

# A SOCIOPHONETIC STUDY OF LABIODENTAL /r/ IN LEEDS

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## Abstract

Labiodental /r/ has previously been considered a mark of infantile, defective or affected speech. However, recent literature has highlighted its increasing credibility as an accepted feature of regional dialects. This paper tracks the spread of the variant, investigating its use in the city of Leeds. Auditory analysis of apparent time data is employed to assess the frequency of labiodental /r/ articulations among Leeds speakers. Since there is an absence in the literature of social identity perspectives on the diffusion of labiodental /r/, this paper also explores speakers' social networks in relation to their use of the labiodental variant. The findings contribute to sociolinguistic theories of language variation and change, emphasising the link between the social dynamics of speakers and the spread of novel linguistic features.

## 1. Introduction

Labiodental /r/ has traditionally had negative associations in British English (Foulkes & Docherty, 2000). Nevertheless, it has been reported (Britain, 2002; Foulkes & Docherty, 2000; Trudgill, 2002) that the variant has gained acceptance in the world of popular media (e.g., Jonathan Ross, Paul Merton, Katy Hill, Isobel Lang), and more recently in a number of regional varieties, where labiodental /r/, henceforth [v], is replacing traditional (post) alveolar approximant articulations, henceforth [ɹ]. Foulkes & Docherty (2000:30) report that [v]:

“...seems to have become established as an acceptable feature of mature speech in non-standard accents in the south-east of England. Secondly, there is evidence that [v] is spreading into the speech of young people across much of England.”

Since its identification as a dialect feature of a non-standard variety in the London area (Wells, 1982), [v] has also been noted in sociolinguistic and dialect studies in several dialect areas outside of the capital, such as Reading, Milton Keynes, Hull (Williams & Kerwill, 1999), Norwich (Trudgill, 1988; 1999), Derby (Docherty & Foulkes, 1999), Middlesbrough (Llamas, 2000; 1998) and Newcastle (Docherty & Foulkes, 1999). Although labiodental /r/ was formerly considered a speech defect, owing to its occurrence as a developmental feature during children's acquisition of rhotics (Jones, 2005; Widdison, 1997), Trudgill (2002:54) notes that:

“...when a speech defect spreads to a majority of the population it is clearly no longer to be regarded as such.”

This paper investigates the use of [v] variants in data collected from speakers in Leeds, a city in the north of England. The presence of [v] in the Leeds data will lend further support to the observation that the variant is becoming an accepted feature in dialect areas some distance away from the capital. The study also explores the process of [v]'s diffusion through distinct regional dialects. Previous studies (Chambers, 1995;

Eckert, 2000; Milroy, 1992) have shown that speakers' relative degrees of integration into the local community or social group are influential in the adoption and diffusion of linguistic innovations. In this paper, relationships between speakers' social networks and their variant use are explored with the aim of shedding light on how the different contact situations of the speakers might contribute to the spread of this variant. In the following section, the articulation of labiodental variants of /r/ is described in relation to the standard variant [ɹ].

## **2. An Articulatory Profile of Labiodental /r/**

The rhotic class comprises a diverse range of articulations, including trills, taps, fricatives, and voiced and voiceless variants (Ladefoged & Maddieson, 1996; Lindau, 1985; Widdison, 1997). There is variability in /r/ articulations across separate linguistic systems and regional varieties of individual languages. The place and manner of articulation differs between separate members of the class and an articulatory or acoustic property that is common to all rhotics has not yet been identified. Consequently, a phonetic basis for defining /r/ sounds as a single class remains elusive. Lindau (1985) has proposed a family membership pattern of similarity for the class of rhotics according to distinct acoustic properties shared between separate clusters of the whole group. Ladefoged & Maddieson (1996) note that if there is a phonetic similarity between rhotics, this similarity may be based on auditory or acoustic features.

Approximant articulations of /r/ in the dental-alveolar region which are typical of Southern British English dialects (Ball & Rahilly, 1999; Ladefoged & Maddieson, 1996), involve approximation between the tongue and the post-alveolar region, with the tongue tip pointing varying degrees upward towards the alveolar ridge or backward in a more retroflex position. Tongue shape is speaker specific and may be more hollowed or bunched. The articulatory dimension of lip-rounding also varies in extent from one speaker to the next.

Labiodental /r/ is a significant departure from [ɹ], involving varying degrees of approximation between the lower lip and upper front teeth, accompanied by some degree of lip-rounding but usually involving wide lip aperture. Ladefoged's (2003: 35) photograph of an Isoko speaker's lip configurations during [v] and [v̪] realisations illustrate only slight approximation of the lips for [v̪]. While there may be a velar constriction involved (Jones, 2005; Wells, 1982), [v̪] notably lacks the stereotypical tongue configuration of [ɹ] and may completely lack a lingual gesture (Jones, 2005).

It is notable that [ɹ] is acquired particularly late relative to the acquisition of other sounds (Widdison, 1997). Consequently, labiodental /r/ occurs frequently as a developmental alternative until children master the articulatory mechanisms that [ɹ] necessitates. In the next section we review [v̪]'s progress as a novel feature in several regional varieties of British English.

## **3. The Progress of Labiodental /r/ as a Regional Dialect Feature**

The spread of labiodental /r/ through distinct regional varieties of British English is reported to be part of a wider process of dialect levelling (Britain, 2002; Kerswill, 1996; Watt & Milroy, 1999; Williams & Kerswill, 1999). The diffusion of

[v] is running parallel with TH-fronting, t-glottaling and L-vocalisation. Britain (2002: 59) charts the remarkably similar geographical distribution of these variants. All are established dialect features in the southeast that are steadily infiltrating more localised dialects due to the increasing contact between geographically distant speakers that is afforded by modern day socio-geographic mobility (Britain, 2002; Williams & Kerswill, 1999).

Wells (1982:303) identified "... a velarized labio-dental approximant, a dark [v], for /r/" as characteristic of the speech of the London Jewish community, one of several sub-varieties of popular London speech. Wells (1982: 282) also observed that the variant may occur as an affectation of "upper-crust RP" speech, but questioned whether it remained more frequent among upper-class speakers than among speakers of other social classes. The variant has since been cited as an innovative feature of several urban English accents (Foulkes & Docherty, 1999).

Trudgill (1974; 1988) found sporadic and idiosyncratic use of [v] pronunciations in a small number of informants during his dialect survey of Norwich in 1968. Considered a speech defect at that time, a 1983 follow up study (Trudgill, 1988; 2002) showed that a third of 10-25 year old informants of a subsequent generation of the same community had [v] articulations. Trudgill (2002) suggested that the age-graded distribution of [v] indicated a variant undergoing change, whereby [v] is acquired by pre-adolescents only, with older informants' traditional [ɹ] articulations remaining unaffected. Trudgill (2002:54) predicts that in many varieties of southern English speech:

"...this pronunciation will be the norm or at least the majority pronunciation within the next few decades."

Trudgill's (1988) prediction concerning [v] is confirmed by several studies. Torgersen (1997), cited in Foulkes & Docherty (2000), found 11 percent use of [v] among middle class (MC) girls under 20 across several localities in the southeast, compared with no usage in the older MC informants.

An investigation of children's and adults' speech in Milton Keynes (Kerswill 1994; 1996; Williams & Kerswill, 1999) found a higher percentage of [v] variants for children than for caregivers. Labiodental variants also had a higher frequency among children and young adults in Reading and Hull (Williams & Kerswill, 1999). Kerswill (1996) has suggested that the maintenance of children's immature forms, such as [v], may be facilitated by the presence of conflicting target forms in the community.

Labiodental variants of /r/ have also been observed in more northern varieties of British English. Foulkes & Docherty (2000) investigated /r/ variants in Derby and in Newcastle upon Tyne among 14-27 and 45-65 year old speakers. The [v] variant was absent in the speech of older informants in both cities in both conversational and word list data. Auditory analysis of the wordlist data showed that 4% of younger speakers' tokens in Newcastle were labiodental, with the majority produced by MC females. In Derby however, 41% of the younger speakers' tokens were labiodental, with a higher frequency among working class (WC) speakers of both sexes. While this wordlist data may under-represent the distribution of variants in these two cities, it confirms the

presence of [v] in Derby. The observation of at least a small number of labiodental tokens in Newcastle hints at a continuing spread further north.

Foulkes & Docherty (2000) tentatively suggest that the presence of [v] in a sub-variety of popular London speech may have facilitated its eventual acceptance as an established feature in an influential dialect area. Wells (1982: 301) has described the working class accent of London as “the most influential source of phonological innovation in England.” The literature therefore suggests that [v] was originally present in one of several sub-varieties in the influential southeast. Following its acceptance as an established dialect feature of non-standard southeast speech, the variant has progressed sufficiently northwards that it can reasonably be expected to have reached Leeds. Leeds is situated approximately 65 miles north of Derby as the crow flies and approximately 175 miles south of Newcastle. The city of Leeds is experiencing rapid growth and increasing social and geographical mobility. The area is therefore ripe for an investigation of innovative variants, such as [v], noted to be gaining ground in several regional varieties. Wells (1982) makes no mention of a labiodental variant in Leeds where the (post) alveolar approximant is the traditional norm, accompanied by some use of the tap variant [r]. However, in a study of liquids, Carter & Local (2004) found evidence of [v] in Leeds, where its incidence was less than for Newcastle speakers.

The social motivation for the spread of this innovative variant is not yet understood. Factors of social identity may shed light on the adoption of [v] by geographically distant speakers. In the next section we turn to social identity perspectives on linguistic variation and change.

#### 4. Social Identity

Linguistic innovations may occur frequently but are not automatically adopted by speakers as dialect features (Milroy, 1992). Correlations between linguistic variation and various aspects of social identity are well documented (Aitchison, 2001; Chambers, 1995; Chambers et al., 2002) since Labov’s (1966; 1972a; 1972b) pioneering studies on phonological variation in Martha’s Vineyard and New York City. Chambers (1995:250) asserts that:

“The underlying cause of sociolinguistic differences, largely beneath consciousness, is the human instinct to establish and maintain social identity.”

Labov (1966; 1972a; 1972b) observed that social knowledge about sets of variables is shared among speakers in a *Speech Community*. Patrick (2002) observes that the speech community concept has proved to be more complex in methodological and theoretical terms than Labov first imagined. Nevertheless, the link between social group and linguistic behaviour has been reinforced in subsequent literature. *Social Networks* (L. Milroy, 2002; J. Milroy, 1992; L. Milroy, 1987; Milroy & Milroy, 1978) and *Communities of Practice* (Eckert, 2000; Meyerhoff, 2002) have been developed as alternative explanatory models of speakers’ shared social evaluations of linguistic variables. *Social Network* theory emphasises the links between social network members. The nature and quality of these links reinforce greater or lesser degrees of integration into the social group and influence speakers’ degrees of resistance to linguistic innovations. The *Communities of Practice* (CofP) approach identifies non-

linguistic behaviours as *practices*, which are juxtaposed with linguistic practices in the construction and maintenance of shared social identity. Both the CofP and the Social Networks approach provide useful tools for variationist studies and highlight the importance of speakers' group behaviour for theories of linguistic variation.

Detailed discussions of the theoretical and methodological implications of Speech Community, Social Networks and Communities of Practice can be found in Britain & Matsumoto (2005); Chambers, et al. (2002); Davies (2005). It is beyond the scope of the present study to apply either approach in depth to the present data. However, the process of [v]’s diffusion across groups of speakers has not been addressed in previous studies. The previous section has shown that an influential reference accent (Foulkes & Docherty, 2000) and contact between speakers of distinct dialects (Britain, 2002) are factors pertinent to the diffusion of [v]. The potential links between the social group behaviour of speakers and the ongoing diffusion of [v] have yet to be probed in a quantitative study. The present study therefore explores relationships between speakers’ social contact situations and the use of [v]. Although exploratory in nature, the methodology draws substantially from the findings of social group perspectives on linguistic variation. The following section reviews the findings of relevant studies and their implications for the spread of [v].

#### **4.1 Linguistic Variation and the Social Group**

The influential role of social group dynamics on the diffusion and maintenance of linguistic features has been demonstrated in several studies. Labov (1972b) investigated Black English Vernacular (BEV) and social group structure among preadolescent and adolescent peer groups in inner city street culture in the United States. BEV is substantially different from other English dialects and appears to have its own distinct rules. Labov (1972b: 63) suggested that the variety “is best seen as a distinct subsystem within the larger grammar of English.” Labov’s (1972b) investigation of BEV revealed that the use of characteristic features varied not only between members versus non-members, but also according to status within the social group. For example, the deletion of *is*, as in *But everybody not black* (Labov, 1972b: 67) occurs frequently in BEV and complex rules determine the linguistic environments in which it can occur. Labov (1972b) demonstrated that *is* deletion rules were applied to vernacular speech with the highest frequency by core group members. Secondary members applied the deletion rules considerably less and periphery members employed the deletion rules least of all.

Cheshire (1982) also identified correlations between adolescents’ use of non-standard features according to their relative group status. Again, core group members demonstrated more frequent use of non-standard features than periphery members. Eckert’s (1988), study of adolescent students in suburban Detroit schools revealed that the degree of affiliation to either of two ideologically distinct adolescent social groups, the *Jocks* and the *Burnouts*, interacted with gender in complex ways as a powerful determiner of the use of the spreading phonological features.

The link between social group integration and the use of non-standard features appears to play a significant role in the spread of linguistic innovations. Milroy & Milroy (1978) investigated spreading linguistic variants across three communities in East and West Belfast and observed a direct link between spreading linguistic variants and social network structure. Within community subsections, particular variant choices were associated with personal network structure (Milroy & Milroy, 1978;

1985). Relative degrees of community integration influenced speakers' use of spreading linguistic innovations. For example, the raising of the DRESS vowel (c.f. the standard lexical sets of Wells, 1982) was associated particularly with higher status, outer city areas and the careful speech styles of inner city women. However, lower realisations of DRESS functioned as a social network marker for inner-city males with a high level of community integration. Similarly, non-prestigious backed variants of the TRAP vowel were primarily associated with inner-city males' casual speech styles in peer group interactions. Yet females with a high degree of community integration adopted backed variants of TRAP as a marker of social network allegiance. It appeared that speakers leading particular vowel changes were those who did not use them as social network markers. Milroy & Milroy (1985:359) suggest that:

“...a close-knit network has an intrinsic capacity to function as a norm-enforcement mechanism, to the extent that it operates in opposition to larger scale institutional standardising pressures.”

Strong network membership supports the maintenance of conservative linguistic norms while weaker network ties lower resistance to changes occurring in the wider linguistic environment. Linguistic innovators are likely to be speakers not closely integrated to a core social group, for whom a relationship between a particular variant and network membership is lacking (Milroy & Milroy, 1985).

Social Network theory may partly account for the adoption and diffusion of linguistic innovations by some speakers but not others where the strength of speakers' social network ties is a key factor. Milroy (1987) defines the strength of a social network in terms of:

- (i) *density*: the number of connections within a network, and
- (ii) *multiplexity*: the number of means by which contacts are maintained

A network in which each and every member of the network knows each and every other member has 100% density. A social tie between two speakers that is maintained through separate capacities, for example, work, recreation and kinship, is a multiplex tie. Loyal dialect users who are territorially attached to their local area and maintain contacts between network members through dense and multiplex ties are members of strong social networks. In weaker networks individuals' ties are loose and uniplex, are typically maintained through only one channel of activity and may span geographically distinct areas. The linguistic consequence of strong versus weak social network ties is that individuals with loose network ties maintained at the periphery of a network have greater exposure to linguistic innovations through contact with speakers on the periphery of other social networks.

Milroy (1996) explored the social network structure of speakers in relation to TH-fronting in Derby. His results suggest that changes are brought into the group via periphery group members and diffused throughout the network via more central members of the group. Milroy (1996: 219) observes that:

“... the change is imported into the group through relatively weak links with other groups and diffused within the group through strong ties.”

While strong network ties facilitate the maintenance of linguistic features established within a network, it appears that the spread of innovative features across

geographically distant cities is likely to be facilitated by contact between speakers with weak ties and periphery group membership, which affords them greater diversity in their social contacts.

It was decided that an attempt to assess correlations between social group contacts and variant use in the Leeds data would at least tentatively identify the significance of the relative strength of speakers' social network ties to the geographical spread of [v]. It was hypothesised that speakers who maintained the traditional variant would be more likely to have strong local ties within their community that would increase their resistance to the innovative variant. In contrast, speakers with more diverse social contacts and looser ties to a core group would exhibit less resistance to the incoming innovation. Any such relationships between speakers' variant use and their degrees of loyalty or integration to a local social network will establish a basis for more detailed studies of dialect levelling in which factors of social group interaction are included in the analysis. The following section describes the method employed to investigate the dynamics of speakers' social contacts.

#### **4.2 Social Network Methodology in the Present Study**

Social network studies (Cheshire, 1982; Eckert, 1988; Milroy, 1987), have typically involved the (at least) passive participation of the observer / interviewer in a given social network, allowing an in-depth analysis of the structure of the network and the relative degrees of integration of individuals within the network. It was far beyond the scope of the present study to adopt such an approach here. The subjects had been obtained via friend of a friend contacts and did not comprise any single, identifiable social network. Indeed, subjects spanned a wide geographical area of the city. Due to this limitation a study of the structural complexities of speakers' social networks was not applicable. Since the study was concerned with how [v] is spreading across distinct varieties, it was decided that an investigation of speakers' relative degrees of local network membership and conversely, their relative degrees of participation in a more diverse set of social interactions, would be an appropriate focus.

Subjects' social network ties were classified as either *loose* or *strong*. A *loose* classification indicated a relatively weak degree of integration into a core local community network and a greater diversity of loosely maintained contacts over a wider geographical area. A *strong* classification indicated a strong degree of integration into a core, local community network and relatively little geographical mobility outside of the local area. The classifications were informed by interview data. Interview questions were designed to address not only speakers' social, geographical and family background but also to elicit information about speakers' occupational environment and contacts, recreational activities, social group membership and extent of travel on a local and national level. Questions asked included the following:

- How would you describe your work environment?
- Do you meet many people through your work?
- Does your work involve any travel?
- Who do you socialise with outside of work?
- How do you spend your free time outside of work?
- Are you involved in any social groups or clubs?

Milroy (1987: 141) describes key interactional factors identified as indicators of social network strength but stresses that the indicators should be ‘readily verifiable from the data.’ For the present study, indicators for the classification of social network ties were adapted from Milroy (1987: 141) as far as they were applicable to the interview data. For example, with regards Milroy’s (1987:141) first indicator: ‘Membership of a high-density, territorially based cluster,’ where cluster is ‘a portion of a personal network where relationships are denser internally than externally’ (Milroy, 1987: 142), there was insufficient detailed information about the members of speakers’ personal networks in the interview data to allow for the measurement of density. Nevertheless, speakers’ descriptions of their personal networks were on the whole sufficient to identify the extent of their membership of a territorially based cluster. The indicators used to assess network classifications are provided below:

*(i) Strong network ties*

Dense links with members of a core local network

Contacts maintained via more than one channel of activity (e.g., work and recreation, proximity of residence and recreation)

Little or no geographical mobility outside of the local vicinity

*(ii) Weak network ties*

Non-dense links with individual members of diverse networks

Contacts maintained in one capacity only (e.g, work only, proximity of residence only, recreational activity only)

Geographical mobility outside of local vicinity for work and/or recreational purposes

There are obvious limitations to reducing the complex structure of speakers’ social relationships to basic, binary terms. These limitations will be discussed in section 7.2. Overall, the indicators were an adequate reflection of speakers’ varying degrees of involvement in a core local network. Dense and multiplex ties within a particular social group were essential criteria of strong ties within a network. Thus, a speaker was considered to have strong social network ties only when conscious allegiance to a particular social or family group was demonstrated and contact with this group was maintained via more than one capacity. Similarly, a speaker’s description of diverse contacts throughout the local or wider geographical area, maintained in only one capacity, was a good indicator that a speaker had relatively weak network ties. The results of the classification of speakers along these lines in relation to their variant use are discussed in section 7.2. The following section describes the method of data collection.

## **5. Data collection**

The data was collected from 18 speakers across a large geographical area of Leeds between January and March 2005. Potential informants were suggested to the author by various personal contacts. The subjects were not known to the interviewer personally, except in the case of one elderly speaker who was the author’s grandmother. The contact details of potential informants were passed to the author who then contacted them by phone. Any informant willing to participate in ‘a project about language’ (with no further details provided) was included in the study provided they had lived in Leeds since early childhood. Six cells with three speakers per cell were obtained with equal numbers of males and females across three age groups: 15 –

30, 31 – 50 and 51+. The author visited subjects in their own homes for approximately 45 – 60 minutes each and interviewed them in a quiet room with only the informant and the interviewer present. Informants also read a word list. The interview and wordlist readings were recorded on a VN-240PC digital voice recorder. Due to its informal nature and the interviewer's native local accent, the interview typically resulted in a friendly discussion about the informants' everyday work and social life. As described in the previous section, the interview data informed the social network classifications of speakers.

The word list comprised 54 words in total. 39 of these words contained /r/ with 13 tokens of /r/ in each of three word positions: word initial (e.g., *rope*, *run*), intervocalic (e.g., *porridge*, *surround*) and in word initial consonant clusters (e.g., *fruit*, *broke*). 15 distracter items with no /r/ were mixed in with the 39 /r/-words to make up the remainder of the 54 words. The auditory analysis was performed on the word list data alone. The word list elicited careful speech styles but provided data where /r/ tokens appeared in relatively controlled phonetic environments. For each word initial token of /r/, a corresponding token appeared in a consonant cluster with the same following vowel (e.g., *run* / *crumb*; *root* / *fruit*). Tokens of /r/ in consonant clusters were preceded by a range of voiced and voiceless consonants and the cluster /st/. In intervocalic tokens /r/ appeared in stressed and unstressed syllables where the vowel either preceding or following /r/ corresponded to a vowel in a word-initial token (e.g., *root* / *maroon*; *ripe* / *pirate*). Ladefoged (2003:151) has noted that articulations of /r/ are affected by following and preceding sounds. The word list was designed to elicit tokens of /r/ in a wide range of phonetic environments that would provide suitable data for future analysis of the effects of the phonetic environment on the labiodentality of /r/ realisations. These effects are not explored in this paper. Subjects read the items with a short pause between each word thus minimising the phonological effects of preceding and subsequent words. Auditory analysis of the resulting data set of approximately 700 tokens of /r/ is described in the following section.

## 6. Data analysis

Following Foulkes & Docherty (2000) and owing to the wide variability of /r/ articulations found among speakers in their study and elsewhere (Kerswill, 1996), tokens of /r/ were rated auditorily on a scale of 1 - 4 according to the degree of alveolar or labial articulation. The variant score definitions are shown in Table 1.

A colleague performed a second auditory analysis without any prior knowledge of the age of the speakers. This served as an independent verification of the scores. Discrepancies often arose when differentiating weak [ɹ] and weak [v] realisations. The lack of a clear-cut distinction made the categorisation of these two variants difficult. For these weaker variants, the detection of a lingual gesture was chosen as a distinguishing characteristic of the (post) alveolar articulation, meritng a score of 2 and words that were perceived as lacking a lingual gesture were given a score of 3. Words that were mispronounced or misread and articulations other than alveolar approximant or labiodental were excluded from the analysis. Alveolar tap ([ɾ]) realisations were also excluded from the calculation of scores. Wells (1982: 368) has noted that tap realisations of /r/ have frequent distribution in the north of England and associates this variant particularly with Leeds. The distribution of this feature in the present data will be discussed in more detail in section 7.1.

Table 1: definition of variant scores for /r/ articulations

Variant score	Definition	Symbol
1	strongly articulated alveolar	strong [ɹ]
2	weak alveolar	weak [ɹ̩]
3	weak labial	weak [v̩]
4	strongly articulated labial	strong [v̩]

The mean of each speaker's scores within word types was calculated to provide a variant index score for each word type and a total index score for the full 39 tokens. The relative height of an individual's index score reflects the extent of labiodental /r/ use. An index score of 1 indicates the consistent use of strong [ɹ] and an index score of 4 indicates consistent use of strong [v̩]. The following section presents the auditory findings.

## 7 Results

### 7.1 Auditory findings

The auditory analysis revealed striking differences in variant use according to age. Table 2 shows speakers' index scores for each word position and for the total number of tokens. The low index scores for speakers aged 51+ reflect a clear preference for the strong [ɹ]. Index scores are highest in the youngest age group and decline as age increases. The scores reflect the distribution of variants across the three age groups. Labiodental variants (weak and strong) were restricted to the young and middle-age groups of speakers while the older age group of speakers used non-labiodental variants (weak and strong) exclusively.

A chi-square ( $\chi^2$ ) analysis (as detailed in Butler, 1985), was performed to examine whether the distribution of labiodental and non-labiodental /r/-variants (with weak and strong realisations combined in each case) varied according to the three speaker age groups. The analysis showed a significant effect of age ( $\chi^2=246.518$ , df:2,  $p<0.001$ ), with younger speakers more likely to use labiodental variants and older speakers more likely to use non-labiodental variants.

Speaker sex did not appear to be a factor affecting the distribution of variants. An  $\chi^2$  analysis examined whether speaker sex was a variable affecting the distribution of labiodental versus non-labiodental variants of /r/ (with weak and strong versions combined in each case). The observed and expected frequencies for the distribution of labiodental versus non-labiodental variants according to speaker sex were highly similar ( $\chi^2=0.229$ , df:1) and not considered significant.

Although index scores were relatively consistent across word types, speakers aged 51+ showed less variability in their scores than either the youngest or the middle age group of speakers. Both across word positions and between speakers, the scores of the oldest group of speakers reflect a narrower range of variants than for the two younger age groups. The number of variants used by each speaker is shown in Table 3.

Table 2: Variant index scores across word positions (13 tokens in each word group unless otherwise indicated).

	Age	Word initial	Cluster	Intervocalic	Total
Maria	15	4.00	4.00	4.00	4.00
Matthew	18	2.54	2.54	2.62	2.56
Kevin	21	3.75	3.85	3.77	3.69
		(12 tokens)			(38 tokens)
Lee	25	2.33	2.54	2.44	2.44
		(12 tokens)		(9 tokens)	(34 tokens)
Rachel	27	1.77	1.92	1.77	1.82
Wendy	28	2.62	2.38	2.69	2.56
David	32	1.46	1.62	1.38	1.49
Adrian	38	2.00	2.15	1.77	1.97
Sandra	39	1.23	1.62	1.46	1.44
Lynne	44	2.69	2.31	2.46	2.49
Pat	46	1.08	1.00	1.15	1.08
Mike	49	1.08	1.23	1.00	1.24
			(8 tokens)		(31 tokens)
JohnB	51	1.54	1.50	1.30	1.46
			(12 tokens)	(10 tokens)	(36 tokens)
JohnC	51	1.00	1.08	1.00	1.11
			(12 tokens)	(10 tokens)	(36 tokens)
Denise	54	1.00	1.08	1.00	1.03
Joan	58	1.00	1.00	1.15	1.05
Ernest	69	1.00	1.00	1.00	1.00
		(12 tokens)	(9 tokens)	(7 tokens)	(28 tokens)
Hetty	79	1.00	1.00	1.00	1.00

It is apparent from Table 3 that the majority of speakers used one variant with a reasonable degree of consistency or alternated between two adjacent variants. Speakers in the youngest group alternated mainly between weak labiodental and weak alveolar variants. Two of the youngest speakers showed a preference for strong [v]. The /r/ tokens of this group spanned the full possible range of articulations although strong [ɹ] was used by just one speaker in 8 tokens. In the middle age group, strong and weak [ɹ] variants were favoured. However, one speaker in this group produced weak [v] in 20 tokens. The data suggests a cut off point in the use of [v] around age 45 since the oldest two speakers in the middle age group show a pattern of variant use identical to that of the 51+ group of speakers, with a striking tendency towards strong [ɹ].

A hierarchical loglinear analysis (Hays, 1981: 561-6) was performed to examine the categorisation of tokens in more detail, with Variant (1-4, corresponding to strong [ɹ], weak [ɹ], weak [v] and strong [v]), Sex (female, male) and Age (old, mid, young)

as factors. This analysis confirmed the apparent time effect that the younger the speakers, the more likely they are to use labiodental variants (Variant x Age:  $G^2=90.51$ , df: 2,  $p<0.001$ ). It also confirmed that there was no effect of speaker sex on the use of four variant types and that the apparent time effect does not differ for the male and female speaker groups.

Table 3: Distribution of /r/ variants (due to reading errors and mispronounced words some speakers did not produce 39 tokens of /r/)

	Age	Index	Variant 1 ɹ	Variant 2 weak ɹ	Variant 3 weak v	Variant 4 v
Maria	15	4.00				39
Matthew	18	2.54		17	22	
Kevin	21	3.75			8	30
Lee	25	2.33		19	15	
Rachel	27	1.77	8	30	1	
Wendy	28	2.62		17	22	
David	32	1.46	20	19		
Adrian	38	2.00	7	26	6	
Sandra	39	1.23	23	15	1	
Lynne	44	2.69	1	18	20	
Pat	46	1.08	36	3		
Mike	49	1.08	30	4		
JohnB	51	1.54	19	16		
JohnC	51	1.00	34	1		
Denise	54	1.00	38	1		
Joan	58	1.05	37	2		
Ernest	69	1.00	28			
Hetty	79	1.00	39			
<i>Total (N=672)</i>			320	188	95	69

Some interesting observations were made in relation to the variant use of individual speakers. For example, in the youngest age group *Rachel* was the only speaker to use strong [ɹ]. *Lynne* in the middle age group used weak [v], unlike other speakers of her age. In the oldest group, where the stronger [ɹ] was the norm for the majority of tokens, *JohnB* produced the weak [ɹ] in 16 (almost half) of his tokens. It was also observed that some speakers produced tap realisations of /r/. The distribution of taps in the data is of some interest. Only male speakers used tap articulations in the Leeds data. Since none of the females used [ɾ], Table 4 shows the distribution of [ɾ] variants for the male speakers alone.

Table 4: the distribution of [r] variants (out of a possible maximum of 13 tokens).

	Age	Word Initial	Cluster	Intervocalic	Total
<i>males</i>					
Matthew	18				
Kevin	21				
Lee	25			4	4
David	32				
Adrian	38				
Mike	49			5	5
JohnB	51		1	3	4
JohnC	51		1	3	4
Ernest	69	1	4	6	11
<i>Total</i>		1	6	21	28

In the Leeds data, two of the male speakers (*Lee* in the youngest age group and *Mike* in the middle age group) produced [r] only in intervocalic position. Speakers age 51+ produced [r] intervocally, in consonant clusters and, in the case of the oldest speaker, in word initial position. As noted earlier, [r] is a regional dialect feature in Yorkshire. It is therefore not surprising that some tokens were realised as taps. Wells (1982: 368) confirms that intervocalic position is a favoured environment for [r]. Its distribution in the present data suggests a traditional variant in use in a gender and age-specific manner. Notably, *Lee*'s (aged 25) use of [r] is linguistically more aligned more with the older male speakers than with speakers of his own age. In the next section we consider these apparent discrepancies in the age-related patterns of variant use (albeit in a small data set) in relation to the results of the classification of speakers' social network ties.

## 7.2. Social Network Ties and Variant Use

The classification of speakers according to social network strength revealed that overall, speakers with [v] realisations appeared to have weaker social network ties than speakers who used [ɹ] realisations. Table 5 shows the classification of speakers' according to the strength of their social network ties together with the speakers' index scores and the distribution of the four /r/ variant types.

A chi-square analysis examined whether the distribution of the four variants varied according to the strength of speakers' social network ties (strong vs. loose). This analysis showed a significant effect of social network ties ( $\chi^2 = 263.775$ , df:3,  $p < 0.001$ ), with speakers with loose ties more likely to use labiodental variants.

It was noted in section 7.1 that certain speakers' variant choices appeared to be at odds with the overall age-related patterns in the data. The social network ties are of considerable interest where these individual speakers are concerned. It was observed in section 7.1 that only one speaker in the youngest group used strong [ɹ] (in 8

tokens). *Rachel*'s tokens were clearly weighted towards [ɪ] variants in contrast to other speakers of her age. *Rachel* described a particularly strong family network and maintained close ties with her local childhood friends. She described her work team as having a “family atmosphere” and commented that her attendance at the local college was contrary to her usual tendency to limit her social activities to a single network of friends and family. *Rachel*'s network clearly contrasts with *Maria*'s. *Maria* used strong [ʊ] in 100% of her tokens. *Maria* described a diverse social network due to her attendance at a non-local school and participation in recreational activities with separate groups of individuals of a similar age. *Maria*'s social contacts are clearly not confined to a core social network to the extent that *Rachel*'s appear to be.

Table 5: speakers' social network profiles, variant index scores and number of labiodental and non-labiodental variants (strong and weak combined).

Speaker	Index scores	Variant 1 [ɪ]	Variant 2 weak [ɪ]	Variant 3 weak [ʊ]	Variant 4 [ʊ]	Social Network Ties
15 - 30						
Rachel	1.77	8	30	1		Strong
Lee	2.33		19	15		Strong
Matthew	2.54		17	22		Loose
Wendy	2.62		17	22		Loose
Kevin	3.75			8	30	Loose
Maria	4.00				39	Loose
31 – 50						
Mike	1.08	30	4			Strong
Pat	1.46	36	3			Strong
David	1.23	20	19			Strong
Sandra	2.00	23	15	1		Loose
Adrian	2.69	7	26	6		Loose
Lynne	1.08	1	18	20		Loose
51+						
JohnC	1.00	34	1			Strong
Denise	1.00	38	1			Strong
Joan	1.05	37	2			Strong
Ernest	1.00	28				Strong
Hetty	1.00	39				Strong
JohnB	1.54	19	16			Loose
<i>Total</i> (N=672)		320	188	95	69	

In the middle age speaker group, where [ɪ] was favoured, *Lynne*'s use of a weak [ʊ] in 20 tokens was highlighted. *Lynne* appeared to have the widest social network of the speakers in this group. She lived alone, travelled regularly for work over a wide geographical area and had spent time living abroad. *Lynne* had many diverse contacts due to a variety of social and work-related activities. *Adrian* also had a higher index score than was typical of his age group. He described frequent ongoing business contact with London and Turkey and gave no evidence of a close-knit social network. The social network ties of these two speakers appear relatively loose in comparison with *David*'s, strong ties with his large family and with local childhood friends that were reinforced through shared membership of the local golf club. *David* discussed his traditional work in a local brewery and commented on the lack of employees of his own generation developing the traditional brewery skills. His colleagues comprised an older generation of local males and he often socialised with these colleagues outside of working hours. *David*'s ties appear somewhat denser and more multiplex than those of *Lynne* and *Adrian*.

The speech of the oldest speakers was not anticipated to have been affected by [ʊ]'s presence in Leeds as a novel feature. The maintenance of [ɪ] by older informants regardless of network strength is to be expected. However, *JohnB*'s use of weak [ɪ] in 16 (46%) tokens, contrasts with the other older speakers' clear preference for strong [ɪ]. Speakers in the oldest age group typically described strong, local ties in the community and close-knit family ties. *JohnB*, in contrast, spoke of his role in the community as a fire officer and the wide diversity of social contacts throughout the Yorkshire area that this role involved.

Of particular interest was *Lee*'s use of a Yorkshire dialect variant that featured in the speech of older male speakers. *Lee* is the only speaker in the youngest age group to use [r]. *Lee* has the second lowest index score in his age group, which may be related to his strong network ties. *Lee* exhibited strong ties within his local neighbourhood, maintaining contact with a core group of childhood friends through football. His family had a strong local history and he was also the member of a political party that resists cultural diversity and strives to maintain traditional British norms. Nevertheless, *Lee* also used a weak [ʊ] in 15 tokens. His variant choices may reflect not only his local group loyalties but also his daily interaction with diverse members of the public in his working life in the busy city centre. *Lee*'s strong local ties have not prohibited him from adopting a labiodental realisation.

It appears that a more detailed analysis is warranted to provide a satisfactory account of individual speakers' idiosyncratic variant choices. The binary classification of social networks was somewhat limited in its ability to define the relative strength of individual speakers' social networks. For example, *Pat* in the middle age group, had a diverse range of professional work-based ties that involved frequent travel outside of the Yorkshire area, including London. Such ties would be considered loose and uniplex. However, *Pat* also explicitly emphasised her strong links with her large family network. Similarly, *Sandra* had relatively loose contacts due to her work situation, but also maintained ties with a childhood group of friends. *Sandra*'s tokens were almost exclusively alveolar with 23 strong [ɪ] and 15 weak [ɪ]. The relationship between *Sandra*'s preference for [ɪ] and her social network ties is not elucidated under the present analysis.

Despite these limitations, the binary classification of speakers' social networks reveals a general trend in the data. Speakers who maintain [ɪ] describe strong local network ties and relatively limited geographical mobility while [ʊ] tends to be a variant adopted by speakers with a relatively diverse social and/or geographical range of contacts. The Leeds data suggests that ties to strong local networks facilitate the maintenance of conservative forms and weak network ties create less resistance to linguistic innovations occurring in the wider linguistic environment.

### 7.3 Summary of findings

The results of the auditory analysis and classifications according to social networks were as expected. Although articulations of /r/ by Leeds speakers exhibited a wide range of variability, labiodental realisations were used by some speakers. The distribution of [ʊ] variants showed an age-related pattern, with some younger speakers using the innovative variant and older speakers maintaining the standard variant in the majority of cases. Closer analysis of the social networks of speakers revealed that speakers who use [ʊ] appear to have relatively diverse social network contacts rather than strong ties within a particular close-knit local network. Speakers with relatively tight local network ties tended to maintain [ɪ]. The implications of these findings are discussed below in greater detail.

## 8. Discussion

The Leeds data appears to provide some confirmation of the northward progress of a labiodental variant of /r/ since its identification as a dialect feature in the southeast of England (Wells, 1982). The age-related use of [ʊ] hints at a gradual loosening of loyalties towards the traditional alveolar approximant in the city of Leeds similar to that identified in other areas. The data suggests a more recent uptake of [ʊ] in Leeds than in Norwich, but a similar time scale as found for Derby. In Norwich, 30% of speakers born after 1948 used the labiodental variant (Trudgill, 1988). In Derby, the 41% of tokens realised as [ʊ] were used by speakers born between 1968 and 1981 (Foulkes & Docherty, 2000). In Leeds, 31% of the speakers in the sample born between 1960 and 1994 had [ʊ] variants.

The maintenance by speakers aged 46+ of the traditional dialect variant is compatible with Foulkes & Docherty's (2000) results in Derby and Newcastle, where speakers aged 45+ did not use [ʊ]. This supports Trudgill's (2002) and Kerswill's (1996) observations that [ʊ] is a dialect feature adopted by younger speakers and does not appear to affect older speakers who have already settled on the alveolar variant.

The presence in Leeds of other phonological variants considered relevant to the spread of [ʊ] (e.g., TH-fronting, L-vocalisation and T-glottaling) would further enhance the present data. The findings in this study indicate, as Trudgill (2002) predicts, that [ʊ] is continuing to gain ground as a consequence of contact between socially and geographically mobile speakers. The data and findings provide scope for future investigations of other variants in Leeds that are involved in this apparent levelling process.

The analysis of speakers' social network ties sheds light on the way in which such variants are diffused across separate cities. The analysis indicates that this spread is facilitated primarily by speakers with relatively weak social network ties. Milroy

(2002) stresses the importance of weak ties in explanatory models of the diffusion of linguistic innovation. Speakers with weak ties gain contact with individuals on a wider geographical level and are therefore more likely to be accountable for variants involved in levelling processes. It would appear that individuals with diverse social contacts may serve as the transport system for variants journeying between regional varieties, often bypassing areas in between.

The sample of speakers in the present study did not constitute a network of individuals in the traditional sense of a social network. Yet the analysis of the kinds of social ties maintained by speakers does suggest that social network information is relevant to the spread of [v]. The results indicate that a more in-depth analysis of speakers' networks and their variant use would be fruitful. At the very least, the study shows that social network information enhances the interpretation of the data. With the increasing social and geographical mobility and global interaction of the modern world, sociolinguists will increasingly need to investigate the social contact situations of speakers if they are to provide an adequate explanatory model of the processes of linguistic innovation and diffusion.

The data does not shed light on previously conflicting findings concerning the gender-related use of labiodental /r/ in the literature. Speaker sex does not appear to be a variable affecting the use of labiodental variants of /r/ in the Leeds data and the role of gender with respect to labiodental /r/ requires further investigation.

The social network classification used here did not adequately account for discrepancies between the variant choices of individual speakers with similar social network profiles. Although the evidence suggests that speakers with loose network ties are in a prime position to adopt linguistic innovations, not all speakers did so. In addition, loyalty to a close-knit network did not preclude all individuals from adopting the novel variant. These issues might be resolved by knowledge gains pertaining to the social significance or social meanings associated with the variants in use.

Aitchison (2001) suggests that a language change may only be adopted and spread when it becomes socially attractive to a particular social group. The social significance of [v] has yet to be probed. Britain (2002) has emphasised that spreading phonological innovations may undergo re-evaluation in a new environment with a subsequent alteration of their original connotations. This is particularly relevant to the traditionally negative perceptions associated with [v] which, in consideration of its growing status as a dialect feature, may have altered. Although the present study identifies speakers with loose social network ties as the prime facilitators of its diffusion, the possible social connotations of the feature have not been addressed.

A CofP approach might be illuminating in this respect. A more detailed investigation of the effects of speakers' perceptions of social identity on their variant choices might enhance our understanding of why linguistic innovations are adopted by some individuals but not others. Future studies of labiodental /r/, probing its significance as a sociolinguistic marker could shed light on how this variant has overcome its traditionally negative connotations and become an accepted feature of regional dialects.

## 9. Conclusion

The application of a social network perspective to the phonetic analysis of a spreading variant has proved to be insightful in the case of [v]. While the phonetic analysis confirms the continuing diffusion of labiodental /r/, the social network classification provides a means to explore the process of its diffusion. The analysis

suggests that linguistic variants are diffused by speakers with weak ties to diverse networks which afford them contact across a wide socio-geographical range. Conversely, speakers with strong, close-knit networks are unlikely to adopt linguistic innovations due to norm-enforcing linguistic loyalties that facilitate social group integration. Strong social networks therefore do not provide a suitable environment for linguistic innovation and change.

This study has addressed the spread of a linguistic innovation. However, the gap in the current state of knowledge about the social connotations associated with labiodental /r/ remains. The findings of the present study establish a sound basis for continuing investigations into the relationship between the social appeal of linguistic innovations, the desire of individual speakers to adopt them and the manner in which such innovations are transmitted from speaker to speaker. An explanatory model of linguistic variation and change must account not only for when and where a variant becomes successful, but also *how* and *why*.

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