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Derhoticisation in Scotland - fine-grained variation and phonemic stability

Monika Pukli (University of Strasbourg)

Abstract

Sociophonetic patterning of rhotics in Scotland has been at the centre of linguistic research in the past decades and a gradual loss or weakening of rhoticity appears to be linked to age, social class, gender and identity (in different combinations). There is undoubtedly a wide range of different phonetic realisations of /r/ in general, and of coda-r in particular, available to Scottish speakers. However, before we can envisage current phonetic variation as part of a more global phonological change resulting in a non-rhotic system, it is essential to make an explicit link between variation in speech and the stability of the phonological system. Results presented in this paper suggest that non-rhotic speakers are not necessarily young, and it is argued that considering the interplay of various social factors today, phonological change is not underway.

1 Introduction

Is structured variation a prequel or a sequel to language change? Is change inevitable? Variation observed at any given moment of time reflects the usage of elements that are potentially undergoing change. The weakening of consonantal coda /r/ in Scottish English today is believed to represent gradual change that will eventually lead to a phonemic re-categorization of the system without coda-r. English accents are typically divided into rhotic vs. non-rhotic varieties according to the phonotactic constraints of /r/: rhotic accents, such as General American, pronounce <r> in every position (*rate, cart, car, car park, car insurance*), while non-rhotic accents, such as RP, only pronounce <r> when it is followed by a vowel sound (*rate, car insurance*). The distribution of the phoneme also has an indirect impact on the vowel inventory. The weakening of consonantal coda /r/ in Scottish English refers to the non-prevocalic context being pronounced without /r/ as in *cart, car, car park*.¹

The original /r/ phoneme used by the different speech communities in Scotland in the past is usually described as an alveolar trill. Accounts from the beginning of the twentieth century (Williams 1909, Grant 1914) identify three major variants: trills, taps and approximants. The explicit or implicit prescriptivist ideology that often accompanies linguistic description well into the fifties and sixties, however, makes it difficult to appraise any real patterning of use in the population of that time. Trills are certainly weakened to a one-stage tap realisation; today, all studies agree on the sporadic presence of trills in different regions in Scotland, but already in 1938 only three in ten students surveyed used them and approximants were recommended in ‘polite speech’ (McAllister 1938). More recent descriptions, however, show that not only central approximants had been used in Scotland for over a century, but that they were adopted more typically than other phonetic realisations more than 40 years ago, at least in some varieties of Scottish English (Romaine 1978 and Speitel/ Johnston 1983 for Edinburgh, Macafee 1983 for Glasgow). It turns out that while an approximant is phonetically closer to vocoids, it is this variant that resists further lenition the most in contemporary varieties. It is also worth mentioning that while the focus on sociophonetic factors is prevalent in present-

¹ The author wishes to thank the two anonymous reviewers for their valuable feedback and insightful comments on the paper.

day reports, earlier Wells (1982) suggested a *phonological* distribution between alveolar taps occurring in intervocalic position (as in *sorry*, *agree*) and post-alveolar or retroflex fricatives and approximants occurring word-finally (as in *word*, *care*), with no preference for either group of forms in initial position. While evidence of non-rhotic and derhoticised forms of coda-r is abundant today (Dickson/ Hall-Lew 2017, Jauriberry 2016, Stuart-Smith/ Lawson/ Scobbie 2014, Watt/ Llamas/ Johnson 2014, to mention only the most recent reports from different parts of Scotland), it is not certain that Scottish English will become non-rhotic.

The outstanding potential of any phonological system to resist change has been underlined for a long time. Variationist and sociophonetic research usually endeavours to unveil patterns of usage in an attempt to highlight the actuation and diffusion of innovating forms, but as Labov (1994) says “the absence of change may be even more difficult to account for than its presence. The long-term stability of many components of the linguistic system is even more striking than the rapid transformation of others” (1994:42). This long-standing question of relative stability was already discussed extensively decades earlier in Weinreich/ Labov/ Herzog (1968) also drawing attention to “the opposite problem – of explaining why language fails to change” (1968:112).

Current approaches to language in complex systems theory² (Larsen-Freeman/ Cameron 2008, Beckner et al. 2009, Kretzschmar 2015, Mufwene/ Coupé/ Pellegrino 2017, for example) can tackle this problem with new insights and methods, but most importantly complexity theory offers a theoretical model of speech in which variation is the key to stability. Constant, repeated everyday interactions among language users in a speech community need a stable communication system that never breaks down and the robustness of the system is achieved by its architecture (e.g. Ferrer i Cancho/ Solé 2001, Corominas-Murtra/ Valverde/ Solé 2009, Arbesman/ Strogatz/ Vitevitch 2010, Steels et al. 2010, Pierrehumbert/ Stonedahl/ Daland 2014, Goldstein/ Vitevitch 2014, Burridge 2017, Jiang/ Yu/ Liu 2019, for example) and this architecture emerges from large-scale variation.

The aim of this paper is first to provide new findings of weakened coda-r realisations from Ayrshire speakers, and then to further discuss questions relating to socio-phonetic patterning and the supposed weakening of rhoticity in Scotland in general.

2 Derhoticisation in Scotland

Over the last twenty years or so, more and more findings confirmed what seems to be a growing derhoticization of coda-r³ in Scottish English. Only a very brief overview of the fine-grained variation in phonetic realisations across different social groups and geographical areas is provided here and the reader is referred to Stuart-Smith/ Lawson/ Scobbie (2014) and Dickson/ Hall-Lew (2017) for a comprehensive and more detailed account.

Scottish English is traditionally described as a rhotic accent of English and while actual realisations of /r/ changed considerably over time, rhoticity in the standard variety of Scottish English remains unaffected. Weakening rhotic instances of coda-r in Glasgow were reported apparently more than hundred years ago (cf. Watt/ Llamas/ Johnson’s account tracing back

² Complex systems in linguistics are most often called complex adaptive systems (CAS); this paper uses the more general term that the reader will find in different fields from mathematics, chemistry and physics to biology, economics, computer science, and social sciences.

³ The term *non-prevocalic* /r/ is preferred in many papers on the subject because it unequivocally identifies the segmental environment of the rhotic under study, i.e. one that is not followed by a vowel sound, thus excluding positions of linking-r that, for obvious reasons, are less likely to undergo weakening. This paper refers to this same environment by the shorter although less exact term *coda-r*.

derhoticised variants to 1901 and 1913 (2014:85) and Stuart-Smith et al. (2015:4)). Derhoticisation in Edinburgh has also been reported (starting with Romaine's study on children (1978) and followed by Speitel/ Johnston's survey of 91 adults (1983)), but accounts become scarce as we move away from the Central Belt of Scotland.⁴

Researchers typically combine articulatory, auditory and acoustic measurements in order to distinguish coarticulatory effects from socially relevant allophones that are independent from the phonological context (Lawson/ Scobbie/ Stuart-Smith 2011, Watt/ Llamas/ Johnson 2014, for example). Ultrasound tongue imaging uncovers the articulatory mechanisms, and acoustic analyses reveal the interaction between perception of rhoticity and formant trajectories. Beyond the traditionally described post-alveolar approximant and the alveolar tap, phonetic realisations include pharyngealisation that may or may not be indicative of the presence of /r/, fricative noise in non-aspirated positions, approximants with different places of articulation and tongue shape, and finally a continuum of possibilities between a clear absence of /r/ and different vocalised realisations and degrees of colouring of the preceding vowel. Watt/ Llamas/ Johnson inventoried more than 40 variants in their 55,000 tokens from 160 speakers (2014:87), and even if Northern English variants account for some of these, the array of actual realisations is spectacular.

Different /r/ realisations are reported to be linked to social class, gender and age, and within derhoticised variants, different *forms* of vocalisation distinguish different groups of speakers (Dickson/ Hall-Lew 2017). However, when we consider sociophonetic variation from a more distant and perhaps necessarily simplified phonological angle, the question arises as to where the boundary should be drawn in a weakening process between a more consonantal vs. a more vocalic variant, and the criteria on which the decision is based are crucial. When does a weak approximant become a mere colouring of the vowel sound? Are r-coloured vowels rhotic segments when their articulation remains purely vocalic? Is there a difference between derhotics and non-rhotics? As it will be explained in section 3, all vocalic forms of /r/ will be considered non-realised in the results presented here.

Working-class speakers are reported to be less rhotic than middle-class speakers in general, at least as far as Glasgow and Edinburgh are concerned. Further social stratification can be observed in the frequency and the quality of approximant realisations between broadly termed working-class and middle-class speakers. For example, Lawson/ Scobbie/ Stuart-Smith (2014) show that a lower rate of approximant realisation plus a different *quality* of realisation within the approximant category is characteristic of working-class speakers. As they explain, such weakly rhotic approximants are probably due to the position of the tongue-tip, while the difference in the articulation of the approximant gives the overall rhotic quality of middle-class speech. At the same time, diastatic variation can sometimes be observed across speaker groups, for example young female speakers in Edinburgh favour post-alveolar approximants in formal style overall irrespective of social-economic background (Speitel/ Johnston 1983). Also, vocalised /r/, especially the colouring of the reduced vowel /ə/, is found typically in female speakers, both working and middle-class in Edinburgh and Livingston (Lawson/ Scobbie/ Stuart-Smith 2011) while non-rhotic /r/ is typical in working-class men.

Younger and older speakers are often shown to use different /r/ variants. Alveolar taps are typical in older speakers, approximants are more widespread among younger speakers, and non-rhotic realisations are reported to be on the increase in younger age groups, especially working-class males (Jauriberry et al. 2012, Stuart-Smith/ Lawson/ Scobbie 2014). Scarcity of

⁴ It is also important to note that most Scots are bilectal and code-switch between (one of the local dialects of) Scots and Scottish English. The continuum of varieties used in Scotland today may be affected to different degrees across regions and social groups.

data and constraints on longitudinal surveys explain why evidence of change in real time is more difficult to find. Stuart-Smith et al. (2015) report on indirect real-time change comparing older male speakers recorded at different times (1970s-80s-90s and 2000s) and suggest that a higher third formant observed in speakers born in the 1910s and 1920s may be a sign of /r/ weakening (Stuart-Smith et al. 2015:4). Lastly, some accounts reveal inverse tendencies in apparent time - younger speakers are more rhotic than older speakers - for example, in the border town of Eyemouth (Watt/ Llamas/ Johnson 2014), and in Edinburgh (Schützler 2010). Both papers seem to offer a logical explanation: stronger identification with a typical Scottish sounding /r/ in Eyemouth, and a side-effect of middle-class professional life in Edinburgh may result in stronger rhoticity in younger versus weaker rhoticity in older speakers, respectively.

Overall, if approximant realisations are innovations with regard to traditional Scottish trills from long ago, then clearly this innovation is not leading to change because approximant usage maintains perceptually strong rhoticity. On the contrary, speaker groups who did *not* adopt approximants at the beginning are now innovators with a new zero-realisation. Moreover, social patterning is not restricted to the coda, it also appears in the onset and intervocally. Conscious or unconscious identification with a specific social group (e.g. Glasgow working class vs. middle-class) or a general social group (e.g. Scottish vs. English) can also have a strong impact on rhoticity.

In the following sections, the present study examines the overall rate of rhoticity in speakers from Ayr, a town which is situated outside the Central Belt of Edinburgh and Glasgow. Section 4 presents results as far as correlations between rhoticity and sociophonetic factors (age, gender, socio-economic background) and phonological aspects (lexical stress and syllabic position) are concerned, and section 5 discusses these findings in the light of previous research on derhoticisation returning to the questions raised above relating to the diversity of phonetic forms.

3 Method

The dataset used in the study is part of a collection of corpora of contemporary English (the PAC corpora, from the French abbreviation of *Phonologie de l'Anglais Contemporain*; see Pukli 2006, Durand/ Przewozny 2015). Participants were recruited in a loosely interconnected local network of Ayrshire speakers living in and around the city of Ayr, Scotland. The corpus, recorded between 2002 and 2004, consists of read and spontaneous speech from ten female and eight male speakers from different socio-economic backgrounds (cf. Table 1 below). All participants were born and bred in Ayrshire, they have had infrequent contact with Anglo-English speakers both at the time of the recording and during their childhood. There was no pre-selection according to socio-economic criteria, this variable was established based on interview data.

Table 1 - Ayrshire speakers: gender, socio-economic background (working-class (WC) vs. lower-middle-class (LMC)) and age

FEMALE SPEAKERS			MALE SPEAKERS		
F1	LMC	19	M1	LMC	18
F2	LMC	25	M2	WC	19
F3	LMC	28	M3	WC	21
F4	LMC	45	M4	LMC	23
F5	LMC	48	M5	WC	50
F6	WC	50	M6	LMC	51
F7	--	60	M7	LMC	64
F8	LMC	71	M8	LMC	65
F9	WC	73			
F10	--	82			

Data used for the analysis of coda-r realisations come from informal unscripted conversations that took place in the participants' home. The casual, non-directed setting with self-selected pairs cannot guarantee authentic usage but it is reasonable to suppose that self-monitoring rapidly decreases soon after the onset of the recording. In some instances, fieldworker interviews had to be used (these were recorded in a slightly more formal context since the interviewers were outsiders).⁵

A preliminary perceptual analysis was carried out to determine the absence vs. presence of /r/ followed by an acoustic analysis on the tokens for which the preliminary analysis was non-conclusive. All vocalic forms displaying continuous flat formants throughout the rhyme were counted as non-rhotic. Reliable visual cues indicate the presence of diverse forms of /r/ articulation such as approximants characterised by a drop in F3 or taps showing a short interruption in spectral energy but there always remain ambiguous realisations. These were either discarded or categorised with rhotic realisations. This decision was motivated by a wish to compensate for the possible loss of articulated but non-perceptible consonantal /r/, namely, possible occurrences of lingual gestures taking place after phonation has ceased (Lawson/ Stuart-Smith/ Scobbie 2008).

A final total of 566 occurrences of coda /r/ after filtering (an average of 30 tokens per speaker) were analysed using Praat (Boersma/ Weenink 2013). Although /r/ is a very frequent phoneme, the greater number of words containing coda-r were function words (e.g. pronouns, prepositions, etc.) that were excluded from the sample because of their overall reduction in an unstressed position that affects every phoneme not just /r/. Thus, data comprise all occurrences of coda-r from the conversational corpus with the exception of 1) function words 2) words directly followed by a vowel sound (linking-r sites), and 3) unclear realisations due to the following segment or noise (e.g. following word with initial /r/, coarticulation and elision of the entire syllable in very rapid speech, etc).

⁵ For more information on the participants, as well as on the entire recording protocol, see Pukli (2006).

4 Results

Figure 1 below shows overall results for 18 speakers, the top part of each bar representing absent /r/ realisations and the bottom part of each bar displaying pronounced /r/ realisations. The overall average of non-consonantal coda /r/ is 42 percent (individual percentages are given in Figure 1). When comparing groups of speakers, a simple chi-squared test of independence shows strong correlation between absence of /r/ and *age* (re-coded in 3 categories, p-value = 0.003793) and *word stress* (p-value = 0.01575). Correlations between the non-realisation of /r/ and gender (p-value = 0.06642), socio-economic background (p-value = 0.1084) and phonological position⁶ (p-value = 0.5111) are non-significant.

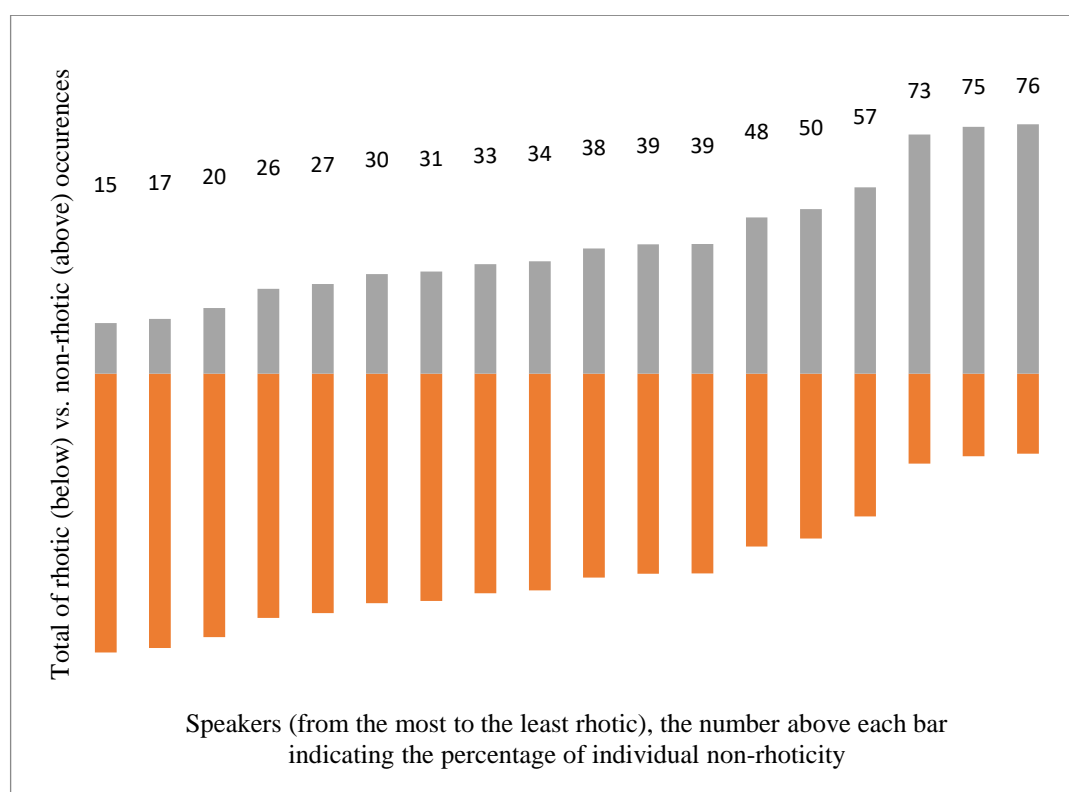


Figure 1. Overall absence vs. presence of coda-r

The speakers' age ranged from 18 to 82 years, and when we compare the distribution of absent versus present r-realizations across three groups - around 20 years of age, around 50 years of age, and 60 or older - we can see in Figure 2 below that rhotic realizations (represented by a darker shade in each bar) are more prevalent in the older age range than they are in younger speakers. Non-rhotic realizations (top, light-shade area within each bar) are present in all three age groups.

⁶ This variable compared r-realizations in three positions: word-medial (*ward*) vs. word-final followed by a consonant (*war# C*) vs. word-final followed by a pause (*war##*).

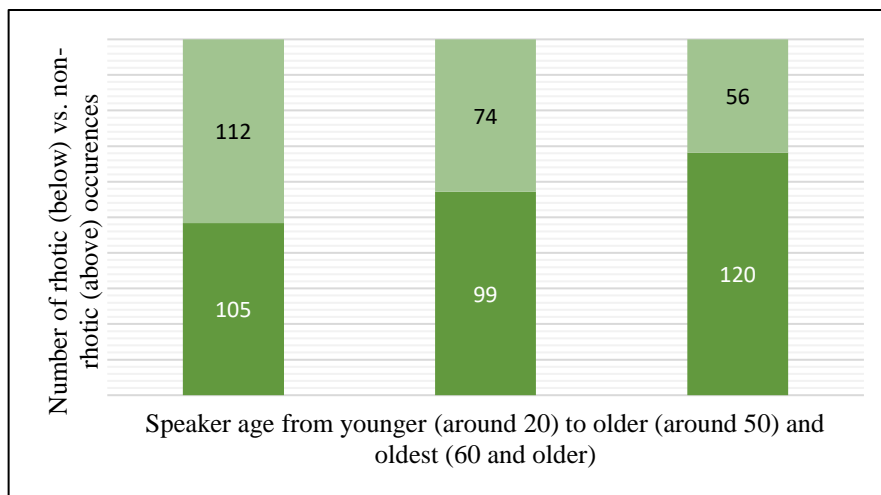


Figure 2. Realization of /r/ by age: around 20 years of age (18,19,21,23,25,28), around 50 (45,48,50,51), and 60 years of age and older (60,64,65,71,73,82).

Rhoticity is known to be sensitive to stress, Figure 3 below shows a clear difference between stressed and unstressed syllables: unstressed syllables (displayed in the second bar) are just as often non-rhotic as rhotic, whereas stressed syllables account for a higher proportion of rhoticity overall (shown in the first bar with 227 occurrences of consonantal /r/ as opposed to 138 realisations of non-consonantal /r/).

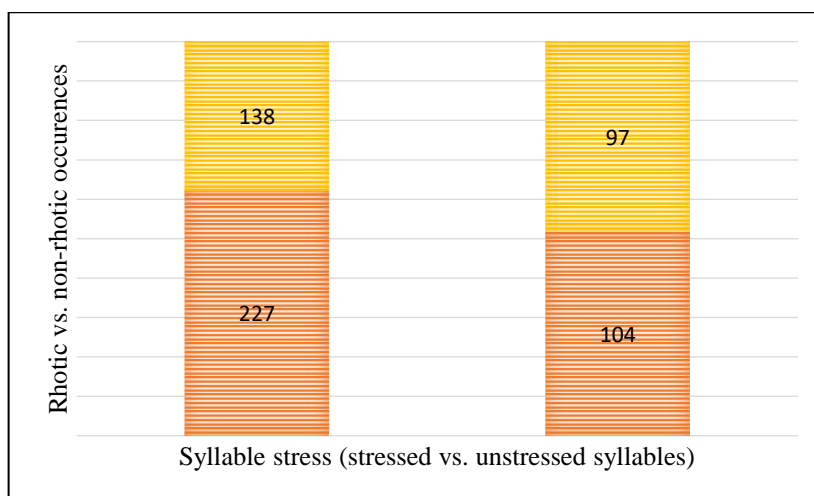


Figure 3. Realization of /r/ in stressed syllables (to the left) vs. unstressed syllables (to the right): the total of rhotic occurrences are in red (bottom) and the total of non-rhotic occurrences in yellow (top)

Since the observations originate from only eighteen speakers and hence are not independent in themselves, generalised linear mixed models (GLMM) were fitted on the full data frame with *word* and *speaker* as random effects using the *lme4* package (Bates et al. 2014) in R (R Core Team 2018). The only significant correlation found was between absence of coda-r and word-level stress (p-value = 0.03516; see Appendix for details).

The influence of the relative prominence of the syllable containing /r/ on the realisation of the sound has been shown repeatedly (Scobbie/ Stuart-Smith/ Lawson 2008; Lawson/ Stuart-Smith/ Scobbie 2008, Schützler 2010). The most remarkable finding here is the absence of

correlation with age, gender or social class. The fact that Ayr is removed from the Central Belt and its densely populated urban areas might mean that sociolinguistic patterns related to gender and socio-economic background are different. Also, social groups were not represented in equal proportions in our sample, thus perhaps the group was simply too homogeneous.

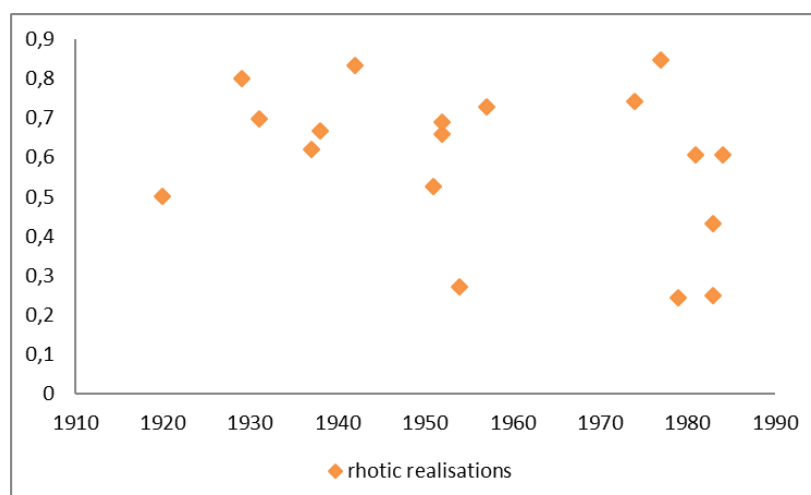


Figure 4. The percentage of rhotic realization of /r/ per speaker by year of birth

The representation of the percentage of rhotic realisations in coda position per speaker, shown in Figure 4 above plotted against the age of the speakers, does not display a clear tendency. The non-random sampling and the smallness of the sample may have led to skewed data on which the results are based. There can also be an abrupt adoption of non-rhotic forms that is taking place among speakers born in the 1990s who were too young at the time to participate in the investigation that targeted adult speakers.

Nevertheless, non-rhoticity is undoubtedly present in older speakers, which is principally why a clear tendency cannot be seen here. For a meaningful discussion, we would need to look into realisations of speakers born before 1940 to see whether our eldest speaker is a simple outlier, in which case the majority of the older age group would be fairly strongly rhotic. Interestingly, Jauriberry (2016)⁷ working on a larger corpus comparing Kinross and Dundee found no significant correlation between non-rhoticity of coda-r and the age of the speakers either, although this might be due to methodological decisions in an attempt to hierarchise /r/ realisations in a single score that will be discussed in the next section. Schützler (2010), as mentioned earlier, also found just as many non-rhotic speakers in older age groups as in younger ones (even more) in middle-class Edinburgh speakers.

Another question, whether lexical items themselves could have an influence on rhoticity - some of them being consistently pronounced with a coda-r, others being systematically pronounced without coda-r - could be raised.⁸ However, word sets across speakers were quite different in the part of the corpus that was analysed here due to the unscripted context of conversational data. Despite the diversity of the tokens, frequency effects were tested in Pukli

⁷ In his study of 29 speakers, significant factors include word-level stress (stressed syllables are more rhotic than unstressed syllables), geographical origin (Dundee speakers are more rhotic than Kinross speakers) and phonological position (the word-final position is more rhotic than the word-medial pre-consonantal position) (Jauriberry 2016:294).

⁸ I thank one of the anonymous reviewers for this suggestion that I was going to ignore.

(2018) but no significant correlation emerged between non-rhotic realisations and lexical frequency.

5 Discussion

The results indicate that non-rhotic realisations of coda-r are more frequent in unstressed syllables than they are in stressed syllables. Speakers are variably rhotic in the corpus but there is no clear correlation between rhoticity and sociophonetic factors such as age, gender and socio-economic background.

5.1 Identity and prestigious forms

First, considering the overall low rate of rhoticity of the 18 speakers one can wonder to what extent this can be linked to identity and prestige. While the social stratification related to rhoticity was repeatedly shown (Lawson/ Scobbie/ Stuart-Smith 2011, Watt/ Llamas/ Johnson 2014, Lawson/ Scobbie/ Stuart-Smith 2014, Dickson/ Hall-Lew 2017) it is not clear whether the use of certain phonetic variants is conscious or not. Furthermore, speaker identities and behaviour in different parts of Scotland are not necessarily similar. On the one hand, rhotic /r/ realisations are clearly part of the repertoire of speakers affirming their Scottish identity in Eyemouth (Watt/ Llamas/ Johnson 2014), on the other hand, Rącz (2013) argues the non-salience of /r/ variants and claims that Scottish speakers are on the whole unaware of derhoticization.

It is also interesting to compare standard Scottish English and General American in terms of their influence on regional variation. In Boston, speakers are variably rhotic, and phonological change (if there is one) is in the other direction: the previously non-rhotic New England variety becomes rhotic to converge with the rhotic norm of the United States. Navarro (2013), for example, reports an increase of rhotic coda-r realisation from 54% in unstressed syllables to 70% in foot initial syllables and to 76% in syllables with nuclear stress.

Clearly, on the scale of the present study, one cannot decide whether speaker behaviour favouring absence vs. presence of coda-r is conscious or not. In the context of code-switching between local and more standard speech forms, rhoticity is generally considered to be an attribute of the latter variety, but it was either simply not available to the speakers of the corpus, or no attempt was made to use it in casual conversations.

5.2 The diversity of phonetic realisations - articulation and perception

This leads to the next question that is crucial in determining the nature of structured variation in linguistic behaviour pertaining to the use of consonantal coda-r. Phonetically speaking it is habitual to represent rhoticity in categories deriving from articulatory action and acoustic markers, but also in terms of perceived strength. Thus, variants are often ordered based on their consonantal strength, for example from the strongest to the weakest: trill, tap, approximant, rhotacised vowel, absence (in Jauriberry 2016, Jauriberry/Pukli 2011, see Figure 5 below) or, similarly from the strongest to the weakest: trill, tap, rhotacised schwa, approximant, derhoticised vowel, absence (in Dickson/ Hall-Lew (2017) and Lawson/ Scobbie/ Stuart-Smith (2014)). Rhotacised schwa realisations, as pointed out by Dickson/ Hall-Lew (2017), are particularly difficult to rank on such a scale because they are simultaneously very rhotic (in their perception) and non-rhotic (in their absence of any consonantal material).

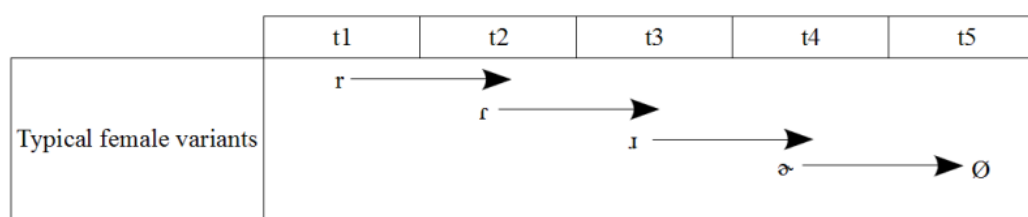


Figure 5. Possible /r/ realisations in female speakers from Jauriberry/Pukli (2011:10, adapted from Figure 9)]

Crucially, what is wrong with this approach is that it not only conflates articulatory and auditory descriptors but also creates an artificial aggregate of rhoticity expressed in terms of strength. The representation creates a false sense of continuum as put forward and argued convincingly by Dickson & Hall-Lew (2017). It also makes the comparison of results across studies very difficult, especially when statistical tests indicate a different ranking of parameters in terms of significance depending on which phonetic categories are considered absent vs present realisations. As suggested in the following section, there are probably different trajectories in lenition from full, non-variable to weakening, variable rhoticity and there is no unique continuum that fits the different speaker groups.

5.3 The overall preference of phonetic variants

When one widens the scope of enquiry to include pre-vocalic environments as well, it is probable that non-rhoticity is in fact related to a global preference in speakers for one type of /r/ realisations over another in all syllable positions Jauriberry/Pukli (2011). According to a purely phonological reasoning, onset and coda /r/ realisations could be different for all speakers: taps in the onset vs. approximants in the coda, and the two could be entirely predictable contextual allophones. All findings from sociophonetic studies contradict this hypothetical distribution in the coda, but very little is known about the onset. As mentioned earlier, Wells (1982) suggested a complementary distribution-like preference for approximants word-finally and taps intervocalically, leaving the word-initial position for both. When looking at a subset of 8 speakers from the present corpus, Jauriberry/Pukli (2011) found a significant correlation between the dominant type of /r/ and the overall rate of rhoticity. A logical consequence of r-variants being socially indexed in all positions is that the sensitive site of the non-prevocalic context has divergent variants across speaker groups to start with *before* derhoticisation can take place.

Interestingly, when looking at the least frequent type of realisations, trills and taps, correlations appear: older speakers use significantly more trills and taps than approximants in the onset in Jauriberry (2016), and middle-aged working class men use a significantly greater proportion of trills and taps in the coda according to Dickson/ Hall-Lew (2017) while they remain overall less rhotic than other cohorts. This adds up because if working class male speakers have a stronger tendency to use taps in general, then they are more likely to be affected by a potential articulatory weakness word-finally, resulting in inaudible segments and a massive impression of missing r's.

To take another example, middle-class female speakers, who adopted approximants as their dominant type of r-realisation, tend to transform coda-r into a strong secondary articulation on the preceding vowel. Stuart-Smith/ Lawson/ Scobbie (2014) found approximants and perceptually strong vocalised variants typically in middle-class speakers (who remain rhotic) and taps characteristically in working class speakers (who are much less rhotic). This

adoption and preference of approximant use that took place between 50-100 years ago, and that might have seemed as a weakening at the time, or that might appear on a consonantal scale weaker than a trill today, is actually ‘protecting’ these users from complete derhoticization. Traditional tap users, on the other hand, are at the same time the least rhotic working-class males.

As Dickson/ Hall-Lew (2017) point it out, there is a mismatch between sociophonetic patterning, i.e. which group of speakers favour which variant, and the way in which the variants are construed as a continuum of realisations in linguistic experiments. Thus, rhotic middle-class speakers whose most frequent variant is an approximant /r/ that appears to be stable, figure as less rhotic on a phonetic scale that starts with trills and taps, the most consonantal realisations:

“Rhoticity is interesting sociophonetically because what can be framed as continuous variation on a phonetic scale does not correspond to similarly structured variation at a socioindexical level. For example, while high rates of rhotic use appear to index middle-class and female identities, the most fortis variants (taps and trills) do not have the same social correlates.” (Dickson/ Hall-Lew 2017:245)

The sociolinguistically motivated preferences make sense phonetically because the articulation of these variants is very different: globally vowel-like, on the one hand, i.e. approximants and vowels with secondary articulation (derhotics or rhotacised schwas), and consonantal on the other, i.e. taps supposedly on their way diachronically from trills to nothing. The contradiction arises from the forced alignment of the variables on a scale that conflates different dimensions. Thus, it is because of the articulatory difference between a tap and an approximant that this finding is recurrent and *not despite* the phonetic differences between the derhoticised variants and the strongly rhotic taps and trills.

5.4 The diversity of phonetic realisations on the phonological level

Phonological variation is socially salient for some features because as Eckert/ Labov (2017) succinctly put it, they are “most readily adapted to convey social meaning by their frequency, flexibility and freedom from referential functions” (2017:467). Thus, new weakened variants of /r/ are not necessarily signs of change from rhoticity to non-rhoticity but, on the contrary, they may signal stability in the system. That sounds are available for social indexing because they are unrelated to meaningful units, because of their inherent elasticity, and because of their frequency means that frequent sounds should show the widest range of variation. There will sometimes be a correlation between lexical frequency and a given phonetic variant, but the causality of this correlation is open to interpretation because frequent does not mean first to change, but simply first to vary.

Unfortunately, the conceptual enquiry that relates variationist studies to phonological theory, and what should and should not be part of the latter, lies outside the scope of the present paper but it is a fundamental question that must occur to anyone interested in sociophonetic variation. The current turn in usage-based grammar that views speech and, perhaps more arguably, language as a complex dynamical system (Kretzschmar 2015, Pierrehumbert 2016, Mufwene/ Coupé/ Pellegrino 2017, Steels/ Van Eecke/ Beuls 2018, for example) places variation back at the centre of its conceptual models: the absence of variation would make the system unviable. The phonology of a given language as a system of sounds and sound patterns is extremely flexible *and* very stable. This is not contradictory because stableness

does not mean homogeneity, variation is not only present in speech, it defines speech. One is sometimes tempted to view phonology at a given moment of time as an ideal, settled system: the result of and ready to change, but functioning, and hence stable and static. Speech (and the phonological model thereof) is certainly functioning and stable, but never static. Phonological systems are happy with variation, variation can remain present for a very long time before, after, and *without* any final change.

6 Conclusion

The results presented in this paper confirmed the role of lexical stress in stronger rhoticity in otherwise massively non-rhotic speakers with high proportion of occurrences of absent coda-r in unstressed syllables. Due to the unexpected non-correlation between weakened r-realizations and socio-economic background – gender and age were not statistically significantly constraining rhoticity in the model – it was argued that derhoticisation may not always be linked to social factors, and that conflating different dimensions in the aggregate of consonantal strength can confound the picture. It was also suggested that when sociolinguistic factors are examined, the analysis should not be restricted to coda-r, as they could explain the overall preference of /r/ realizations in the speaker irrespective of phonological position or speech style, which, in turn, can have an impact on the rate of weakened rhoticity. It was further argued that although there is undeniable variation in /r/ realizations in Scotland today, this does not necessarily imply phonological change from rhoticity to non-rhoticity.

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Appendix - GLMM in R

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation) ['glmerMod']

Family: binomial (logit)

Formula: rful ~ gender + age + SEb + WS + position + (1 | speaker) + (1 | word)

Data: munich.data

Control: glmerControl(optimizer = "bobyqa", optCtrl = list(maxfun = 1e+05))

AIC	BIC	logLik	deviance	df.resid
736.8	780.2	-358.4	716.8	556

Scaled residuals:

Min	1Q	Median	3Q	Max
-2.4696	-0.8216	0.4921	0.6973	1.6235

Random effects:

Groups	Name	Variance	Std.Dev.
word	(Intercept)	0.4976	0.7054
speaker	(Intercept)	0.5404	0.7351

Number of obs: 566, groups: word, 389; speaker, 18

Fixed effects:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	0.004139	1.022192	0.004	0.9968
genderm	-0.405236	0.437783	-0.926	0.3546
age	0.013605	0.011053	1.231	0.2184
SEbnwc	0.022664	0.747869	0.030	0.9758
SEbwc	0.420131	0.814472	0.516	0.6060
WSu	-0.487020	0.231196	-2.107	0.0352 *
positionfp	0.302156	0.328198	0.921	0.3572
positionm	0.025883	0.268942	0.096	0.9233

Correlation of Fixed Effects:

	(Intr)	genderm	age	SEbnwc	SEbwc	WSu	pstnfp
genderm	-0.121						
age	-0.769	0.150					
SEbnwc	-0.792	-0.197	0.400				
SEbwc	-0.707	-0.269	0.349	0.825			
WSu	-0.099	0.016	-0.047	-0.007	-0.012		
positionfp	-0.176	-0.015	0.047	0.033	0.018	-0.018	
positionm	-0.214	-0.005	0.001	0.020	-0.002	0.266	0.537

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: rful

	Chisq	Df	Pr(>Chisq)
gender	0.8568	1	0.35463
age	1.5150	1	0.21837
SEb	0.7539	2	0.68596
WS	4.4374	1	0.03516 *
position	1.0705	2	0.58552