

Changing sounds in a changing city?

A real-time study of Glaswegian /u/

GULP



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Background

/u/ is fronting towards /i/ in the acoustic vowel space in Standard Southern British English (Harrington et al. 2011), American English (Labov et al. 2006), New Zealand English (MacLagan et al. 2009).

What about Scottish English? Auditorily, /u/ has been reported to be fronted, and/or central in the vowel space for a long time (McAllister 1938, Macaulay 1977, Johnston and Speitel 1983). Recent acoustic and articulatory analysis suggests that /u/ is front and low (Scobbie et al. forthcoming).

Research outline

We start to tackle this question using data drawn from the analysis of a real-time corpus of the dialect of Scotland's largest city, Glasgow, which has experienced substantial socio-spatial changes across the course of the 20th Century.

We look at the relative placement of /u/ in the auditory space defined by formant frequencies of /i/, /a/, /u/ in Bark (cf. Harrington et al. 2008). The origin of sound change has often been sought in the perceptual failure to compensate for phonetic context (Ohala 1981). Can we relate vowel quality patterns in our data to the consonantal (Harrington et al. 2011) or prosodic (Beckman et al. 1992) environments they occur in? And, relevant to this context, are differences found which relate to specifically Scots lexis?

Method

Tab.1: Structure of the corpus and data presented here (recorded either in the 1970s and 2000s)

Decade of Birth	1930s	1940s	1950s	1960s	1970s	1980s
Speaker age						
G2: adult >40	4m, 4f 2m	7m, 1f	5m, 4f	6m, 6f 2m		
G1: young >10			4m, 4f 2m	(3m, 3f)	4m, 4f	6m, 6f 2m

Shaded columns indicate the period of urban regeneration experienced by Glasgow.

- 1970s: sociolinguistic interviews between fieldworker and informant (Macaulay 1977)
- 2000s: spontaneous conversations from self-selected pairs of speakers from the Glasgow Media Project (Stuart-Smith 2006)
- Other sources are oral history interviews, BBC recordings and sociological surveys made in Glasgow

Phonetic and linguistic factors analysed

- Four levels of prominence: stress, pitch-accent, nuclear accent, emphatic accent
- Three phrasal positions: initial, medial and final in a prosodic phrase
- Segmental context: voicing, place, manner of articulation of preceding and following consonant (syllables with /r/-offset were excluded)
- Lexical set: Scottish Standard English or Scots, e.g. *oot/out*, *hoose/house*

Formant dispersion across decades

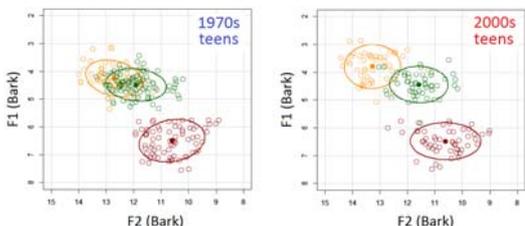


Fig. 1: F2/F1 formant plot of vowel tokens measured in young speakers. Ellipses include 70% of the data.

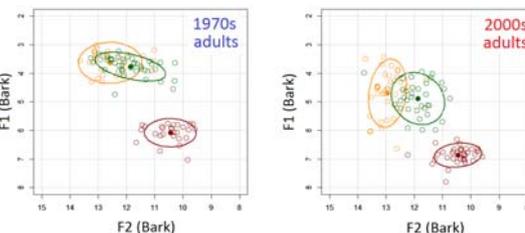


Fig. 2: F2/F1 formant plot of vowel tokens measured in adult speakers. Ellipses include 70% of the data.

Placement of /u/

$$d_u = \log E_{u/a} - \log E_{u/i} \text{ (after Harrington et al. 2008)}$$

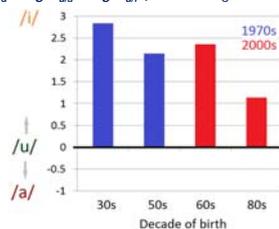


Fig. 3: F1 (raising/lowering as d_u between /u/ and /i/, /a/)

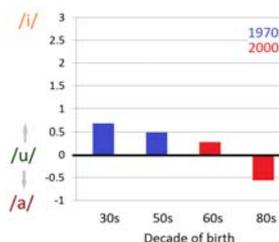


Fig. 4: F2 (fronting/backing as d_u between /u/ and /i/, /a/)

Phonetic and linguistic factors

1. *Non-fronting segmental contexts?*
 - ✗ Slightly less tokens with preceding anterior than posterior consonants (30-50% preceding; 40-60% following) but the impact on F2 is minimal (0.2 Bark), no impact on F1
2. *Impact of liquids?*
 - ✗ F2 lowered by 0.8 Bark, F1 raised by 0.1 Bark but only 10-25% of tokens have /l/ in on- or offset
3. *Target undershoot?*
 - ✗ No correlations between vowel height and duration.
4. *Prosodic effect?*
 - ✗ Neither accentuation nor phrasal position have a systematic effect on vowel quality in these data.
5. *Scots lexicon?*
 - ✗ Less than 1% of the /u/-tokens are in Scots words. Realisations are fronted and raised by 0.5 Bark but only in young speakers from the 1970s.

Sociolinguistic context

- ✓ F2 drops (/u/ retracts) in speakers who were adolescents after the main period of urban regeneration

Summary

- Our preliminary results for both age groups in the 1970s are in line with the reports based on auditory analysis stating that /u/ in Scottish English vernacular was very front (Macafee 1983, Macaulay 1977).
- In apparent time for both decades, /u/ is lowering. In apparent time for 2000s, we additionally see retraction.
- In real-time, we find a continuous lowering across the decades of birth and a discrete retraction of /u/ in speakers born in 60s and after. The retraction is more apparent in the younger group.

If these results are indicative of real-time change, the interesting point is that Scottish English is diverging from other accents of English in its trajectory for /u/.

Discussion

Are we observing real-time change in /u/ in Scottish English vernacular?

- So far, we have analysed a very small part of the dataset which presents a number of challenges for measurement (background noise and recording quality).
- The recordings from the two decades are stylistically different, interviews in the 1970s but very casual conversations between close friends in the 2000s. However, we do not have a clear prediction as to its impact on the acoustic space.
- We were surprised not to find any impact of segmental or prosodic context on the vowel quality in our data. On the basis of Scobbie et al. (forthcoming), we hypothesise that at least one driving factor in this sound change may be overall structural changes in the Scottish vowel system.

References Beckman, M., de Jong, K., Jun, S.-A. Lee, S.-H. (1992). The interaction of coarticulation and prosody in sound change. *Language & Speech* 35(1/2). Harrington, Kleber, Reubold, (2008). Compensation for coarticulation. *JASA* 123: Harrington, Kleber, Reubold (2011) The contributions of the lips and the tongue to the diachronic fronting of high back vowels in Standard Southern British English. *JIPA*; Scobbie, Lawson, Stuart-Smith (forthcoming): Back to front: a socially-stratified ultrasound tongue imaging study of Scottish English /u/. *Italian Journal of Linguistics*. Labov, W., Ash, Sh., Boberg, Ch. (2006), *The Atlas of North American English: Phonetics, Phonology and Sound Change*. MacAllister, A. (1938), *A Year's Course in Speech Training*. Macafee, C. (1983) *Glasgow*. Macaulay, R. (1977), *Language, Social Class and Education: A Glasgow Study*. MacLagan M., Watson C., Harlow R., King J, Keegan P. (2009), /u/ fronting and /t/ aspiration in Māori and New Zealand English. *Language Variation and Change*. Ohala, J. (1981). The listener as a source of sound change. *Papers from the session on language and behaviour*. Chicago Linguistic Society. Stuart-Smith (2006): The influence of the media. In: Llamas, C., Mullany, L. and Stockwell, P. (eds.), *The Routledge Companion to Sociolinguistics*, 140-8.



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