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Journal of English Linguistics

Class, gender and rhoticity: the social stratification of non-prevocalic /r/ in Edinburgh speech

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Keywords:	sociolinguistics < Methodological Approaches, language variation < Methodological Approaches, British dialects < Language Varieties, social class, upward mobility, rhoticity, Scottish English
Abstract:	<p>Despite the prominence of socioeconomic status as a factor in models of English variation, few studies have explicitly considered speakers whose social class status changed over their lifetime. This paper presents an auditory and acoustic analysis of variation in non-prevocalic /r/ among middle-aged adults from Edinburgh, Scotland. The speakers represent three groups: the Established Middle Class (EMC) and the Working Class (WC), both of which are characterized as socioeconomically non-mobile, and a third group we call the New Middle Class (NMC), comprised of individuals born to working class families and living middle class lives at the time of data collection. The results demonstrate that realizations of /r/ have a significant correlation with socioeconomic status, and that the effect of class further interacts with gender. NMC speakers demonstrate the highest level of rhoticity of all three groups. In contrast, WC men show extensive derhoticization and deletion, while WC women show patterns of rhoticity that are more comparable to the NMC women. The EMC speakers show more non-rhoticity than either the NMC speakers or the WC women. A consideration of the indexical value of weak rhoticity highlights the need for more robust phonetic measures distinguishing non-rhoticity from derhoticization, and to that end we consider the cue of post-vocalic frication. Overall, the results point to the need to conceptualize socioeconomic status as potentially fluid and changeable across the lifespan, thereby improving models of the relationship between social class and linguistic variation.</p>

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3 Class, gender and rhoticity: the social stratification of non-prevocalic /r/ in Edinburgh
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11 **1. Introduction**
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16 Studies of social class in variationist sociolinguistics rarely examine the speech patterns of
17 individuals whose socioeconomic status has changed over the course of their lifetime.
18 However, as Labov (1966b:192) has argued, attention to both upwardly mobile and
19 downwardly mobile individuals is necessary to represent very “normal” aspects of how social
20 class is experienced by many individuals. Attention to social mobility over the lifespan
21 necessitates speaker samples from older populations, which is again a relatively unusual
22 focus for a community study in sociolinguistics (but see, e.g., Rose 2005; Stuart-Smith et al.
23 2015). In the present paper, we focus on a sample of men and women from Edinburgh,
24 Scotland, who are between the ages of fifty-seven and sixty-nine and whose social class has
25 either remained the same or changed throughout their lifetime. We find that the upwardly
26 mobile speakers show production patterns of non-prevocalic /r/ that are significantly different
27 from those of the socially stable groups.
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44 Varieties of Scottish English have long been established as rhotic (Wells 1982:10-11):
45 non-prevocalic /r/, found in syllable codas, is articulated in words such as *car* (Stuart-Smith
46 2007:1449). This contrasts with non-rhotic varieties, where /r/ is absent or vocalized unless
47 followed by a vowel, e.g., *car is* (Wells 1982:76). However, recent research has demonstrated
48 increasing evidence of weak rhoticity, or *derhoticization*, in urban Scottish English.
49 Derhoticization refers to auditorily weak, but not deleted, non-prevocalic /r/, often
50 characterized by a pharyngealized off-glide or a pharyngealized quality on the preceding
51 vowel. Derhoticization has been reported in and around Edinburgh (Romaine 1978; Speitel &
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3 Johnston 1983; Lawson et al. 2008, 2011, 2014; Scobbie et al. 2008, 2013; Schützler 2010,
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6 2011, 2013) and Glasgow (Macafee 1983; Stuart-Smith 1999, 2003, 2004, 2007, 2008, et al.
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8 2015). Variation in non-prevocalic /r/ is reported to be socially stratified in urban Scottish
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10 English, with the highest rates of derhotization occurring among speakers of lower
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12 socioeconomic status (e.g., Lawson et al. 2014:53).

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15 Despite a growing interest in the relationship between social class and non-rhoticity in
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17 urban Scottish English, there is a lack of research on non-prevocalic /r/ and social mobility.
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19 Like many sociolinguistic studies of social class, previous investigations of Scottish rhoticity
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21 have defined class in terms of a dichotomy between Working Class and Middle Class
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23 speakers. In addition to these groups, the present study considers the production of non-
24
25 prevocalic /r/ in speakers from a third group: the *New Middle-Class* (NMC). The NMC
26
27 consists of speakers whose socioeconomic status, as defined by education and occupation,
28
29 has transitioned from Working Class to Middle Class over their lifetime. The inclusion of this
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31 intermediate socioeconomic group allows for the inclusion of socially mobile individuals in
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33 studies of sociolinguistics, and presents a fuller picture of the relationship between rhoticity
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35 and social class in Edinburgh. In contrast to previous variationist studies of rhoticity in
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37 Scotland, many of which have considered the speech of school children (e.g., Romaine 1978;
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39 Lawson et al. 2008 et seq.), or an age-stratified sample (Speitel & Johnston 1983; Schützler
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41 2010a), the present study focuses on speech from participants in late middle age or retirement
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43 (as in Stuart-Smith et al. 2015).

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46 Our results show a significant correlation between the production of non-prevocalic
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48 /r/ and socioeconomic status. Like previous work (e.g., Lawson et al. 2014:53), we find
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50 greater rhoticity among Established Middle Class (EMC) speakers than Working Class (WC)
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52 speakers. However, unlike previous findings, the WC women in our sample show much
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54 higher rates of rhoticity than WC men, essentially patterning like the Middle Classes. WC
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3 men further distinguish themselves from all the other groups by employing a small but
4 significantly greater proportion of “traditional” Scots variants of /r/ -- taps and trills –
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6 combined with otherwise low rates of rhoticity. Furthermore, the main contribution in this
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8 paper is that speakers from the NMC group demonstrate the highest rates of strong rhoticity
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10 in the sample; significantly higher than those of the EMC group. This finding echoes Labov’s
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12 (1966a, 1972) observations of rhotic variation in New York City English, specifically his
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14 (1966b) analysis of rhoticity among upwardly mobile speakers. The EMC group, on the other
15
16 hand, shows higher-than-expected levels of non-rhoticity, which acoustic analysis suggests is
17
18 distinct from the WC production of derhoticization, despite some auditory similarities.
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20 Overall, the results highlight the importance of social mobility, as opposed to a stable
21
22 socioeconomic identity, as a source of variation and change in urban Scottish speech.¹
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32 2. Previous Literature

33 2.1. Social mobility and sociolinguistics

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36 This is a study of variation and social class mobility. Britain (2016), building on the work of
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38 Cresswell (2006), points to the various ways in which sociolinguistic research has prioritized
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40 the study of sedentary individuals, to the exclusion of mobile individuals. While his critique
41
42 centres on geographical mobility, he notes how social mobility is directly implicated: only
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44 certain members of the social order can be geographically mobile. Attaining greater access to
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46 geographical mobility, and increased interaction with other geographically mobile persons, is
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48 itself an aspect of upward social mobility. Indeed, the sociolinguistic effects of social
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50 mobility have often been equated with those of geographical mobility, such as in Milroy and
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52 Milroy’s work on social networks, which notes that “social or geographical mobility is
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54 conducive to the formation of weak ties” (1985:366) and “closeknit networks are located
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3 primarily at the highest and the lowest strata, with a majority of socially and geographically
4 mobile speakers falling between these two points” (1985:363). Yet, despite decades of
5 interest in mobility and linguistic variation, few studies in sociolinguistics have explicitly
6 sought out individuals whose social status has changed over their lifetime.
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12 Labov’s (1966b) reanalysis of rhoticity in his Lower East Side study is our primary
13 point of comparison. His paper takes a closer look at the social class designation of the
14 speakers in his original study of New York City English, noting that the criteria used are
15 inherently tied to issues of mobility, because they are relevant at different life stages:
16 “[e]ducational level is the earliest, occupations reflect decisions made somewhat later in life,
17 and incomes reflect only present status” (1966b:191). He then makes a prescient critique of
18 static representations of social class, arguing that such studies miss what is ‘normal’ about
19 how social class is experienced in the community:
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34 The first, most obvious hypothesis would be that such “steady” middle class speakers
35 would exemplify the norms of middle class society more completely than upwardly
36 mobile speakers who grew up in a working class environment. One would expect
37 members of the “upward” group to show erratic behavior and inconsistent
38 performance, because they had not been trained in middle class linguistic norms early
39 enough to have internalized them. Therefore, the structure of social and stylistic
40 stratification would appear most clearly if we considered only the “steady” groups
41 with a history of two generations of membership in the same class. This reasoning
42 fails to take into account the specific structure of New York City society, especially
43 the fact that upward social mobility is normal, even normative, for the middle class
44 groups. (1966b:192)
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3 Based on considerations of class mobility, Labov further classifies the speakers from his main
4 (1966a) study into different social mobility types, separating those for whom all measures are
5 “congruent”, termed *Steady* [S], from those who have experienced either *Upward* [U] or
6 *Downward* [D] mobility.² This exercise results in a correlation between class mobility and
7 class status, with the Lower Class and Working Class groups showing relatively more Stable
8 and Downwardly mobile persons, and the Lower Middle Class and Upper Middle Class
9 showing relatively more Upwardly mobile persons. Labov (1966b) identifies a number of
10 significant differences between these mobility types. Most relevant here is the fact that,
11 across all styles, the Upwardly mobile speakers always produced more rhoticity than the
12 Stable speakers. This was true for both Working Class and Lower Middle Class speakers,³
13 and comparisons with the (mostly upwardly mobile) Upper Middle Class speakers show
14 evidence of hypercorrection. Labov (1966b:197) concludes that “the shift to the hypercorrect
15 pattern is more characteristic of upward mobility than of membership in any particular
16 socioeconomic group.”

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Another source of variationist analysis and social mobility is the growing body of work
on intraspeaker variation and lifespan change. For example, Sankoff (2004) tracks one
upwardly mobile and one downwardly mobile speaker (both highly geographically mobile),
showing different rates of change in the production of the BATH and STRUT vowels between
the ages of seven and thirty-five. Sankoff notes that the magnitude of change seems to
depend, among other things, on the social salience of the vowel as an index of regional
identity. Baugh (1996) compares the use of African American English (AAE) by four men as
teens and as adults, three upwardly mobile and one downwardly mobile, and finds a marked
decrease in AAE features only among the former three. Sankoff and Blondeau’s (2007:572)
large longitudinal study of change across the lifespan in Montreal French mentions one
speaker (‘Lysiane B.’) who experiences “exceptional upward social mobility” between the

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ages of twenty-four and forty-eight and who also shows dramatic lifespan change in her adoption of the incoming variant. Rickford and Price (2013) also study AAE use and social mobility, looking at two women recorded between the ages of fifteen and thirty-five, and find a similar decrease in use. In contrast to the present paper, the focus in all three of these studies is more on the contrast between pre-adulthood and adulthood, rather than on class attainment in late middle-age.

By virtue of their design, few of the studies on lifespan change compare socially mobile individuals to socially stable ones. An exception is Blondeau (2001), whose analysis of pronoun variation in Montréal French includes 189 speakers differentiated by social mobility: 158 upwardly mobile, thirty socially stable, and one downwardly mobile. Upward mobility is by far the majority experience in this context, showing how the exclusion of social mobility in variationist work risks overlooking a key aspect of social class experience. Blondeau (2001) finds that both upwardly mobile and socially stable individuals favor simple plural pronoun forms, but that the upwardly mobile speakers do so to a greater extent. Similar to the other intraspeaker variation studies mentioned, and in contrast to ours, Blondeau's speakers are relatively young, with the older speakers in the sample only in their mid-forties; mobility is operationalized based on status measures taken at the time of recording. Unlike Baugh (1996) and Rickford and Price (2013), Blondeau (2001) finds clear evidence of a community-wide change, rather than age-grading, with speakers in their forties in 1995 using more of the simple plural form than speakers in their forties in 1971. Since the vast majority of her sample consists of upwardly mobile individuals, perhaps one way to understand "community change" in this case would be in terms of community-wide upward mobility.

Another perspective on social mobility and sociolinguistics is Johnstone et al.'s (2006) study of Pittsburghese. While linguistic features can index both place identity ("Pittsburgh") and Working Class identity, they argue that the option to adopt those features is restricted to

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3 “those whose repertoires included both regional and supraregional variants, and the kinds of
4 social and geographical mobility that would give rise to varied linguistic repertoires were
5 available to relatively few people” (2006:88). They discuss how new social meanings
6 “[become] possible in the context of social mobility” (2006:89), profiling one speaker “[w]ith
7 a working-class upbringing and an upwardly mobile professional, marital, and residential
8 trajectory” (2006:91). This speaker has a lower production rate of the local variant than is
9 found for other, less mobile speakers.
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20 Studies of mobility are far more common in areas of sociolinguistics outside of
21 variationist work, namely in the broader intellectual movement on the “sociolinguistics of
22 mobility.” Work in this area tends to consider globalized, transnational, and multilingual
23 contexts (Blommaert 2010; Pennycook 2012), and differs from studies based on speaker
24 samples chosen explicitly for their geographical sedentarism, such as the current paper (see
25 Britain 2016). Theodoropoulou (2015), for example, examines the context of Qatar, where
26 the vast majority of local residents are immigrants, and the heritage population is a tiny
27 minority. Important insights from the sociolinguistics of mobility include a consideration of
28 the constraints on which members of a community have access to mobility, and under what
29 circumstances.
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44 Other studies on social class in sociolinguistics hint at the importance of mobility by
45 suggesting that class position in adulthood should be reflected in patterns of linguistic
46 variation, regardless of class position in childhood. Some have argued that speaker
47 occupation alone is an effective predictor of class-based variation (e.g., Macaulay 1977;
48 Horvath 1985), while others propose that class is better defined according to consumption
49 patterns rather than production patterns (e.g., Mallinson 2007). Ash (2004:414) notes the
50 potential for linguistic variation driven by social mobility, as well as a speaker’s orientation
51 to their local community and their relationship to the linguistic market. Eckert (1989, 2000)
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3 shows that young people's orientations to local social structures may be more indicative of
4 their patterns of linguistic variation than their parents' social class positioning. The present
5 analysis tests this directly, focusing on speakers over the age of fifty-seven. Social mobility is
6 defined by a speaker's educational and occupational attainment, compared with that of their
7 parents. Socially mobile and socially stable individuals will be compared with respect to a
8 widely studied sociolinguistic variable: rhoticity.
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20 2.2. Sociolinguistics, rhoticity, and Scottish English

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24 The realization of /r/ in English has been reported to correlate with various aspects of
25 speakers' identities, particularly socioeconomic status. The landmark study considering the
26 co-variation of /r/ with socioeconomic status was Labov's (1966a, 1972) aforementioned
27 study of New York City, where rhoticity had recently become the prestige variant (Labov
28 1972:169). Labov's rapid and anonymous survey of sales assistants in three department stores
29 of varying social status reported a correlation between employee rhoticity and the perceived
30 social class of their customers (1972:174), with the highest rates of rhoticity found in
31 employees of the most upmarket store. The main contribution of the New York City study
32 was the analysis of variation among speakers of the Lower East Side neighbourhood, where
33 Labov's analysis of rhoticity (along with several other linguistic variables) showed fine-
34 grained correlations with social class, with relatively higher rates of rhoticity occurring in the
35 casual speech of those from higher social classes. One of the most influential findings in these
36 data was the robust occurrence of the *crossover effect*, whereby speakers classified as
37 intermediate between Working Class and Middle Class used the highest rates of the standard
38 variant in word list elicitation tasks, despite having lower rates than Middle Class speakers in
39 casual and interview speech. Labov's work led to a wealth of research on variable rhoticity in
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3 American speech (e.g., Wolfram & Schilling-Estes 1998; Elliott 2000; Eberhardt & Downs
4 2013), including follow-up studies specifically confirming the department store results
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6 (Fowler 1986; Mather 2012). Becker (2009, 2014) has studied rhoticity in New York City's
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8 Lower East Side more recently, and argues that non-rhoticity is today a resource for indexing
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10 localness and constructing place authenticity. Rather than framing the social meaning of
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12 rhoticity with respect to prestige, Becker shows how speakers employ "micro-variation" in
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14 rhoticity with respect to prestige, Becker shows how speakers employ "micro-variation" in
15
16 rhoticity to index local styles and take particular stances toward their community.
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20 Similar to its status in American English, rhoticity is well-attested as the standard
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22 variant in varieties of English spoken in Scotland (Romaine 1979:154; Johnston 1997:511;
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24 Scobbie 2006:339; Schützler 2010:12). However, the picture is not the same as New York
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26 City with respect to the direction of change in progress, nor is it as straightforward with
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28 respect to social class patterns. While in New York there has been a gradual change in
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30 progress towards rhoticity (Becker 2009:634), the reverse situation has been proposed in
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32 urban Scottish English, where a "slow-moving, local sound change" toward weaker rhoticity
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34 has been observed (Lawson et al. 2014:53). Urban speech in Scotland's central belt is
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36 understood to be dominant in establishing the prestige forms of Scottish English (Lawson et
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38 al. 2014:56). Lawson et al. (2014:54) report that, during the nineteenth century, non-rhoticity
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40 was considered "fashionable" among some of the Scottish middle classes but, from the mid
41
42 twentieth century onwards, rhoticity became established as the overtly prestigious variety,
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44 despite sustained contact with non-rhotic Anglo-English varieties like Received Pronunciation
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46 (RP). Since the 1970s, a number of studies have investigated the sociophonetic patterning of
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48 non-prevocalic /r/ in Scotland's Central Belt, with a focus on speech in Edinburgh (Romaine
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50 1978; Speitel & Johnston 1983; Scobbie et al. 2008; Lawson et al. 2011, 2014; Schützler
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52 2013) and Glasgow (Macafee 1983; Stuart-Smith 1999, 2003, 2004, 2007). Studies have
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54 reported that Middle Class speech in Scotland is largely rhotic, favoring strongly rhotic
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3 alveolar and retroflex approximant realizations (e.g., Lawson et al 2013:199). Lawson et al.
4 (2014:54) propose that non-prevocalic /r/ is “almost never omitted” in Middle Class
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alveolar and retroflex approximant realizations (e.g., Lawson et al 2013:199). Lawson et al. (2014:54) propose that non-prevocalic /r/ is “almost never omitted” in Middle Class Edinburgh speech, and Stuart-Smith’s (2008:64) study of Glasgow speech reports that Middle Class speakers retain /r/ in 90 percent of tokens.

Despite the status of Scottish Standard English (SSE) as the overtly prestigious variety in urban Scotland, there is evidence to suggest that contact with Anglo-English can result in the anglicization of a limited set of phonological features among some of Edinburgh’s middle class (Schützler 2015:23-26). Aitken (1979:111-112) identifies the loss of coda /r/ as an optional feature available to some middle class Scottish speakers. In his investigation of middle class speech in Edinburgh, Schützler (2010a; 2010b; 2013; 2015) reports a significant correlation between extensive Anglo-English contact and the deletion of coda /r/. Schützler also finds greater non-rhoticity in women than men. However, Schützler (2013:21) concludes that “while there is considerable variation and a substantial overall proportion of vocalized (r), all speakers seem to be aware of a rhotic SSE norm,” the influence of which “becomes stronger in language-conscious or more formal situations.” This finding echoes Speitel and Johnston (1983:28), who found that all speakers, even RP-like speakers, favored the SSE variant in formal styles, “which implies that high-status SSE, and not the ‘foreign’ RP, is viewed as the model variety.” Schützler (2015:23-26) argues that SSE is positioned along two continua simultaneously: one between Scots and Scottish English, and another between the conflicting “standard” varieties of SSE and Southern Standard British English.

In contrast to the predominantly rhotic (albeit variably non-rhotic) Middle Class speech, a distinct process of the derhoticization of non-prevocalic /r/ has been reported in contemporary WC urban Scottish speech (e.g., Romaine 1978; Speitel & Johnston 1983; Lawson et al. 2011). Lawson et al. (2014:54-55) note that, for Working Class speakers, approximants usually lack the “strong rhotic quality” that characterizes Middle Class speech.

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3 Based on a corpus of speech and ultrasound tongue imaging data from Working Class and
4 Middle Class adolescents, Scobbie et al. (2008) and Lawson et al. (2008, 2011, 2013, 2014)
5 investigate the socioeconomic patterning of rhoticity in Edinburgh speech.⁴ These studies
6 conclude that, while speakers remain largely rhotic overall, there is social stratification in “the
7 degree of strength of rhoticity,” with greater derhoticization occurring in Working Class
8 speech (Lawson et al. 2014:53). This derhoticization is present alongside the variable non-
9 rhoticity attested in Middle Class speech, resulting in three key variants: strong rhoticity,
10 derhoticization, and non-rhoticity. Speitel and Johnston’s (1983:28) auditory analysis
11 indicated that the derhoticization was “almost entirely confined to WC speech...while 0 [non-
12 rhoticity] is rare outside of UMC [Upper Middle Class] speech.” We return to the phonetic
13 differences between derhoticization and non-rhoticity in §4.2.
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29 Age and gender have also been identified as important factors interacting with social
30 class in predicting the realization of non-prevocalic /r/. Speitel and Johnston (1983:28) found
31 that, regardless of socioeconomic status, women generally favored the alveolar approximant,
32 although tap realizations were reported among older lower-middle-class women. Taps were
33 the preferred variant for older Working Class men. Younger speakers, and particularly
34 women, favored the alveolar approximant. Class stratification in /r/ realisation was concluded
35 to be more evident in men than in women. Schützler (2010) finds that Middle Class women
36 display more non-rhoticity than their male counterparts, although, like Speitel and Johnston,
37 he finds that MC women favor the alveolar approximant while Middle Class men show a
38 higher rate of alveolar taps and trills. Lawson et al. (2011) note that both Middle Class and
39 Working Class females have relatively high rates of schwa realizations (rhoticization of the
40 schwa vowel [ə]) and that Working Class males show the most derhoticization. In Glasgow,
41 Stuart-Smith (2003) also finds that Working Class males produce the most /r/ weakening.
42 Stuart-Smith et al.’s (2015) acoustic analysis of older Glaswegian men finds higher F3 values
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3 (and, therefore, weaker rhoticity) for rhotic syllables produced by relatively younger men
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5 (1890s vs. 1920s) and those men recorded more recently (2000s vs. 1970s), pointing to a
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7 change in apparent time. However, in Edinburgh, Lawson et al. (2014) found no gender
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9 difference in the patterning of rhoticity among young, Middle Class speakers.
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13 Despite a wealth of research on the relationship between rhoticity and socioeconomic
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15 status in urban Scottish speech, little attention has been paid to the speech of individuals who
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17 have been socially mobile over the course of their life. Macfarlane and Stuart-Smith note the
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19 “social fluidity” that is reflected in Scottish urban speech, where “[a]ttempts by emerging
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21 middle-class speakers to distance themselves from their working-class roots linguistically has
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23 led to a range of varieties associated with the middle-classes” (2012:767). Social mobility in
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25 urban Scottish society is typically associated with speech styles such as *Morningside English*
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27 in Edinburgh and *Kelvinside English* in Glasgow (Johnston 1985:37), terms referring to
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29 neighborhoods that have been historically associated with affluent social groups. These
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31 “enregistered” varieties (Agha 2007) are commonly believed to reflect “pseudo-upper-class
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33 gentility” among older Lower Middle Class women (Johnston 1985:37), giving a variety
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35 perceived as pretentious, affected or snobbish (Aitken 1979:526). *Morningside English* is
36
37 described as “a compromise between elocuted Hyper-RP and Scots vernaculars” (Johnston
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39 1985:40), with a vowel system that resembles RP, combined with exaggerated intonation
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41 contours and strongly rhotic realizations of /r/ (Johnston 1985:39). Johnston identifies
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43 *Morningside English* as an accent acquired during adolescence, commonly in speakers who
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45 have been privately educated (1985:42).
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53 Although *Morningside* and *Kelvinside English* are now regarded as highly stigmatized
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55 (Johnston 1985:52), recent studies have reported the emergence of related speech styles such
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57 as the *Glasgow Uni accent* (MacFarlane & Stuart-Smith 2012), a hypercorrect variety
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59 associated with upwardly mobile students at the University of Glasgow. MacFarlane and
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3 Stuart-Smith's matched guise test reveals a bias in listeners' perceptions of socioeconomic
4 status based on phonetic features of the Glasgow Uni accent, including lengthened retroflex
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8 approximants for /r/ (2012:767). This suggests that, beyond the stereotypes of Morningside
9
10 and Kelvinside English, upwardly mobile speakers may encode aspects of that mobility in
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12 related, but more subtle, acoustic features.

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15 Recent work in sociolinguistics (e.g., Preston 2013) has challenged Labov's initial
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17 (1966a:318) hypothesis that hypercorrection among Lower Middle Class speakers is "rooted
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19 in a profound linguistic insecurity [which is] an inevitable accompaniment of social mobility
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21 and the development of upward social aspirations in terms of the socio-economic hierarchy."
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23 In light of our results, we argue that the approximant variant now carries the most linguistic
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25 capital in Edinburgh's linguistic marketplace (Bourdieu 1977), and its high rates of use by
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27 NMC speakers is a reflection of upward mobility across the lifespan.
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34 **3. Methods**

35 36 37 38 39 3.1. Data and participants

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42 Speech was collected from sixteen men and women (Table 1) born and raised in Edinburgh
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44 with Scottish parentage, living in Edinburgh at the time of interview. The participants were
45
46 aged fifty-seven to sixty-nine years at the time of data collection (November 2013 to January
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48 2014) and broadly represent three categories of socioeconomic status: Working Class (WC),
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50 New Middle Class (NMC) and Established Middle Class (EMC). Socioeconomic status was
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52 assessed on the basis of participants' education and employment, and that of their parents,
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54 following classifications outlined by the UK Office for National Statistics (ONS 2010). Smith
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56 et al.'s (1998) study of health in the West of Scotland also identifies education and
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58 occupation as strong indicators of social class. The inclusion of parental education and work
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3 allows for the key comparison of participants' socioeconomic status during childhood and
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5 adulthood.
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8 Participants were recruited through former pupil networks at a number of schools in
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10 central Edinburgh and by word of mouth. The WC group consists of speakers who left full-
11
12 time education at age sixteen or younger and began work in "blue-collar" jobs (Boyle
13
14 1995:7), such as construction or retail work, and whose parents had similar jobs. The EMC
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16 speakers are university graduates who attended private schools in Edinburgh and went into
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18 professional or "higher managerial" occupations (ONS 2010), in fields such as medicine,
19
20 teaching, and academic research, and had parents who followed similar career paths. The
21
22 NMC group consists of speakers who have been upwardly mobile over the course of their
23
24 life. These participants had parents who fit the WC criteria specified above, and were the first
25
26 in their family either to go to university or to work in a skilled profession. A number of the
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28 NMC participants had been awarded a scholarship to attend a fee-paying school. Given that
29
30 upward mobility is characterized by changes over the lifetime in education (Deary et al.
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32 2005:455), employment (Tiffin et al. 2005:870) and cultural interests (Schерger & Savage
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34 2010:406), older participants were recruited in order to find speakers who had established
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36 these social characteristics over the course of their life.
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43 [TABLE 1 HERE]

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46 The criteria for socioeconomic status employed here are far from exhaustive, given
47
48 the plethora of cultural factors that can contribute to a speaker's class identity (e.g., Schерger
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50 & Savage 2010:406), which is flexible, multifaceted, and can be difficult to classify
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52 categorically. However, for the purposes of the present study, education and employment
53
54 offer a guideline for identifying tiers of socioeconomic status in a small sample of
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56 participants who broadly represent WC, NMC, and EMC social groups in Edinburgh society.
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58 Only participants who reported relatively minimal face-to-face contact with Anglo-English
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3 were included in the study, given Schützler's (2010a, et seq.) findings that Anglo-English
4 contact is a significant predictor of non-rhoticity.
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8 Participants were recorded in casual, lightly directed conversation in single-sex same-
9 socioeconomic groups of two or three speakers. Six sessions were recorded in total, each
10 lasting approximately one hour. Conversations were prompted with a written list of
11 discussion topics, including aspects of childhood, education, family, work, and life in
12 Edinburgh. The sessions were led by the first author, a female speaker of SSE from
13 Edinburgh, who was present at each session. Interpersonal dynamics were impressionistically
14 similar across each conversation group, as most participants had met previously or had
15 mutual friends. Participants were told that the recording would be used for a study of
16 language in Edinburgh, but were not told that non-prevocalic /r/ was the area of interest. The
17 sessions were recorded using an *EdirolR-44* four channel audio recorder with lapel
18 microphones.
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39 3.2. Challenges in coding rhotic variation 40 41

42 Despite its presence in three quarters of the world's languages (Maddieson 1984:83) the
43 phoneme /r/ is difficult to define phonetically, due to the “astonishingly nondeterministic
44 correspondence between an /r/ and the cross-linguistic range of possible phonetic exponents
45 involved” (Scobbie 2006:337; see also Ladefoged & Maddieson 1996:244; Docherty &
46 Foulkes 2001:174; Cathcart 2012:76; Savu 2012:15). Lindau (1985:166) proposes that rhotics
47 should be viewed as a “family” of interrelated sounds with some overlapping phonetic
48 characteristics but with no single unifying feature.
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58 In their investigation of rhoticity in urban Scotland, Lawson et al. (2011; 2014)
59 attempt to classify variants of /r/ in terms of perceived strength of rhoticity. They propose a
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3 series of “auditorily distinct” /r/ variants “correlat[ing] with strong and weak ends of an
4 auditory rhotic continuum” (Table 2), with rhotic taps and trills at the strong end, non-
5 rhoticity and derhotization at the weak end, and approximants and schwa as intermediate
6 variants. However, they further note that the tap and trill realizations “sit somewhat uneasily
7 in the continuum of what are otherwise approximant forms of /r/” (2014:56). Romaine
8 (1978:147) similarly states that “there is nothing ‘in between’ an [r] and [ɹ].”⁶ Schwa is also
9 a challenging variant to rank on the continuum since it refers to the quality of a vowel rather
10 than the presence of a non-vocalic segment. Lawson et al. (2014:56) position it towards the
11 strong end because the long duration of the rhotic quality results in the auditory perception of
12 strong rhoticity.

13 [TABLE 2 HERE]

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Aside from the challenges of arranging rhotic variants on a continuum of phonetic strength, Schützler (2010:17) notes that the organization of rhoticity into a hierarchical scale of realizations can be misleading as “intermediate values may have distinct and stable social meanings.” We agree that any continuum of rhotic strength is fundamentally orthogonal to the indexical “strength” or quality of the variation in question.

Because of all of these issues in treating rhoticity as a continuum, it may seem advisable to eschew fine phonetic variation and treat rhoticity as a binary variable, rhotic and non-rhotic, as early studies have done. However, we have adopted the continuous auditory scale here because we believe that it represents levels of variation that are linguistically and socially relevant to the Edinburgh context. Specifically, the differences within the level of non-rhotic (“no /r/” and “derhotitized”), as well as the level of rhotic (“approximant” and “tap/trill”, at least), are socially important, as the analysis will show.

3.3. Auditory coding

A total of 5212 tokens of non-prevocalic /r/ were coded (an average of 326 tokens per speaker) by auditory and visual analysis using Praat (Boersma & Weenink 2011). Each token was assigned to one of seven categories on the ‘auditory-rhotic continuum’: no /r/ (Ø), derhoticization [V^h], alveolar approximant [ɹ], retroflex approximant [ɻ], schwa [ə], tap [ɾ], or trill [r] (Table 2). All tokens of non-prevocalic /r/ were included in the dataset, with the following exceptions:

(1) Tokens followed by a word-initial /h/ that is deleted, resulting in a prevocalic context

(2) Tokens followed by a word-initial /r/, resulting in two adjacent /r/ segments that cannot be distinguished

(3) Tokens where the total duration of the preceding vowel and /r/, measured from the onset to the offset of voicing, was less than 30ms (Scobbie et al. 2008:10).

All coding was conducted by the first author. To check the reliability of coding decisions, a five-minute data sample was cross-coded by the second author. The results showed a match of 90.6 percent in the identification of /r/ realizations, allowing a difference of one category. Stuart-Smith (2007) notes that there is scope for variability between transcribers in the auditory classification of /r/ realizations.

3.4. Statistical analysis

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3 Rhoticity was operationalized as a pseudo-continuous linear scale based on the continuum in
4 Table 2, with “non-rhotic” coded as “0” and “tap” and “trill” combined (due to data sparsity
5 and phonetic similarity) and coded as “5” (see §3.2). The final statistical model of RHOTICITY
6 was obtained through by-hand drop-one ANOVA comparisons of mixed effect linear
7 regression models built using lme4 (Bates et al. 2014) in R (R Core Team 2013). Random
8 effects of WORD and SPEAKER were included in order to account for interspeaker differences
9 and the effect of individual words.⁷ Speaker socioeconomic status and gender were entered as
10 fixed effects and an interaction effect, and a number of linguistic factors were tested as
11 independent fixed effects (Table 3).
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24 One linguistic constraint considered was SYLLABLE STRESS, based on previous work
25 showing that unstressed syllables are more susceptible to derhoticization (Scobbie et al.
26 2008:11; Schützler 2010:17). PRECEDING VOWEL has also been shown to predict patterns of
27 rhoticity (Lawson et al. 2011:263, Schützler 2010:19, Stuart-Smith et al. 2015). We followed
28 Lawson et al. (2013:200) in coding tokens according to Wells’ (1982) lexical sets: NURSE [ʌ],
29 NEAR [i], SQUARE [e], START [a], NORTH [ɔ], FORCE [o], CURE [ʊ] and LETTER [ə].⁸
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39 Following phonological environment was also coded for. Scobbie (2006:340)
40 proposes that the weakening of non-prevocalic /r/ is more common word-internally than word
41 finally, and has elsewhere (Scobbie et al. 2008:10) shown that weakening is favored in pre-
42 pausal positions (see also Romaine 1978:148; Speitel & Johnson 1983:28, but see Schützler
43 2010a:9), although socially stratified variation is also apparent. All tokens were also
44 categorized according to the manner of articulation (approximant, fricative, nasal, pause,
45 stop) of the following segment. Lastly, LEXICAL FREQUENCY was considered to test whether
46 frequent words are more likely to be derhoticized, as proposed by Scobbie (2006:340).
47 Lexical frequency values were taken from the spoken version of the BNC and run as a log-
48 scaled factor (see e.g., Schützler 2010).⁹
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3 [TABLE 3 HERE]
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8 4. Results 9

10 4.1. Rhoticity in Edinburgh English 11 12

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17 Figure 1 shows the proportional realization of non-prevocalic /r/ according to socioeconomic
18 status and gender. The variants are ranked in order from the weakest (non-rhotic) to strongest
19 (trill) levels of rhoticity. With the exception of the WC men, *schwar* is the most common
20 variant across all groups (46 percent of the data). The alveolar approximant is next most
21 frequent (27 percent of the data), with similar rates of use across all groups. The retroflex
22 approximant and the derhotic variants are found in all groups but relatively rarely (8 percent
23 and 6 percent of the data respectively).¹⁰ Taps and trills are extremely rare overall (1 percent
24 of the data), and are hardly found in EMC speech. Lastly, every group shows some non-
25 rhoticity or derhoticization, but WC males have the greatest proportion by far. Echoing
26 classic findings on gender and social class (e.g., Guy et al. 1986), the greatest gender
27 difference we find is among the WC speakers. WC women show relatively low levels of
28 weak rhoticity compared with WC men.
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48 Social groups differed in their degree of intragroup variation, which was not always
49 explainable by differences in token counts. As shown in Figure 1, the highest proportion of
50 tokens comes from the NMC men and the least from the WC men, due in part to the number
51 of speakers (three NMC men versus two WC men). However, the greatest amount of
52 intragroup variation is seen among the three NMC women, two of whom show an 11 percent
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3 difference in the rate of production of approximants (40 percent vs. 51 percent). Overall,
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5 between group differences appear to be greater than within group differences.
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8 As set out in §3.4, our statistical model follows Lawson et al.'s (2014) auditory-rhotic
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10 continuum, operationalizing RHOTICITY as a pseudo-continuous linear scale ranging from
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12 non-rhotic (coded as 0) to tap/trill (coded as 5). The model tests for both the fixed effects and
13
14 the interaction effect of socioeconomic status and gender. The descriptive results show
15
16 evidence of an interaction between class and gender, given the difference in realization
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18 patterns between WC men and women (Figure 1). Independent fixed effects were also
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20 included for the linguistic factors listed in §3.4
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24 [TABLE 4 HERE]
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27 The process of model comparisons retained the interaction effect between the two
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29 social factors; these results are slightly complicated and we return to them momentarily. As
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31 for linguistic constraints, the best fit model eliminated LEXICAL FREQUENCY, WORD FINALITY,
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33 and PHRASE FINALITY¹¹ but retained SYLLABLE STRESS and FOLLOWING MANNER. The
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35 coefficients are summarized in Table 4. As previous work has found, unstressed syllables
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37 favor less rhotic variants ($p < 0.0003$). Of the preceding vowel contexts, the back vowels in
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39 NORTH ($p < 0.014$), FORCE ($p < 0.026$), and START ($p < 0.044$) favor less rhoticity than the front
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41 vowel environments. For following manner, fricatives ($p < 0.018$), and stops ($p < 0.015$)
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43 following /r/ significantly favor rhoticity, while approximants, nasals, and pauses do not.
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48 The results with respect to social factors are complicated for several reasons. Firstly,
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50 social class does not pattern in a linear way, i.e., it is not the case that the NMC speakers
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52 pattern “in-between” the EMC and the WC. Rather, the NMC speakers show higher rates of
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54 rhoticity than the other groups ($p < 0.0004$). At the same time, in contrast to previous
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56 observations that (Established) Middle Class speakers show hardly any non-rhoticity, and that
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58 Working Class speakers show the most derhoticization, here we see the opposite pattern, with
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3 WC speakers, specifically WC women, favoring rhoticity more strongly than EMC men and
4 women ($p < 0.005$). Figure 1 confirms that there is indeed a higher proportion of non-rhotic
5 and derhotic tokens among EMC men and women than has been noted previously,
6 particularly for studies on much younger speakers (see Lawson et al. 2011, Table 2). The
7 overall finding of a relatively rhotic Working Class, despite the very high rate of weak-/r/
8 production among WC men (Figure 1), highlights the gender difference among WC speakers.
9 It is therefore important to examine the interaction between class and gender, as aggregate
10 results by social class alone fail to capture the distinctive patterns of variation we find here.
11 While there is no difference between the NMC men and the EMC men ($p = 0.105$), the
12 strongest effect in the whole model is the fact that the WC men are the least-rhotic social
13 group ($p < 0.0001$). Although there is no significant effect of gender on its own ($p = 0.208$), the
14 interaction effect between class and gender seems to achieve significance in this model
15 simply by virtue of the very stark differences between WC men on one hand, and the rest of
16 the sample on the other. In this way, the surprising “rhoticity” of the WC group is due to a
17 combination of relatively higher-than-expected rates of rhoticity among the WC women, and
18 relatively lower-than-expected rates of rhoticity among the EMC. We return to these points in
19 §5. In the next section, we briefly take a closer look at the fine phonetic differences between
20 the non-rhotic and derhotic realizations of weak rhoticity.
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51 4.2. Non-rhoticity versus derhoticization

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55 Rhoticity is interesting sociophonetically because what can be framed as “continuous”
56 variation on a phonetic scale does not correspond to similarly structured variation at a
57 socioindexical level. For example, while high rates of rhotic use appear to index Middle Class
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3 and female identities, the most fortis variants (taps and trills) do not have the same social
4 correlates. Although “schwar” and “tap” are only one step apart on Lawson et al.’s (2011)
5 auditory scale, they are very different with respect to indexicality. Schwars and taps are also
6 extremely different phonetically, in that schwar is a liquid colouring of a vowel and a tap is a
7 reduced stop consonant, so perhaps it is unsurprising if different social meanings attach to
8 these major differences in manner. The situation is less straightforward for two other scale-
9 adjacent variants: non-rhotics and derhotics. While both variants are clearly favored in our
10 data by the WC men, non-rhoticity is notably more frequent among the EMC speakers than
11 the NMC speakers. Thus, despite their phonetic similarity, non-rhotics and derhotics show a
12 difference in their apparent socioindexical functions. For this reason, we set out to conduct an
13 acoustic analysis with a view to determining the acoustic features that distinguish non-rhotics
14 from derhotics. This section reports the findings of our analysis, which is based on data from a
15 subset of the main corpus.
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34 Non-rhotics and derhotics together comprise only 18 percent of our entire corpus,
35 despite their high proportion in WC men and, to a certain extent, EMC speech. This confirms
36 that Scottish English is generally rhotic but presents a challenge for quantitative analysis.
37 Since full quantitative modelling would not be possible with such a limited data set, we
38 present here only a descriptive analysis of the data.
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46 A number of acoustic features have been proposed to distinguish non-rhotics from
47 derhotics. Formant structure has been the basis of most acoustic studies of rhoticity in
48 English, in which dynamic measures of the second and third formant values are taken
49 throughout the syllable rime, controlling for vowel quality. While approximant realizations of
50 /r/ feature a steep drop in F3, non-rhotic, derhotic, and schwar realizations are all
51 characterized by flat formants throughout the syllable rhyme. In schwar realizations, F2 and
52 F3 are closer together than for non-rhoticity or derhoticization (Lawson et al. 2014:54).
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Lennon et al. (2015), who limited their analysis to the vowels in *feared* and *hurt*, show that derhotic tokens have a drop in F2, with F2 and F3 moving further apart at the end of the rime. Non-rhotic tokens show a slightly higher F2 throughout, with F2 and F3 relatively closer at the end of the rime.

Other acoustic features reported to distinguish derhotic tokens from non-rhotic tokens include the presence of frication or devoicing (Speitel & Johnston 1983) and a pharyngealized off-glide or “a pharyngeal, velarized or retracted quality on the preceding vowel” (Lawson, et al. 2014:55). Speitel and Johnston’s (1983:27-28) auditory analysis of non-prevocalic rhoticity in Edinburgh English notes that, “RP has vocalized the /r/ in this position...This reflex (symbolized by 0) must be carefully distinguished from a vocalization to a strongly pharyngealized vowel,” the variants of which are “sometimes turned into fricatives, often partially devoiced” and are “slightly more common in pre-pausal position than elsewhere.” Thus, the pharyngealization that typifies the derhotic variant of /r/, as opposed to the non-rhotic variant, is evidenced by at least two acoustic measures: formant structure, and the presence of frication. Figure 2, from our data, shows an example of a rhotic (the /r/ in *car*) produced by one of our WC male speakers with pharyngealized frication, or a devoiced offglide. The portion of pharyngealized frication, evidenced by the area of voiceless noise on the spectrogram, is highlighted.

[FIGURE 2 HERE]

Our analysis of the distinction between derhotics and non-rhotics focuses on the presence or absence of discernible frication following a vowel with an absence of /r/-colouring.¹² This period of frication is measureable only in phrase-final contexts. We therefore limited the tokens coded as either non-rhotic (N=641) or derhotic (N=290) to those occurring phrase finally, leaving a total of 135 tokens. We coded all non-rhotic or derhotic tokens of the START vowel for the presence or absence of frication¹³ (as illustrated in Figure

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3 2). The results showed that 51 percent of tokens had some evidence of devoiced frication.
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5 However, our data contain a much higher proportion of tokens coded as derhotic (72 percent)
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7 than non-rhotic (28 percent). This presents a caveat to the coding of non-rhotics versus
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9 derhotics on the basis of auditory judgements alone.
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12 [TABLE 5 HERE]
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15 The significance of socioeconomic status and gender as predictors of the presence of
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17 frication for weak rhoticity was tested with a mixed-effects model. Table 5 presents the
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19 results of the model, which tests socioeconomic status and gender as independent fixed
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21 effects (with speaker and word as random intercepts). As this analysis is based on only a
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23 limited subset of our corpus, full quantitative modelling of an interaction effect of class and
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25 gender was not possible. The results indicate that class, but not gender, is a significant
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27 predictor of the presence of frication (Table 5). As expected, WC speakers are more likely to
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29 produce audible frication than either EMC or NMC speakers. However, these results do not
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31 account for the stark gender difference in /r/ realization for WC speakers; the results of the
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33 main study show that WC men produce a far higher proportion of non-rhotic and derhotic
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35 realizations than WC women. Men therefore represent 91 percent of the ‘Working Class’ data
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37 for this analysis (which is limited to tokens coded as non-rhotic or derhotic).
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43 The results provide evidence to support the claim that pharyngealized, devoiced
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45 frication is a feature of WC men’s speech in urban Scotland (e.g., Lawson et al. 2011).
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47 However, the discrepancy between the proportion of tokens with frication (51 percent) and
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49 the proportion coded as derhotic (72 percent) raises two issues; firstly, devoiced frication may
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51 not be an essential and defining property that is unique to devoiced realizations of /r/; and,
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53 secondly, auditory judgements alone may not be sufficient to identify the presence of
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55 frication or to distinguish between derhotic and non-rhotic tokens.
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4 The results overall show that speakers of all class and gender groups produce both
5 non-rhotic and derhotic variants, to some degree (see Figure 1). The key challenge for an
6 auditory analysis is the difficulty that arises in trying to distinguish between non-rhotic and
7 derhotic variants. This distinction is important, given the complex socioindexical histories of
8 the two variants, non-rhotic realizations being linked to (Upper) Middle Class Anglo-English
9 varieties, while derhotics are associated with Working Class varieties (including Scots).
10 Methodologically, this small side analysis supports the use of a post-vocalic frication period
11 as one potential acoustic cue to derhoticization, building on existing acoustic methods that
12 draw on formant analysis, as well as auditory and articulatory measures.
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30 **5. Discussion**

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34 The results from this analysis of spontaneous conversational speech among Edinburgh natives
35 in their 50s and 60s suggests that the production of non-prevocalic /r/ is socially stratified and
36 strongly interacts with gender for Working Class speakers. Middle Class speech favors rhotic
37 variants, although ‘Established’ Middle Class speakers, particularly EMC women, produce
38 variable non-rhoticity, in line with previous findings (e.g., Speitel & Johnston 1983; Schützler
39 2015). The ‘New’ Middle Class speakers, particularly NMC women, show extremely high
40 rates of rhoticity, with realizations largely divided between approximant and schwa. These
41 speakers, who were born into the Working Class and who experienced upward mobility over
42 their lifespan, show very low rates of derhoticization and non-rhoticity. Taps and trills are
43 used very sparingly by both groups of Middle Class speakers, supporting Lawson et al.’s
44 observation of the general “attrition of stereotypical Scottish variants in postvocalic position”
45 (2014:63). WC men show widespread derhoticization, while WC women show very high rates
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3 of rhoticity, essentially patterning like the Middle Classes. Although infrequent, the highest
4 proportion of tap and trill variants is found in WC speakers, especially men. NMC speakers
5 and WC men are, therefore, polarised in their production of non-prevocalic /r/. Some possible
6 explanations for these patterns are discussed in the following sections.
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12 13 14 15 5.1. Mobility and variation: superstandard non-prevocalic /r/ in New Middle Class speech 16 17

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20 The central focus of this investigation has been to shed light on the relationship between class
21 mobility and the realization of non-prevocalic /r/. The majority of variationist studies
22 considering social class have treated the socioeconomic status of individual speakers as static:
23 a single speaker is assigned to a single class category, and those categories are arranged on a
24 scale from lowest to highest. Any indication of a possible change in class membership for an
25 individual speaker (i.e., class mobility) is then inferred by their linguistic behaviour. The
26 prime example of this is the interpretation of the “crossover effect” (Labov 1966a), where
27 speakers who have been categorized as Lower Middle Class and/or Upper Working Class are
28 shown to produce markedly high rates of “standard” linguistic forms in tasks like reading
29 aloud word lists (Labov 1966a:318; Preston 2013:325). This high proportion of “standard”
30 realizations is reported to indicate an aspiration for upward social mobility and the
31 employment of linguistic resources toward attaining that goal (e.g., Labov 1966a). Therefore,
32 although the LMC/UWC label is a static category, one of the hallmarks of a LMC/UWC
33 identity is the potential for upward mobility. In this way, explanations of a crossover effect
34 among LMC speakers may similarly be extended to the study of socioeconomically mobile
35 individuals like the NMC speakers examined here.
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58 The NMC group in the present corpus shows evidence of sociophonetic patterns that
59 are distinct from those of both WC and EMC speakers. NMC speakers consistently show the
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3 highest rate of rhoticity in the corpus, avoiding both the derhoticization that increasingly
4 characterizes WC urban Scottish speech (e.g., Lawson et al. 2014) and the variable non-
5 rhoticity that has been attested for Middle Class speakers (e.g., Schützler 2015). This high
6 proportion of overtly prestigious rhoticity mirrors Labov's (1966b) findings for
7 socioeconomically intermediate (or indeed upwardly mobile) speakers in New York City:
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18 The most striking finding of this discussion is that a group of speakers
19 with a past history of upward mobility is more apt to resemble the
20 next higher socioeconomic group in their linguistic behavior than the
21 one with which they are currently associated. Despite the fact that
22 these speakers may be expected to show traces of their class origins
23 by retaining behavior patterns of the next lower class group, we find
24 exactly the reverse. (Labov 1966b:202)
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36 Thus, patterns of /r/ realization among the socially mobile residents of the Lower East Side in
37 1963-1964 are strikingly similar to those of Edinburgh's NMC in 2013-2014, despite the
38 radical difference in community and time period. One question is whether the rhoticity of the
39 NMC speakers would have resembled the patterns of their WC peers when they were
40 adolescents. For example, Eckert's work and other studies of adolescents (e.g., Wagner 2012)
41 argue that differences in class aspiration among members of the same social class (as defined
42 by, for example, their parents' occupations) can shape production patterns prior to
43 individuals' entrance into the work force. Lawson's (2011) study of male adolescents in a
44 Glasgow high school illustrates how members of the school-oriented "schoolie" peer group
45 express social distance from the anti-establishment "ned" peer group through raising of the
46 Scottish CAT vowel. The present study demonstrates that, despite achieving the same
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3 economic outcomes as the Established Middle Class, patterns of linguistic variation among
4 the New Middle Class are somewhat different even in later life. This pattern follows quite
5 clearly from the understanding of linguistic variation as a potential resource for the
6 construction of a social identity (e.g., Eckert & McConnell-Ginet 1992; Kirkham 2015;
7 Coupland 2016), and the continuous modification and reconstruction of this linguistic identity
8 over the course of the lifespan.
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11 The question, then, is how best to characterize the motivations inherent to socially
12 mobile speakers, especially as related to patterns of linguistic production. Various scholars
13 (e.g., Yaeger-Dror 1992; Milroy 1999; Preston 2013) have rejected Labov's explanation of
14 hypercorrection among socially mobile groups as "linguistic insecurity", favoring instead the
15 discussion of language ideologies (Woolard & Schieffelin 1994:60) and the linguistic
16 patterns that result from apparent ideological differences. Macfarlane and Stuart-Smith
17 (2012:770) note that, although speakers' socioeconomic backgrounds "may contribute to
18 their linguistic behaviour, it is important to acknowledge that they also create and manage
19 their identity through their language." Lippi-Green asserts that situations of hypercorrection
20 cannot be understood without a more thorough exploration of the "underlying motivations for
21 shifts in power and solidarity" that cause social variation (1997:175). For instance, in her
22 study of American "geek girl" speech, Bucholtz (2008:88) defines "superstandard" English as
23 a marked variety that contrasts ideologically with both standard and non-standard varieties of
24 English. In urban Scotland, patterns of superstandard speech have been reported previously in
25 varieties such as Morningside and Kelvinside English (in Edinburgh and Glasgow
26 respectively; Johnston 1985), where exceptionally high rates of rhoticity are said to
27 characterize both varieties. Given that an approximant realization of /r/ is widely attested as
28 an overtly prestigious variant of urban Scottish speech (Romaine 1979:154; Speitel &
29 Johnston 1983; Johnston 1997:511; Scobbie 2006:339; Schützler 2010a:12), it is likely that
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3 high rates of rhoticity have been characteristic of upwardly mobile speakers in Scotland for
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5 some time. The high proportion of rhotic variants reported for NMC speakers in the present
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7 study may therefore constitute a symbolic resource of economic gain (Bourdieu 1977),
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9 constructing as well as reflecting their upward socioeconomic mobility.
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17 5.2. Derhoticization in Working Class speech

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22 In contrast to the pattern identified for NMC speech, the results reveal a strikingly high rate
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24 of non-rhoticity and derhoticization in WC men. This finding joins previous work
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26 documenting widespread derhoticization as an emerging marker of WC speech (Lawson et al.
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28 2014:53), although the present data suggest that this pattern is only apparent in men. A
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30 similar pattern of non-rhoticity among WC speakers can be seen in Becker's study of
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32 rhoticity on New York City's Lower East Side, where WC speakers use increased rates of
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34 non-rhotic variants to index local authenticity (2009:634). Becker proposes that WC speakers
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36 can "actively create and change social meaning" through selective use of non-rhoticity
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38 (2009:635). Derhoticization in WC men in the present study may similarly stem from a
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40 distinctive language ideology among this group of speakers, as reported by Milroy (2015) for
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42 WC speakers in Glasgow. Macfarlane and Stuart-Smith note the perceived authenticity of a
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44 WC identity in Glasgow, which "is certainly the 'prestige' option for many" (2012:766). The
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46 interaction of class identity with gender is further discussed by Lawson (2015), who notes the
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48 association of vernacular speech with WC masculinity and "toughness" among pupils in a
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50 Glasgow high school. Coupland (2016) proposes that change over time in class structure and
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52 the way in which social class is experienced calls for new approaches to the study of
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54 language and class. Coupland introduces the concept of "vernacularization" as a type of
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3 sociolinguistic change running counter to processes of standardisation, and we return to this
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5 concept in the conclusion. In the following section, we analyze the realization patterns found
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8 for WC men with reference to wider claims of the distribution of rhoticity in urban Scottish
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10 speech and the proposal of a socially stratified rhotic continuum (Lawson et al. 2014:63).
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17 5.3. Socioeconomic status and the auditory-rhotic continuum 18 19 20 21

22 The patterns reported above offer support for the claim that derhoticization in Edinburgh is
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24 most prevalent in the speech of Working Class men (Lawson et al. 2011:257). The auditory-
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26 rhotic continuum set out by Lawson et al. (2014:63), and illustrated in Table 2, has been
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28 reported to be socially stratified in urban Scottish speech. Weakly rhotic variants are said to
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30 occur mostly in WC speech, with MC speech characterized by strong rhoticity (Lawson et al.
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32 2014:63), to the exclusion of the MC use of non-rhoticity, which has in previous studies been
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34 attributed to Anglo-English influence (Schützler 2010). However, the results of the current
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36 study complicate the notion of a socially stratified rhotic continuum. In addition to high rates
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38 of derhoticization in WC men, speakers in the WC group also show the highest rates of use of
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40 the strongly rhotic tap and trill variants, which are situated at the opposite end of the
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42 auditory-rhotic spectrum. Romaine (1978:148; see also Speitel & Johnston 1983) similarly
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44 found that WC boys have the highest rate of both /r/ deletion and alveolar taps, while girls
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46 favor approximant realizations. Speitel and Johnston propose that alveolar taps are a sign of
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48 “self-identification with vernacular culture or with Scottish ethnic identity” (1983:26).
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50 Schützler (2010:5) concludes that “innovation on the structural level [the deletion of /r/] and
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52 conservatism on the realizational level [the retention of taps and trills] appear to be
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54 conditioned by the same sociolinguistic factors.” Thus, despite their phonetic and articulatory
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3 differences (Lawson et al. 2014:63), the derhoticized variants and the strongly rhotic tap and
4 trill variants share a common status as linguistic features of Working Class speech for men in
5 urban Scotland.
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10 The results therefore suggest that, while there is a tendency for greater derhoticization
11 among WC men, they make use of variants from across the auditory-rhotic spectrum. In
12 contrast, the EMC speakers in the present study make almost exclusive use of variants that
13 are situated in the middle of the rhotic continuum (with high rates of approximant and schwar
14 realizations). In this way, Working Class men and Middle Class speakers are polarized in
15 their patterns of /r/ realisation (c.f., Milroy 2015). The divergence between these two speaker
16 groups supports Coupland's assertion that vernacularization and standardisation are
17 competing processes that can operate simultaneously in a given speech community.
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32 6. Conclusions

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34 Sociolinguistic studies typically treat speakers as stable with respect to social class, despite
35 evidence that class mobility is often the community norm (e.g., Blondeau 2001), especially
36 for speakers born into a class level somewhere in between Working Class and Middle Class
37 (e.g., Labov 1966b). The present study has investigated rhoticity in Edinburgh, Scotland, as
38 realized by Established Middle Class, New Middle Class, and Working Class speakers. The
39 results confirm a significant correlation between /r/ realization and socioeconomic status,
40 with gender as an interacting factor. Patterns of /r/ realization in NMC speech reflects
41 previous claims that "Lower Middle Class" speakers display hypercorrection in their use of
42 prestige forms (e.g., Labov 1966a:318; Preston 2013:325). NMC speech shows very little
43 non-rhoticity, a result which distinguishes this group from both EMC and WC speakers.
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Conversely, derhoticization is widespread among men in the WC group, in line with previous

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3 findings for WC urban Scottish speech (e.g., Stuart-Smith 2003:131; Lawson et al.
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5 2011:257). However, WC men also show a small but significant number of strongly rhotic
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7 taps and trills; future research could employ a more qualitative approach to the study of these
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9 variants and their socioindexical functions. The presence of these traditional variants
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11 indicates that WC men make use of highly rhotic as well as non-rhotic variants, both of
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13 which contrast with the approximant and schwa realizations common in Middle Class speech
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15 (Lawson et al 2013:199). These results highlight the importance of including social mobility
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17 in sociolinguistic studies of social class. Excluding mobile persons reduces overall
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19 descriptive accuracy – the levels of rhoticity in our sample would be lower, on average,
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21 without the NMC speakers included. Static measures of class would either allocate NMC
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23 speakers to the Middle Class, based on criteria such as occupation or income, or the Working
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25 Class, based on criteria such as parents' occupation or the school attended. In both cases the
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27 overall average level of rhoticity would have been overly inflated for that group.
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34 It is possible that these patterns represent a stage in a gradual change in progress
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36 towards non-rhoticity in Scottish speech, given the observation that “linguistic change
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38 originating in the Central Belt cities will have a tendency to diffuse throughout Scotland in
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40 the long term” (Lawson et al. 2014:56). Scobbie proposes that vocalization through the loss
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42 of non-prevocalic /r/ may also lead to an expanded vowel system or the neutralization of
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44 existing vowel contrasts (2006:339). Variability in non-prevocalic /r/ may therefore be
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46 indicative of wider phonetic change in Scottish speech.
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50 Future research should investigate rhoticity in younger speakers of Edinburgh English
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52 who have been upwardly mobile, in order to determine whether the “superstandard” rhoticity
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54 identified here in NMC speakers is also found in younger generations. This topic has been
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56 considered to some extent in Glasgow by MacFarlane and Stuart-Smith (2012), who conclude
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58 that, despite the decline of styles such as Morningside English and Kelvinside English,
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3 perceptions of socioeconomic status are still highly relevant to speakers' linguistic
4 presentation of their social identity. An investigation of articulatory, as well as auditory,
5 variation in New Middle Class speakers would also build on the findings of the present study.
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Lawson et al (2011:256) propose that articulatory analyses, using techniques such as ultrasound tongue imaging, can offer a fuller account of the social meanings encoded in realizations of /r/.

Sociological literature continues to stress the centrality of class to our understanding of social structures, and the theorizing of social class is a subject of ongoing debate (Ash 2004:403; Kirkham 2015). Coupland (2016:417) argues that sociolinguistic approaches to social class have thus far “not been sensitive to change over time.” In the present paper we have focused on change over time at the level of the individual speaker, but Coupland’s call for the study of vernacularization argues for the need to theorize wider change in class structure in a given society over time. While traditional models of social class are sustained in the ideologies of Edinburgh residents, those ideologies (and studies such as this one) participate in an erasure (Gal & Irvine 2000) of the more complex social dynamics that characterize Edinburgh society, such as the intersection of class and ethnic identities (see, e.g., Kirkham 2015). Future work would do best to combine Coupland’s insights with the argument we have made here by, for example, considering individual class mobility with respect to the circulation of new indexical meanings for class-related variants (e.g., Johnstone et al., 2006; Kirkham 2015). By understanding socioeconomic status as fluid and changeable across the lifespan, we come closer to a more accurate understanding of how individuals construct social class identity and, therefore, better models of its relationship to linguistic variation.

Notes

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1. Whether the varieties spoken by the speakers in our study ought to be called “Scottish English” or “Scots” is a complex issue beyond the scope of the present study. The blurry difference between these terms is a well-recognized complication for any study of linguistic variation in Scotland (Stuart-Smith 2004; Johnston 2007; Maguire 2012). The classification of speakers according to these terms is unnecessary and potentially misleading. In this paper, the term “Edinburgh English” and related variants is used to encompass Edinburgh varieties of Scots as well as English.

2. There is a fourth category, Up-and-Down, in which the speaker’s occupation was initially higher than their father’s but lower at the time of the study. Labov further notes that Down-and-Up is not attested.

3. The study includes no Upwardly mobile Lower Class speakers and no Stable Upper Middle Class speakers.

4. One concern with the findings of Lawson et al. (2011:158) is that the Working Class adolescents are from Livingston, a New Town twelve kilometers west of Edinburgh and thirty kilometers east of Glasgow, while the Middle Class adolescents are from Edinburgh. Scobbie et al. (2008:13) note that, in Glasgow, derhoticization is more widespread than in Edinburgh, and is almost categorical for some speakers in certain vowel contexts, so there is a risk that the derhoticization reported among Working Class speakers could be influenced by the relatively western location of Livingston. The present study seeks to eliminate this concern by using data collected only from speakers in central Edinburgh.

5. All names are pseudonyms.

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6. A reviewer notes that fricative realizations might be one possibility (e.g., Grant 1913:37). Variants realized as full fricatives did not occur in our dataset; variants with fricative release were always also pharyngeal, which is a known correlate of derhoticization, not strong /r/ (Lawson et al. 2014).

7. A full model including random slopes did not converge, so only random intercepts are included.

8. Tokens from the Scottish English *birth~berth~nurse* classes (Stuart-Smith 2004:53-54) were coded as NURSE. Most speakers in the present study showed evidence of the NURSE merger (see §3.4), or retained only the *berth~nurse* distinction.

9. For cases where the BNC recorded two different values for two homophonous lemmas, we took the higher of the two values. For contractions like *you're* we took the frequency of *you*. Although both decisions resulted in an over-estimation of lexical frequency, it arguably resulted in a more realistic coding than if these forms had just been given a zero or consistently lower frequency value.

10. One difference between our coding and that of Lawson et al. (2011) is the way in which “retroflex” variants were coded. The latter use the term to label approximant tokens where the rhotic quality was relatively strong as compared to tokens labelled “alveolar”, whereas in our data the term “retroflex” was reserved only for approximant tokens with very strong rhoticity but not extending through the whole vowel. The differences between these approximant variants are subtle and should not be taken to indicate major cross-study differences in overall findings.

11. Scobbie et al. (2008) combine word- and pause-finality into a single factor, which would be advisable in future analysis of these data.

12. We do not present measures of formant structure, as formant measurements are strongly affected by interspeaker differences in the quality of the preceding vowel. We

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3 attempted an analysis on tokens of the START lexical set only, but found that even within
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5 this class there were very marked differences in vowel quality between the different social
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7 groups, which seriously complicates an analysis of pharyngealization based on formant
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9 structure.
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13 13. Future work might also consider the duration of the period of frication, but this
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15 was not possible for our data because the distance from the speaker's mouth to the
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17 microphone was not consistent across speakers.
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For Peer Review

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For Peer Review

TABLE 1

Participants

Name ⁵	Gender	SEC	School education	Higher education	Occupation	Paternal occupation	Age
John	Male	EMC	Fee-paying	Yes	Teacher	Minister	61
David	Male	EMC	Fee-paying	Yes	Chartered adjuster	Minister	62
James	Male	EMC	Fee-paying	Yes	Engineer	Insurance manager	66
Emily	Female	EMC	Fee-paying	Yes	Physiotherapist	Engineer	61
Sarah	Female	EMC	Fee-paying	Yes	Lawyer	Engineer	58
Laura	Female	EMC	Fee-paying	Yes	Buyer	Engineer	63
Michael	Male	NMC	Fee-paying	Yes	Teacher	Carpenter	63
Fergus	Male	NMC	Fee-paying (scholarship)	Yes	Charity director	Retail Worker	69
Bill	Male	NMC	Fee-paying (scholarship)	Yes	Engineer	Butcher	66
Jennifer	Female	NMC	Fee-paying (scholarship)	Yes	Teacher	Plumber	63
Anne	Female	NMC	State sector	Yes	University learning services manager	Tradesman	59
Caroline	Female	NMC	State sector	Yes	Librarian	Motor mechanic	67
Martin	Male	WC	State sector	No	Truck driver	Miner	61
Stephen	Male	WC	State sector	No	Tradesman	Retail worker	57
Emma	Female	WC	State sector	No	Clerical worker	Factory worker	63
Fiona	Female	WC	State sector	No	Clerical worker	Factory worker	63

TABLE 2

Categories of non-prevocalic /r/ along an auditory-rhotic continuum (adapted from Lawson et al. 2014:63)

no /r/	→	derhoticized	→	alveolar approximant	→	retroflex approximant	→	schwar	→	tap	→	trill
∅		[V ^r]		[ɹ]		[ɻ]		[ə]		[ɾ]		[r]
Least rhotic						Most rhotic						

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TABLE 3

Fixed effects and levels

Fixed effect	Levels	Reference level
SYLLABLE STRESS	primary, other	primary
PRECEDING_VOWEL	CURE, FORCE, LETTER, NEAR, NORTH, NURSE, SQUARE, START	CURE
WORD_FINALITY	final, non-final	final
PHRASE_FINALITY	final, non-final	final
FOLLOWING_MANNER	approximant, fricative, nasal, pause, stop	approximant
LEXICAL_FREQUENCY	<i>log continuous</i>	
SOCIOECONOMIC_CLASS	EMC, NMC, WC	EMC
GENDER	female, male	female

TABLE 4

Significant fixed effects for /r/ as a continuous variable

Fixed Effects	Levels	Coeff.	Std. Error	t-value	p <
(Intercept)		2.255	0.233	9.659	0.0001
Word Stress	unstressed	0.272	0.075	3.621	0.0003
Preceding Vowel	FORCE	-0.527	0.237	-2.229	0.026
	letter	0.385	0.220	1.751	0.081
	NEAR	-0.384	0.254	-1.515	0.130
	NORTH	-0.553	0.225	-2.459	0.014
	NURSE	0.370	0.216	1.712	0.087
	SQUARE	-0.281	0.237	-1.186	0.235
	START	-0.449	0.223	-2.016	0.044
Following Manner	fricative	0.152	0.064	2.375	0.018
	nasal	-0.001	0.086	-0.009	0.993
	pause	0.100	0.067	1.480	0.139
	stop	0.163	0.067	2.433	0.015
Socioeconomic	NMC	0.489	0.139	3.520	0.0004
	WC	0.431	0.153	2.815	0.005
Gender	male	0.174	0.138	1.260	0.208
SEC:Gender	NMC:Male	-0.317	0.196	-1.621	0.105
	WC:Male	-1.839	0.217	-8.489	0.0001
Random Effects	Type	Variance	Std. Dev		
Participant	Intercept	0.231	0.480		
Word	Intercept	0.024	0.154		
Residual		1.314	1.146		

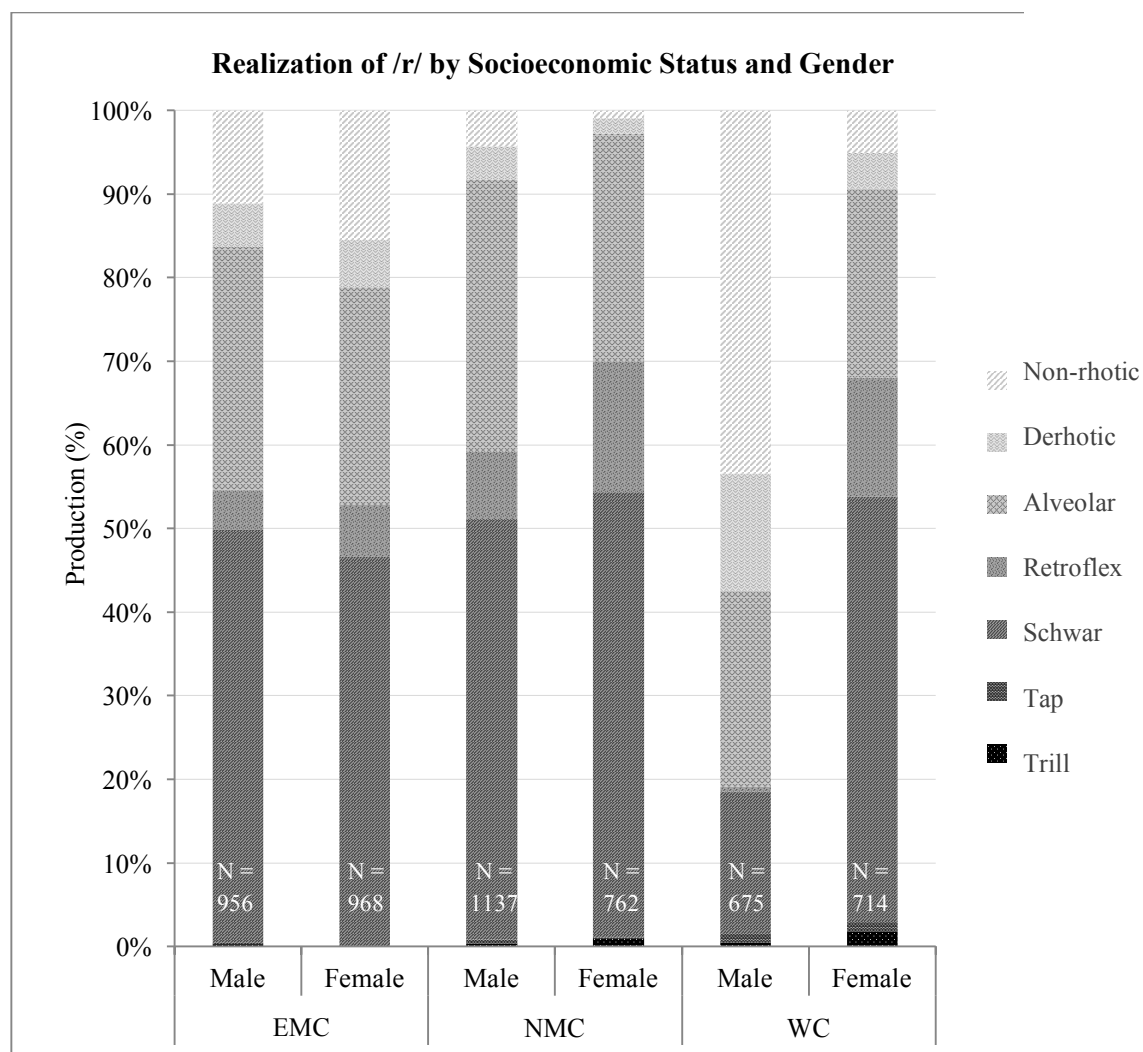
TABLE 5

Class and gender as fixed effects for the presence of frication for weak rhoticity

Fixed effects	Levels	Estimate	Std. error	z value	p <
(Intercept)		-2.228	0.774	-2.880	0.004
Socioeconomic	NMC	1.564	1.120	1.397	0.162
	WC	2.208	2.575	2.575	0.010
Gender	male	0.349	0.430	0.430	0.667
Random effects	Type	Variance	Std. dev		
Participant	Intercept	0.638	0.779		
Word	Intercept	0.266	0.516		
		Min	Median	Max	
Residual		-1.898	0.404	2.261	

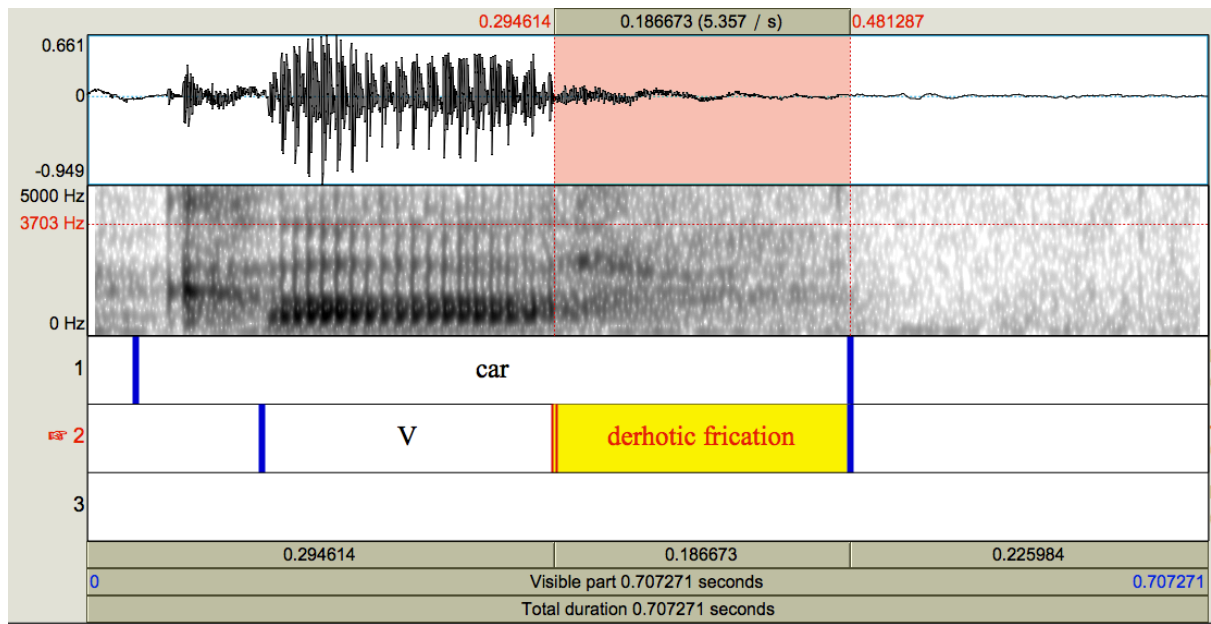
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Figure 1: Realization of /r/ by socioeconomic status and gender



View

Figure 2: Example of a non-prevocalic /r/ realized with pharyngealized, devoiced frication



Peer Review

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3 Victoria Dickson is a PhD candidate in Linguistics and English Language at the University of
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7
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17 change and phonetic variation. She also works on issues in sociophonetic methodology, and
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19 her most recent project examines the commodification of phonetic variation in the Scottish
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21 tourism industry.
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