LIFESPANS & STYLES
Undergraduate Papers in Sociolinguistics

Volume 6 Issue 1

2020

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ISSN: 2057-1720 doi: 10.2218/ls.v6i1.2020.4399

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Glottal Replacement in Retrospect: A Quantitative Analysis of /t/-glottaling in Edinburgh Speakers in the Mid-1970s

Zoé Titheridge

This research examines the production of glottal replacement, i.e., /t/-glottaling, in the speech of Edinburgh residents in 1975 and compares its findings to those in the existing literature to provide a better understanding of the variant's spatial and temporal development in the area. Most of the results concur with those previously described, as phonological factors and social class are concluded to be strong predictors of /t/-glottaling. Variation in preferred phonological environments is argued to be an effect of polygenetic roots. Absence of constraining effect for age is interpreted in light of the variant's history in the region.

1 Introduction

Glottal replacement or /t/-glottaling — the realisation of /t/ as a glottal stop — has been the object of extended and long-standing interest in studies of English language variation due to its rapid spread across the British Isles (Fabricius 2002:119, Schleef 2013:203, Smith and Holmes-Elliott 2017:324). As such, speculation about its origin has been multiple. On the one hand, scholars have argued that the variant first emerged in London Cockney English (Williams and Kerswill 1999:306), later dispersing to other localities. On the other hand, claims point towards a polygenetic hypothesis with cases of /t/-glottaling having arisen in Scottish English and the Southeast of England independently of each other (Fabricius 2002:119). Further arguments indicate a longer history in Scotland than in England (Schleef 2013:212). Research has reported increasing instances of /t/-glottaling in Southern and Northern urban varieties of English over the last century (see studies mentioned in Smith and Holmes-Elliot 2017:325), commenting on its acquired status as a staple of British urban speech more generally (Milroy et al. 1994). Additionally, Wells (1982) notes that in Scotland, the feature can be found in the Central Lowlands, coastal communities (Smith and Holmes-Elliott 2017), Glasgow (Macaulay 1977, Stuart-Smith 1999, Stuart-Smith 2004), and Edinburgh (Schleef 2013). In his comparison of /t/-glottaling in London and Edinburgh, Schleef (2013) further remarks that the use of the variant seems to be greater for teenagers in the Scottish capital, with higher rates of glottal replacement than in London.

Once categorised as "offensive" (Romaine 1980:214) and stigmatised through its association with urban youth styles, /t/-glottaling has found its way across the geographical map of Britain and up the socioeconomic ladder into the speech of Received Pronunciation (RP) users (Wells 1982, Fabricius 2002), following "tendenc[ies] of low-status features to spread upward [in English]" (Milroy et al. 1994:329). The association of the variant's rich *indexical field* (Eckert 2008) with urbanity, solidarity, familiarity, and friendliness (among young speakers) (Kirkham and Moore 2016:108) has even contributed to making it a political tool in affirming alliance to a social group. Notably, Kirkham and Moore (2016:108) remark on Ed Miliband's increased use of glottal replacements when addressing members of the Trade Union Congress, which they suggest is an attempt on the part of the former Labour Party leader at conveying "a more collaborative and familiar persona".

This study aims to contribute to the ever-growing body of research on glottal replacement by looking at its production in the speech of Edinburgh natives recorded in 1975 (Esling 1978). Though, as noted above, investigation into the feature in Scottish communities has been rich, comparisons with Schleef's (2013) findings will hopefully bring to light new information as to the real-time development of /t/-glottaling in the Midlothian city. Section 2 summarises the main findings from past analyses of /t/-glottaling. Section 3 presents the analysis of the current study. Section 4 situates the results with respect to previous claims about the constraints on glottal replacement. The implications of these findings are then discussed in Section 5.

Overall, it is concluded that production of /t/-glottaling in this dataset adheres, to a great extent, to the conditions outlined in the literature. However, the phonological environments found to be favourable to the production of glottal replacement do not entirely coincide with those most frequently described in earlier research. Furthermore, unlike previous studies, it is also concluded that speaker age is not a significant predictor in the production of the feature. To explain these findings, it has been argued that differences in the ordering of favouring phonological environments are a possible consequence of polygenetic roots (Smith and Holmes-Elliott 2017, Schleef 2013). Additionally, the indexical characteristics of /t/-glottaling might explain why age, though initially a predictor, loses its constraining effects more quickly than social class.

2 Literature Review

2.1 Grammatical Constraints

In the early nineties, Milroy et al. (1994, quoted in Schleef 2013:202) pointed out that constraints of /t/ variation were somewhat blurry, sparking further investigation into occurrences of /t/-glottaling. Following research helped reveal a set of favourable and unfavourable phonological environments for the production of the variant, which is well attested in the literature (see studies mentioned in Smith and Holmes-Elliott 2017:326). These are summarised in Table 1 alongside other grammatical constraints. Straw and Patrick (2007, quoted in Schleef 2013:204) suggest a general diffusion pattern from pre-consonantal to pre-pausal to pre-vocalic phonological environments (henceforth "PreC>PreP>PreV"), with exceptions to this ranking reported in Tyneside (Milroy et al. 1994), Buckie (Smith and Holmes-Elliott 2017), and the rest of Scotland, perhaps indicating polygenetic origins. Building on this diffusion pattern and Wells's (1982) envelope of variation, Schleef (2013) notes that glottal replacement is less likely to occur if preceded by a nasal or liquid, and more likely if preceded by a vowel.

The position of the /t/ in the word is likewise said to influence rates of /t/-glottaling, with word-final position being a stronger candidate than word-medial position (Smith and Holmes-Elliott 2017:325), even when eliminating non-foot-initial onsets (where the variant is generally disfavoured [Schleef 2017:201]). However, Smith and Holmes-Elliott (2017:345) observe that in "-teen" numerals and the lexical item *sometime(s)* in Eastern Scottish dialects, instances of glottal replacement in foot-initial position are more typical than in other regions. Function words (e.g., prepositions, pronouns, conjunctions), which are often subject to stress reduction, show greater rates of glottal replacement than content words, specifically nouns and adjectives (Schleef 2013:212). With previous research almost exclusively focusing on the phonological constraints of /t/-glottaling, Schleef's study (2013) explores the morphophonological conditioning of the feature. In this, Schleef finds that besides an effect of word frequency, boundaries of high-frequency morphemes like those of progressives and past participles "seem to benefit from some boost for glottal replacement via their related and frequently glottaled word forms with word-final /t/" (2013:217). As use of the variant becomes more commonplace, so does its production in previously unfavourable contexts. Hence, Smith and Holmes-Elliott suggest that word-medial syllable "onsets are one of the last contexts to 'succumb' to glottal replacement" (2017:345).

Table 1: Favourable and unfavourable grammatical environments for the production of /t/-glottaling

Favourable	Pre-consonantal
	Pre-pausal
	Post-vocalic
	Word-medial
	Non-foot-initial
	"-teen" numerals
	Function words
	Progressive/Past participle morpheme boundary
Unfavourable	Pre-vocalic
	Post-liquid/Post-nasal
	Word-final
	Foot-initial
	Content words

2.2 Social Constraints

Effects of gender, social class, age, and style have also been found to be significant in constraining occurrences of /t/-glottaling (see Schleef 2013:205 for a detailed listing of studies by external factors). For gender, studies diverge in their results (see Smith and Holmes-Elliott 2017:326). Milroy et al. (1994, quoted in Smith and Holmes-Elliott 2017:326) suggest that females' use of glottal replacement is greater than males' when the variant has supralocal prestige (see Labov 1992). In Glasgow, Macaulay (1977:47) observes that females tend to resist /t/-glottaling with lower middle-class speakers showing tendencies of hypercorrection. In Buckie, Smith and Holmes-

Elliott (2017:337) found that male speakers produced significantly more glottal variants than female speakers. However, apparent-time analysis of glottal replacement revealed that the gap levelled for young speakers (Smith and Holmes-Elliott 2017:342), supporting previous studies' findings (Fabricius 2002:127) and the claim that the change might be approaching completion in these areas of the British Isles. Effectively, /t/-glottaling is a feature which indexes youth and is as such more common among young speakers throughout the United Kingdom (Schleef 2013:205), though its frequency varies between location (Marshall 2003). Multiple studies also conclude that the variant is associated with working-class speakers (Macaulay 1977, Wells 1982, Milroy et al. 1994, Williams and Kerswill 1999, Stuart-Smith 2004) and becomes progressively less frequent in upper socioeconomic classes (Schleef 2013:205), which helps explain its usual connotation with urban and vernacular styles. Finally, speakers tend to use less glottal replacement in formal than informal styles (Fabricius 2002:133, Schleef 2013:213) as a result of attention paid to speech (Labov 1972). Smith and Holmes-Elliott (2017:342) also notice greater use of /t/-glottaling in a community outsider than insider when communicating to the studied addressees, hence suggesting an effect of audience design (Bell 1984).

3 Methods

3.1 Data Collection

The corpus was based on casual half-hour interview recordings of 13 male speakers led by John Esling for the purpose of his study on voice quality variation between Edinburgh social groups (Esling 1978). To elicit naturalistic speech, the interviewer's conversational topics covered occupation, advent of television, memorable fights, games, and football, among others. The 12 speakers analysed were native residents of Edinburgh and all lived in the Pilton or Morningside area.

Residence was selected as representative of level of affluence "on the basis of their demographic characteristics taken from the 1971 Census for Scotland", with Pilton "consistently exhibit[ing] features of least affluence" and Morningside of most affluence (Esling 1978:19). Demographic information (see Table 2) about speakers' age, year of birth (YOB), place of birth (POB), year in which they moved into residence, years of schooling, age at which they left school, social class, occupation, and paternal occupation had been established during data collection. Speakers were aged twenty-two to sixty-seven years old at the time of the recording (1975). According to scores established in Esling's study (1978:20), they were sorted into one of three numbered groups. To facilitate analysis, these categories were relabelled Working Class (WC), New Middle Class (NMC), and Established Middle Class (EMC), respectively (Dickson and Hall-Lew, 2017).

Table 2: Demographic information for all speakers

YOB	Name	SEC	GSC	Yrs.School	Age.School	Occ.	Par. Occ.	Res.	Living.Res	POB	Age
1911	JNS	WC	VII	2	12	Unskilled labourer	Dockworker	Pilton	1946	Leith	64
1921	WRA	NMC	VI	7	14	Paver	Trawlerman	Morningside	1946	Leith	54
1923	RAQ	WC	VI	5	14	Builder mason	Shopkeeper	Pilton	1963	Canongate	52
1923	GAB	WC	V	5	14	Tram driver	Tramway fitter	Pilton	1950	Dalry	52
1929	AH	NMC	III	9	14	Housing inspector	Soldier docker	Morningside	1955	Dalry	46
1929	MF	EMC	II	12	17	Police admin	Cabinet maker	Morningside	1973	Stenhouse	46
1929	WJL	EMC	V	11	14	Joiner foreman	Joinery manager	Morningside	1943	Costorphine	46
1937	JCF	WC	VI	5	15	Transformer builder	Carter	Pilton	1965	Leith	38
1938	DB	EMC	II	13	15	Electrical engineer	Taxi limo driver	Morningside	1938	Morningside	37
1938	RT	NMC	VI	6	15	Joiner labourer	Travel Sales Rep.	Pilton	1965	Lochend	37
1940	JHY	WC	VI	6	15	Painter decorator	Bricklayer	Pilton	1970	Kilmarnock	35
1947	JHC	WC	V	5	15	Lorry driver	Miner labourer	Pilton	1974	Craigmillar	28
1953	PDS	EMC	II	14	19	Bookkeeper	Unknown	Morningside	1963	West End	22

Though years of schooling, place of birth, and residence at recording are all robust indicators of socioeconomic class, only the pre-established social class factor was considered for statistical analysis. This decision was made on the assumption that social class was the most comprehensive variable to interpret socioeconomic status, as it was thought to encompass and correlate with all of these factors. As further support, Esling's (1978:20) operationalisation of the variable had considered "occupation, education, area of residence, type of housing and father's occupation".

3.2 Auditory Coding

Using Praat (Boersma and Weenink 2019), /t/ realisation was coded auditorily rather than acoustically (see Smith and Holmes-Elliott 2017:329). Each token was assigned to one of five variants: alveolar /t/, tap /ɾ/, glottal /ʔ/, deleted (Ø), and other. Tokens were coded if they came after a vowel/sonorant and fell into the following envelope of variation:

- Word-medial followed by a sonorant
- Word-medial followed by a vowel
- Word-final followed by pause
- Word-final followed by vowel
- Word-final followed by non-/t/ consonant

Coding was done by 29 undergraduate students in a class at the University of Edinburgh who were informed as to the purposes of this study. Coders were set up in pairs (or groups of 3) and assigned a single speaker along with an orthographic transcription of their interview. To ensure a full initial set of codes, coders in each pair either started at the beginning or midpoint of the interview. Each coder was instructed to code for 50 word-medial and 50 word-final occurrences of /t/ variation. Inter-rater reliability checks were performed so that at least 10% of tokens which were not clearly identifiable were blindly double-coded by the other member in each pair or group. After discarding tokens which could not be reliably coded, 2034 tokens of /t/ realisation were left (an average of 154 tokens per speaker). Though minority variants (tap, deleted, and other) constituted almost a quarter of all variants (Table 3), noticeably more than noted in previous studies (Schleef 2013:207, Smith and Holmes-Elliott 2017:331), only alveolar and glottal variants were selected for analysis here in order to follow analysis of existing studies on glottal replacement. The final remaining data included a total of 1535 tokens: 758 alveolar and 777 glottal tokens. Further linguistic constraints were coded for by the author including specific following phonological environment (affricate, approximant, fricative, lateral, nasal, pause, plosive, rhotic, sibilant, and vowel), foot-initial (yes/no), and word class (function/content).

Table 3: Overall distribution of variants, with only /t/ and /ʔ/ included in analysis

	/t/	/ɾ/	/ʔ/	Ø	Other	Total
N	758	63	777	429	7	2034
%	37%	3%	38%	21%	0.30%	100%

3.3 Statistical Analysis

Following Smith and Holmes-Elliott (2017:331), descriptive analysis was first carried out to help guide subsequent multivariate study of the data. For inferential analysis, variables with too many levels were re-operationalised into fewer levels to reveal potential trends more clearly and prevent discarding relevant predictors than if only their original categorisation were considered. Specifically, this was the case for age, where descriptive exploration did not yield the expected result. As a result, tokens were sorted into two groups depending on speaker age and its relation to the median age of the set: under 46 (<46) or over or equal to 46 (≥46). Similarly, as following phonological environment and specific following phonological environment both tapped into the same factor, only the first was considered for multivariate analysis. Another reason for doing so was to enable easier comparison with past research. As the body of speech came strictly from male speakers, evaluation of expected variation in gender was not possible. Instead, other factors of variation — age and social class — were investigated.

As noted above, realisation of /t/ variation was limited to alveolar and glottal variants. Consequently, the dependent variable was coded as a binary factor. The final mixed-effect model was obtained through by-hand drop-one ANOVA comparisons using the lme4 package (Bates et al. 2019) in RStudio (2019). Variation in participant identity was controlled for by entering speaker as random intercept. Similarly, word was also entered as random intercept. Factors which appeared to be strong predictors in the descriptive exploration of the data were tested as independent fixed effects and entered into the initial model. This included the recategorised variable age to ensure that it was not being erroneously dismissed on the basis of the results from the descriptive analysis alone.

For inferential testing, only social class was preserved as descriptive exploration of the data revealed an apparent collinearity with GSC score, as had been anticipated. Interaction between following phonological environment (FPE) and age, and following phonological environment (FPE) and position was also tested in consideration of Smith and Holmes-Elliott's (2017) findings that these interaction effects were significant. The initial maximal model thus included position, following phonological environment, foot-initial, word class, position*FPE, age*FPE, age, and social class.

4 Results

4.1 Descriptive Analysis

4.1.1 Overall Distribution of Grammatical Constraints

Glottal replacement is predicted to occur at higher rates in word-final than word-medial position. Figure 1 shows /t/ realisation with relation to position in the word and conforms with predictions: /t/-glottaling occurs in 29% of word-medial and 67% of word-final contexts.

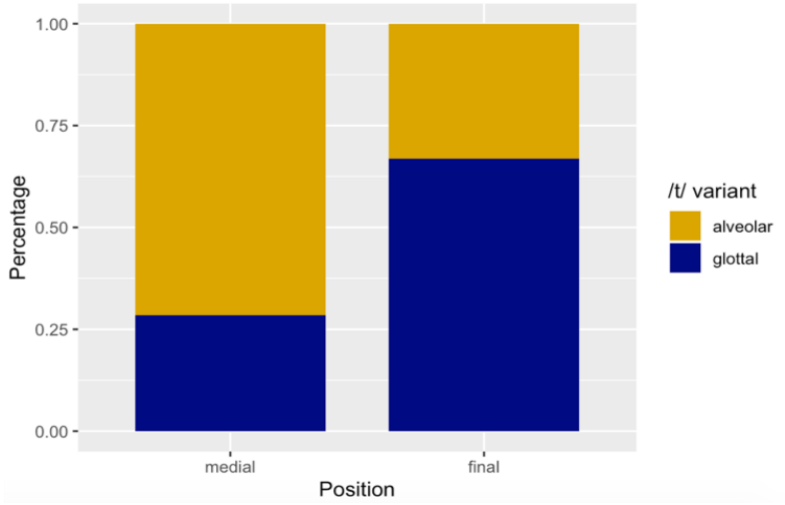

Figure 1: Variation in /t/ realisation by position in the word in %.

Figure 2 illustrates results for specific following phonological environment and Figure 3 for following phonological environment more generally. Again, results follow the expected trend. In pre-consonantal environment, /t/-glottaling is 72% likely compared to 37% likely pre-vocalically. Additionally, fricatives appear to be the most favourable to preceding glottal stops, as the variant occurs in 84% of these cases. This concurs with Schleef's claim that "following nasals, liquids, fricatives, and affricates favour glottal replacement" (2013:210).

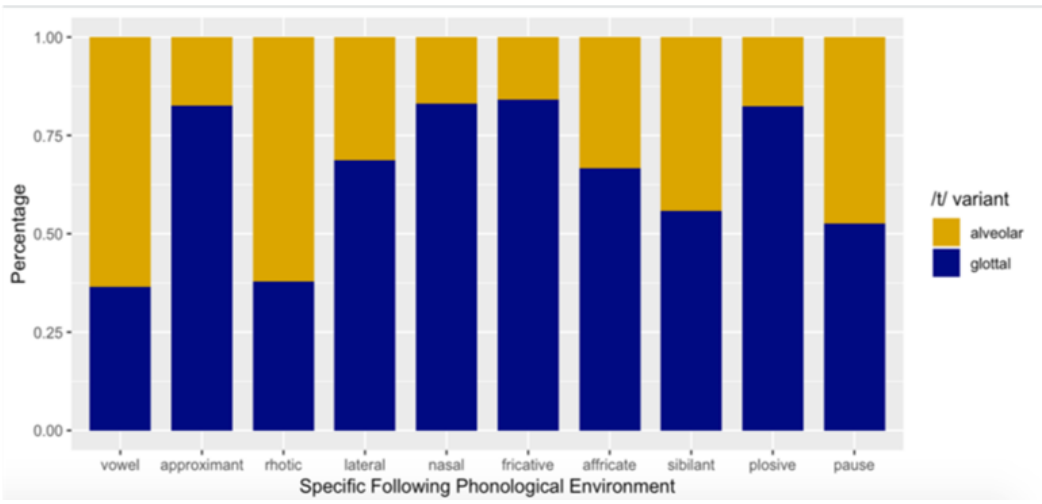

Figure 2: Variation in /t/ realisation by specific following phonological environment in %.

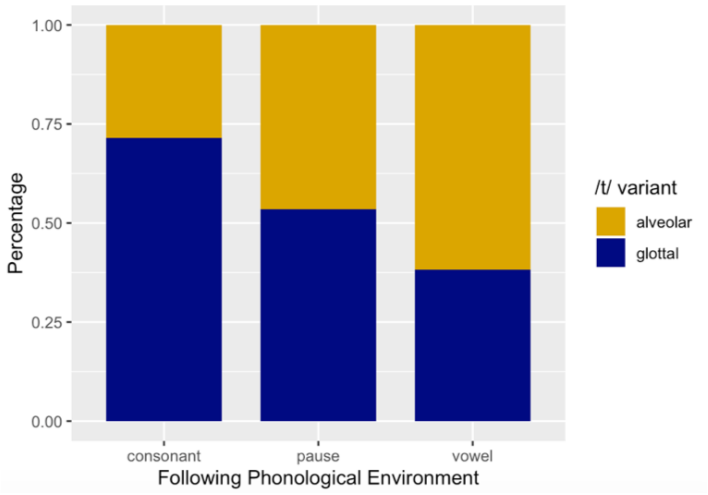

Figure 3: Variation in /t/ realisation by general following phonological environment in %.

Figure 4 shows percentage of realisation of alveolar and glottal variants in foot-initial and non-foot-initial contexts. Foot-initial onset positions strongly discourage /t/-glottaling with 94% of variants being alveolar; half of the 6% of glottal variants occurred in the word *nineteen*, which is probably a consequence of the Eastern Scottish dialect norms mentioned in Section 2. In non-foot-initial contexts, both variants are nearly equally possible (56% vs 44%).

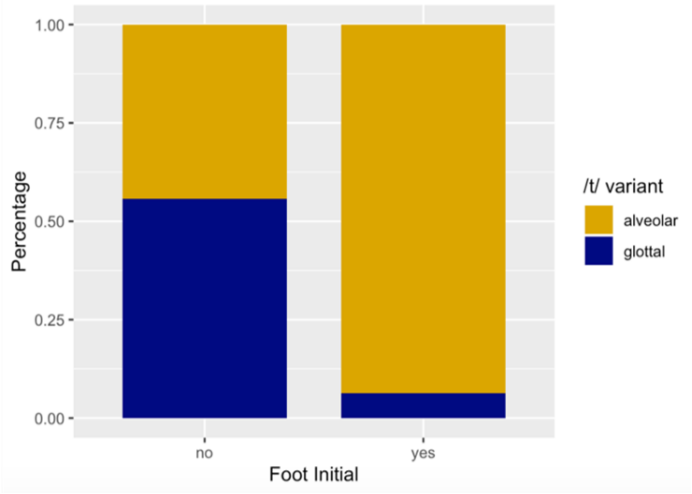

Figure 4: Variation in /t/ realisation by position in the foot in %.

Finally, following Schleef's (2013) findings, word class appears to constrain instances of glottal replacement as glottal tokens occurred in 68% of function words, in contrast to 42% in content words (see Figure 5).

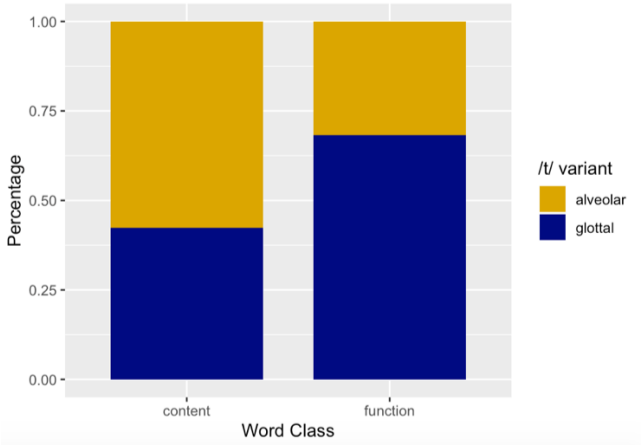

Figure 5: Variation in /t/ realisation by word class in %.

4.1.2 Overall Distribution of External Constraints

Previous studies suggest an effect of age on glottal replacement, with younger speakers more likely to produce glottal variants of /t/ than older speakers. However, as shown in Figure 6, the rate of variation in /t/ realisation by age (factored by speaker) indicates that some older speakers present higher rates of glottal replacements than other younger speakers. In particular, the oldest speaker used glottal variants in 76% of /t/ variation instances, in contrast with the youngest speaker who only displayed the feature in 35% of cases. Nonetheless, it should be noted that the speaker who produced /t/-glottaling the most (83%) was part of the younger cohort.

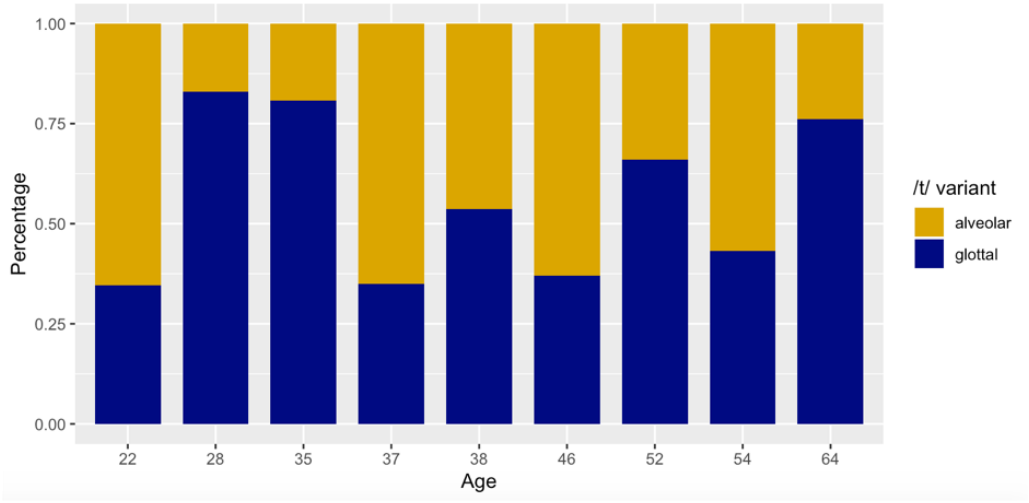

Figure 6: Variation in /t/ realisation by age in %.

Figure 7 shows rates of /t/-glottaling by social class. As anticipated, glottal replacement increases as one moves down the social ladder: 35% for EMC speakers, 47% for NMC speakers, and 70% for WC speakers. The speaker with least production of the variant overall (25%), WJL, belonged to the EMC category, while the speaker with the most production of the variant (83%), JHC, belonged to the WC category.

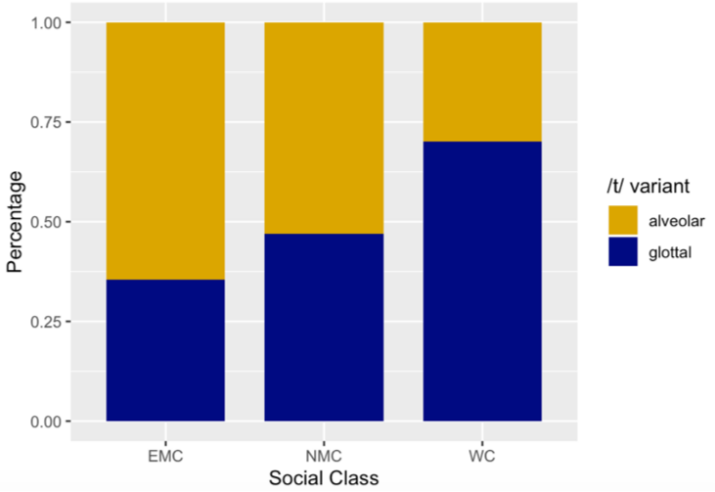

Figure 7: Variation in /t/ realisation by social class in %.

Before concluding this section, it is necessary to point out that all speakers in the corpus produced glottal variants of /t/. This seems to imply that /t/-glottaling had likely been a feature of Scottish English in Edinburgh for a long period of time before data collection, having made its way into the speech of speakers regardless of social category.

4.2 Multivariate Analysis

Table 4 summarises all constraints which, based on the descriptive analysis, were fitted into the mixed-effect model prior to ANOVA comparisons.

Table 4: Fixed effects and levels

Fixed effect	Levels	Reference Level
POSITION	final	final
	medial	
FPE	consonant	consonant
	pause	
	vowel	
WORD CLASS	content	content
	function	
FOOT INITIAL	no	no
	yes	
SPEAKER SOCIAL CLASS	EMC	EMC
	NMC	
	WC	
SPEAKER AGE	<46	<46
	≥46	

The best-fit model retained position, following phonological environment, social class, foot initiality, and an interaction effect between position and following phonological environment. The coefficients are given in Table 5. With respect to the linguistic constraints, word-medial position is found to favour alveolar variants, which coincides with findings from previous studies. Results for following phonological environment are somewhat unexpected. On the one hand, following pauses and vowels both discourage glottal replacement, conforming with predictions. On the other hand, following pause is a stronger predictor of non-glottal realisation than following vowel, unlike the ordering seen in the PreP>PreV>PreP hierarchy. As anticipated, foot-initial position, the strongest predictor of all effects, significantly discourages glottal replacement. Finally, the interaction effect revealed that word-medial /t/ followed by a vowel significantly constrains variation, as /t/-glottaling is the least probable in this context.

For social class, results support the hypothesis that realisation of glottal variation of /t/ is conditioned by socioeconomic status, as previously assumed. Specifically, working-class speakers favour /t/-glottaling over other social class groups.

Table 5: Best-fit mixed-effect regression model of /t/ realisation as a binary factor: Glottal vs. alveolar

Fixed effects	**Levels**	**Estimate Coeff.**	**Std.Error**	**z-value**	***p* <**
(Intercept)		0.474	0.484	0.978	0.328
POSITION	medial	-2.510	0.414	-6.050	0.001
FPE	pause	-2.204	0.281	-7.825	0.001
	vowel	-1.829	0.234	-7.821	0.001
FOOT INITIAL	yes	-3.155	0.518	-6.088	0.001
POSITION:FPE	medial:vowel	1.785	0.434	4.110	0.001
SOCIAL CLASS	NMC	1.106	0.615	1.798	0.072
	WC	2.455	0.594	4.137	0.001
Random Effects	**Type**	**Variance**	**Std.Dev**		
SPEAKER	Intercept	0.675	0.821		
WORD	Intercept	1.854	1.362		
	Min.	**Median**	**Max.**		
Scaled Residuals	-9.015	0.092	7.238		

5 Discussion

The results from this analysis of variation in /t/ realisation suggest that production of /t/-glottaling was socially and phonologically stratified for Edinburgh natives in 1975. In line with previous findings, WC speakers produced higher rates of glottal replacement than EMC or NMC speakers. Interestingly, the descriptive analysis revealed that NMC speakers did not show any effect of hypercorrection, which may imply that stigmatisation of the variant was possibly not as substantial as anticipated. Concurring with past research, word-medial were less likely than word-final glottal variants of /t/, and foot-initial glottal realisations of /t/ were significantly disfavoured. The literature also points out that word-medial and pre-vocalic environments significantly disfavour glottal replacement. This is well reflected in the results here.

However, unlike previous research, the pre-pausal context is found to be the least probable of all following phonological environments for production of glottal replacement. This diverges from the expected PreC>PreP>PreV ordering (Williams and Kerswill 1999:147) and suggests instead an alternative hierarchy — PreC>PreP>PreP — despite what descriptive results illustrate (see Figure 3). Since Schleef's analysis (2013:210) demonstrated that teenagers in Edinburgh followed the PreC>PreP>PreV pattern, the hierarchy suggested from the results is even more confounding. In order to account for this disparity, it is suggested that glottal replacement in the speech of Edinburgh locals in 1975 was in part representative of Eastern Scottish Dialects. This would coincide with comments advanced in Sections 1 and 2 that constraints for /t/-glottaling in Eastern Scottish Dialects are different to the norm or other varieties. Consequently, the movement from the PreC>PreV>PreP hierarchy to PreC> PreP>PreV might have emerged from contact with /t/-glottaling changes having originated in another area, especially because pre-vocalic and pre-pausal had relatively similar predicting strengths already. If this is the case, then it would provide further support for the polygenetic hypothesis of glottal replacement.

Another surprising finding was that age did not affect occurrence of /t/-glottaling. While this could be an effect of faulty re-operationalisation, descriptive analysis had not been congruent either, despite including the initial categorisation of the variable. This seems to indicate that the result that age was not a predictor of glottal replacement is valid for these data. Therefore, an explanation is needed with respect to status of the change in the community. As glottal replacement has a deeper history in Scotland than anywhere else in the British Isles, /t/-glottaling might have reached an advanced stage by the time of the 1975 recordings, so that speaker age was no longer a significant determinant of glottal production of /t/. At the same time, teenage speakers in Schleef's data (2013:309) used more than double the rate of /t/-glottaling than those in Esling's data from 1975, across all constraints (84.5% vs. 38% [see Table 2]): an apparent consequence of real-time change. Since no effect of age was observed in the analysis of this study, the assumption is that the variant ceases to index age as it becomes more widely adopted by the population. With social meaning of alveolar and glottal stops in mind, whereby the former indexes articulateness, reliability, and poshness (Kirkham and Moore 2016:108) and the latter familiarity, the fact that upper social classes more robustly resist the change is coherent.

This study focused essentially on the variation between glottal and alveolar variants of /t/. As such, an unexpectedly large part of the data represented by minority variants was discarded. Future investigation into these variants would contribute to a more holistic appreciation of /t/ variation in Edinburgh.

6 Conclusion

This study provides an insight into the phonological constraints of glottal replacement in 1975 among Edinburgh speakers. Overall results give support to a polygenetic hypothesis of /t/-glottaling after comparison with phonological constraints of the variant found for Edinburgh speakers in a study conducted 40 years later (Schleef 2013). On par with previous studies, results suggest that glottal replacement is significantly constrained by position in the word, position in the foot, following phonological environment, and social class. It is further hypothesised that because age was not a predicting factor of /t/-glottaling, age is less inclined to resist the change than social class, which was a significant constraint. In other words, the variant is more likely to be found among individuals of different ages than of different socioeconomic status. Additionally, since /t/-glottaling had been a characteristic of Edinburgh speech for a compelling amount of time, it would have found its way among all age groups. The indexical properties of the variant which strongly evoke affiliation to more modest social classes can help explain why glottal replacement was determined by socioeconomic category.

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