IDENTITY AND ETHNICITY IN /t/ IN GLASGOW-PAKISTANI HIGH-SCHOOL GIRLS

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ABSTRACT

This paper presents an acoustic phonetic analysis of Glasgow Asian syllable-initial /t/, in speech data collected from Pakistani-Muslim girls in a Glasgow high school after a long-term participant observation into their shared and differing social practices. The results show differences in spectral energy and shape according to following phonetic segment, and to membership in two contrasting Communities of Practice, more conservative girls maintaining traditional cultural practices, and more rebellious girls whose behaviour challenges such norms. The findings demonstrate that ethnicity is integrally linked with locally-salient identity, and hence that fine phonetic variation which indexes ethnicity is in fact indexical of local ethnic identity.

Keywords: sociophonetics, ethnic accents, acoustic analysis, stops, accents of English

1. INTRODUCTION

Recent sociophonetic research has shown that fine phonetic variation can be systematically related not only to macro social factors such as age, gender and social class, but also to the construction of locally-salient social identities, e.g. [2], including those which relate to ethnicity, e.g. [11].

In England, Wales and Northern Ireland, almost 8% of the population were reported as belonging to a minority ethnic group in the 2001 Census, with most resident in urban conurbations. The British Asian community, which is actually a range of different intersecting communities speaking several Modern Indo-Aryan languages (e.g. Punjabi, Urdu, Bengali), originally from the Indian subcontinent, make up the largest reported minority ethnic group. Studies on regional Asian accents in England, e.g. [7, 8] have all shown links between ethnicity and accent, bar [4].

1.1. The Glasgow Asian community

In Scotland, the minority ethnic population is much smaller, reported at only 2%, but the main ethnic group is also Asian, and located in the country's largest city, Glasgow. 77% of the Glasgow Asian community is of Pakistani heritage, and Muslim religion.

Previous auditory and acoustic analyses of Glasgow Asian accent in second generation speakers show clearer (brighter) realisation of /l/, and closer realisation of the GOAT and FACE vowels, than Glasgow non-Asian speakers [10, 14]. They also suggest that fine phonetic variation relates not just to ethnicity, but specifically to local ethnic identity.

1.2. /t/ in Glasgow Asian

Using retroflex stops for /t/ (and also /d/) is stereotypical of stylized British Asian accents, and is also found in first generation British Asian speakers who were born outside the UK and are proficient speakers of a modern Indo-Aryan language like Punjabi which shows retroflex consonants [1, 12]. Second+ generation British Asian speakers also show retracted realisations of /t/ [7], though these usually sound more postalveolar than retroflex [9].

In Glasgow, auditory analysis of /t/ in second+ generation Asian speakers showed retracted, postalveolar stops (including some ejectives) [10]; Glasgow English typically shows fronted, denti-alveolar or dental allophones for this stop.

This paper examines the links between acoustic variation in the stop burst of syllable-initial /t/ and social practices in British-born, Punjabi/Urdu/English high-school girls from a Pakistani-Muslim background in Glasgow. The main research question is: does fine phonetic variation pattern according to locally-salient ethnic identities?

2. DATA COLLECTION

The study from which these results are drawn is located in the sociolinguistic Communities of Practice (CoP) framework [3]. The first part of the study involved a long-term ethnographic fieldwork in an inner-city high school in Glasgow, with the highest proportion of ethnic minority pupils in the

city. The first author, herself a female member of the Glasgow-Pakistani Muslim community, carried out participant observation over three years, by spending time with girls during breaks and free periods, and by attending school social events.

Digital recordings of 97 speakers aged between 15-18 years were made in a quiet room in the school during informal interviews between the researcher and pairs or triads of girls, using AT831b microphones and a Microtrack recorder with a sampling rate of 44,100Hz/16bit.

2.1.   Communities of practice

The qualitative sociolinguistic analysis of the ethnography revealed sharp social segregation between Asian and non-Asian girls. Within the Asian girls several Communities of Practice were salient. Membership of the different Communities of Practice relate to girls' affiliation to western ideologies as opposed to eastern ideologies, spanning a multidimensional continuum from very traditionally Pakistani and/or Muslim, to very British/western, values and practices. In this paper we present results from six 17-18 year-old girls, selected on the basis of their participation as core members of three Communities of Practice (pseudonyms are given for the girls here):

Conservatives (Inaya, Aneela): strongly adhering to traditional Pakistani cultural values and practices, including wearing the headscarf, little or no make-up or jewelry, favouring marriage young without previous relationships.

Moderns (Zahida, Huma): trendy fashionable clothing, no headscarf, visible make-up, aspirations for further education and careers, dating and talking about boys; daring but not acting outwith the bounds of accepted community norms.

Messabouts (Asma, Naazi): similar (visibly) in many ways to the Moderns, but different in that some of their practices (e.g. drinking, smoking, swearing) would not be acceptable to the community, and would lead to serious consequences. (Their socializing is still restricted to the Glasgow Asian community).

Auditory impressions of the realisation of /t/ in these speakers were of fine-grained, complex articulatory differences along a kind of continuum which can be rather coarsely captured in two parameters, place, or front-/backness of the articulation, ranging from dental to postalveolar, and active articulator, or configuration of the

tongue tip or blade. Conservatives sounded more apico-postalveolar, whilst Messabouts' variants seemed more laminal-dental.

3.   ACOUSTIC ANALYSIS

The recordings were uploaded with orthographic transcripts to the database tool ONZEMiner. All possible tokens of syllable-initial /t/ were extracted into Praat, and tokens without stop burst were removed. The sound files were high pass filtered at 450Hz and low pass filtered at 12000Hz; FFT spectra were taken using a 10ms Hamming window manually centred on the stop burst.

We considered different aspects of the spectral energy of the stop bursts using a spectral moment or 'centre of gravity' analysis [5, 6], by which the overall distribution of spectral energy is captured using four measures. Mean is the midpoint frequency at which the energy under the curve on either side of the point is equal; Spread (standard deviation) is the 'bandwidth' of the energy either side of the mean; Skew refers to the asymmetry of the energy surrounding the mean; and Kurtosis to the peakiness of the distribution.

Whilst the mapping of these measures onto articulation is still rather uncertain [15] p. 1035, they have been shown to discriminate even relatively fine differences in place of articulation, e.g. alveolar and dental stops in Canadian English/French bilingual speakers [15].

Statistical analysis of the measures was carried out using 3-factor ANOVAs followed by Bonferroni post hoc tests, to test for effects of Preceding and Following Segment and Community of Practice (or Speaker) and their interactions. Only results significant at $p < .05$ are reported.

4.   RESULTS

4.1.   Adjacent phonetic segment

Only Following Segment showed significant effects for all four spectral moments (Mean: [$F_{(4, 436)}=3.788$, $p=.005$], Spread [$F_{(4, 436)}=9.259$, $p<.000$], Skew [$F_{(4, 436)}=4.334$, $p=.001$], Kurtosis [$F_{(4, 436)}=3.267$, $p=.012$]) though without any interactions with Community of Practice or Speaker; see Table 1.

Post hoc tests showed that the highest Mean was before /ʉ/, which also showed the lowest Skew. The Mean was lower before the rounded consonants /w/ and /r/, which also showed the lowest Spread and highest Kurtosis.

Table 1: Average spectral moments for all speakers according to following segment.

Following segment	Mean	Spread	Skew	Kurtosis	n
i	2338	1856	1.55	5.09	104
ɛ, a, ai	2329	1901	1.66	5.04	81
o, ɔ	2389	1658	1.37	4.67	72
ʉ	2761	1809	1.00	3.17	151
w, r	1802	1222	1.89	9.73	28

4.2. Community of practice

A significant effect of Community of Practice was found for the Mean [$F_{(2,436)}=5.050$, $p=.007$], Skew [$F_{(2,436)}=7.657$, $p=.001$], and Kurtosis [$F_{(2,436)}=4.145$, $p=.044$]. Post hoc tests show that the Conservative girls have a higher Mean than both the Modern and Messabout girls, who are not different from each other (Table 2).

Table 2: Average spectral moments by Community of Practice.

CoP	Mean	SD	Skew	Kurtosis	n
Conservative	2885	1712	0.72	2.17	175
Modern	2261	1819	1.61	5.22	176
Messabout	1981	1813	2.21	8.55	85

Skew and Kurtosis are different for each Community of Practice: the values for both Skew and Kurtosis rise from Conservative through to Messabouts, reflecting respectively an increasing positive tilt to the spectrum, and an increasingly peaked distribution.

4.3. Individual speakers

Substituting Speaker for Community of Practice improved the explanation of variance as indicated by the R^2 by about 10% to almost 50% for all measures. An effect of Speaker was found for all four measures: Mean [$F_{(5,436)}=3.410$, $p=.005$], Spread [$F_{(5,436)}=9.158$, $p=.000$], Skew [$F_{(5,436)}=4.334$, $p=.001$], and Kurtosis [$F_{(5,436)}=5.074$, $p=.000$]; a summary of the results is given in Table 3.

Table 3: Average spectral moments for each speaker.

CoP	Speaker	Mean	Spread	Skew	Kurtosis	n
Cons	Aneela	2782	1870	0.75	1.48	94
Cons	Inaya	3004	1528	0.68	2.96	81
Mod	Zahida	2588	2057	1.26	2.51	105
Mod	Huma	1778	1466	2.14	9.23	71
Mess	Asma	1901	1402	2.04	9.04	30
Mess	Naazi	2024	2037	2.31	8.29	55

Post hoc tests for Mean, Skew and Kurtosis measures confirmed the grouping of Aneela and Inaya as 'Conservative' and Asma and Naazi as 'Messabouts'. But for the same measures, the 'Modern' girls were split: Zahida consistently patterned with the Conservatives, and Huma with the Messabouts. Spread showed a completely different pattern, cutting across CoP, with Aneela, Zahida and Naazi showing higher values, and Inaya, Huma and Asma showing lower ones.

5. DISCUSSION

The spectral moment analysis of /t/ showed a consistent effect of Community of Practice for three measures (Mean, Skew, Kurtosis), which is supported and informed by subsequent analysis of individual speaker variation. Specifically, these measures show systematic variation with membership of the Conservative and the Messabout CoPs, which capture shared engagement in more traditional Pakistani culture and Muslim religious practices on the one hand, and bold ventures into forbidden western social practices on the other.

Variation in spectral energy was also consistently affected by the following segment, cf. [6] p. 302. Before /w/ and /r/, both of which show lip-rounding for all allophones, /t/ showed the lowest Mean; the highest Mean occurred before /ʉ/ (BOOT), which is a fronted vowel in Scottish English, and for these speakers. Further acoustic analysis of the Glasgow-Asian vowel system is needed in order to understand better the coarticulatory effects of these vowels on /t/ release.

It is difficult to compare absolute values of moment analyses across different studies because they are sensitive to recording condition and analytical procedure, and this is particularly so for Skew and Kurtosis, e.g. [15]. In the absence of articulatory data, relating spectral moment measures to auditorily-identified articulations is not entirely straightforward. Nevertheless there is a correspondence between the patterning of the Mean with ethnic identity in the Glasgow-Pakistani girls, and with ethnicity in Glasgow male speakers. The Mean values of the Messabouts (and Huma), heard as laminal dental stops, are lower than those for the Conservatives (and Zahida), whose /t/s are thought to be apico-postalveolars. This is very similar to the lower Mean in Glasgow non-Asian males (laminal dental) compared with

the overall higher Mean in Glasgow Asian males (postalveolar), found by [13]; see Figure 1.

Figure 1: Box plots of Mean in 5 Glasgow Asian speakers and 2 Glasgow non-Asian speakers (n = 88).
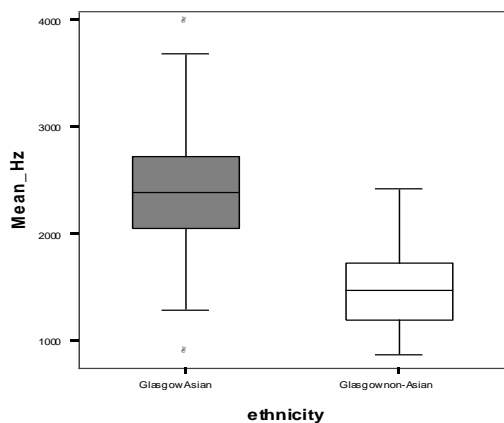
The absolute Mean values for the auditory postalveolars heard in the Glasgow Asians (Conservative girls and Glasgow Asian males) are somewhat lower than those found recently in Sheffield Asian speakers [9]. It is unclear to what extent this relates to differences in data collection and analysis, and/or to differences in articulation of Sheffield Asian postalveolar /t/, and also to a different linguistic phonetic contrast, given that the Sheffield non-Asian realisation of syllable-initial /t/ is typically alveolar.

The low Mean in the Messabouts and Glasgow non-Asian stops heard as laminal dentals is consistent with the rather flat spectrum associated with dentals, compounded by the damping effect of a longer constriction (see Sundara's results and her discussion of Canadian French dental /t/, [15]). The inverse association between Mean and Skew and Kurtosis, which are significantly correlated with each other (p<000), also presumes a rather flat energy distribution, probably as an artifact of the high-pass filter at the lowest frequencies: the lower the Mean the flatter the distribution, and so the more an apparent positive tilt and increased peakiness emerge.

6. CONCLUSIONS

This sociophonetic study of /t/ in Glasgow-Pakistani girls suggests that fine phonetic variation which indexes ethnicity is in fact indexical of local ethnic identity. Our study also raises a number of questions for further research: to what extent are these differences in speech production available to listeners within and outside the community? What kinds of articulatory configurations underlie this kind of patterning? And, to what extent are realisations like postalveolar /t/ in Glasgow Asian similar to regional Asian accents elsewhere in the UK; i.e. what phonetic basis, if any, is there to the notion of a 'British Asian' accent?

7. REFERENCES

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