livingston
4 WC males
4 WC females

15 Informants aged 12-13
Livingston
4 WC males
4 WC females

4 MC males
4 MC females

15 Informants aged 12-13

Figure 1: Recording locations of the 2008 Eastern Central Belt Scottish UTI corpus (ECB08)

ECB08 confirms the previously reported discovery (Scobbie, Stuart-Smith and Sebegts 2006) that derhotised prepausal tokens may have a covert tongue-tip gesture (Figures 3, 4). ECB08 (in two WC speakers) further reveals that this can affect /r/ in diphthongs and in some clusters: but and hur may be homophones. In low back /r/, hur, car, the post-alar gesture has a negligible acoustic effect, because it occurs when source energy is weak or absent, i.e. in the voicelessness arising from a glottalised allophone of /l/, or from the utterance-final position.

Especially when following mid or high vowels, the root retraction gesture of /r/ gives rise to a clear acoustic difference between many lexemes contrasting only in the presence/absence of that /r/ (Figures 3, 4). Diphthongisation and breaking leads to the conclusion for many listeners that “/r/” is still present. An audible post-alveolar constriction may also remain, occurring because voicing has entirely ceased, or during breathy glottal energy in prepausal contexts. Finally, vowel duration may cue /r/ in some contexts, for some vowels.

Previous work by Sproat and Fujimura (1993), Gick et al. (2003, 2006) and Byrd and Saltzman (2003) suggests that such root-tip gestural dissociation may be due to gesture lag in lengthened syllables that occur before major boundaries. But such articulatory factors interact with segmental, social and perceptual ones: derhotisation is clearly socially stratified.

Speakers intend to sound derhotic yet in suitable contexts they still articulate rhotic-like postvocalic gestures.

Future work
• Does a typical rhotic Scot use retroflexion? MC Scottivc rhotic /r/ is usually described, from an auditory perspective, as “retroflex”. However, initial analysis of the MC informant’s tongue movements suggests that postvocalic /r/ might often have a bunched tongue configuration typical of American speech. Such differences are reported to have no acoustic consequences (Guenther et al 1999) so should not be socially stratified.

• What conditioned variation is there (cf. Mikelje et al. in press)? We are currently quantifying the range of different tongue shapes and intersegmental timing relationships in onset, prepausal singleton /r/ and prepausal clusters. As well as examining the acoustic qualities. Our main focus is on the low back vowels like /aɪ/ and /ɛɪ/, which can be monophthongal.

Bibliography