

**Title page**

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Vowel change across time, space and conversational topic: the use of localised features in former mining communities.

**Abstract**

MOUTH vowel variation is explored across male speakers from four ex-mining communities in North East England. The paper presents analysis of: the geographical distribution across the communities of a variant of the vowel which is highly localised to a nearby location; age-correlated variation to infer change in progress away from localised form usage; and the effect on usage of traditional, locally-relevant conversational topics.

Older speakers from all villages, who lived in the area when the mines were open, often produce the localised variant, especially in speech produced during conversation about the locally-resonant mining topic and most frequently in communities closest to the location with which the form is associated. Conversely, speakers born since the loss of mining hardly produce the local form in any community or conversational context. Exploring conversational topic provides evidence for the connections between shifting social contexts and sound change, specifically that otherwise recessive features persist in speech concerning traditional, locally-relevant topics related to speakers' identities.

## **Text**

### **1. Introduction**

Much variationist work explores which speakers use innovatory forms within a speech community (Britain, 2005; Docherty, Foulkes, Milroy, Milroy & Walshaw, 1997; Trudgill, 1974) but fewer studies focus on the speakers who continue to use forms which are recessive in a community. The phonological and conversational contexts in which recessive forms persist are also under-researched.

This study samples male speakers from ex-coalmining villages in North East England which have witnessed considerable social change through the decline of that industry over the past half-century. It investigates usage of a form highly localised to parts of the region: the [ɛʊ] variant of the MOUTH vowel (Wells, 1982)<sup>1</sup>, compared to a non-localised [aʊ] variant. Use of the form is examined in terms of its distribution across four geographically contiguous speech communities to assess whether there is an abrupt or a gradual change from one form to the other. Use of the form across age groups is also assessed in order to identify age-correlated variation which suggests change in progress in the variable. Finally, use of the form is investigated across conversational topics in order to ascertain any effect of the discussion of traditional ways of life of the community on the speech produced.

The role of economic and linguistic change in terms of place and how conversational topic has been investigated in previous studies is explored, followed by an outline of the context of the study and the use of coalmining as a locally relevant conversational topic. Then, variation and change in the vowel across age groups within each community is considered before examining the conversational contexts in which the highly localised form is used most frequently.

### **2. Economic and linguistic change**

It is well-known that speakers construct and maintain social identity through linguistic behaviour (Chambers, 2003). Variants gain associations with repeated use in the same environments (Johnstone & Kiesling, 2008) and use of particular forms indexes speakers' social attributes and allegiances to social groups (Eckert, 2000; Lawson, 2009) or places (Llamas, 2007; Watt, Llamas & Johnson, 2013).

Sociolinguistics traditionally treated place as a physical concept mapped by geographical coordinates (Entrikin, 1991: 10), in line with the original aims of the dialectological paradigm, like the Survey of English Dialects (Orton & Dieth, 1962-71), which charted the geographic distribution of traditional features before they were lost (Schilling, 2013: 36). This goal of capturing recessive heritage variants focused efforts on sampling Non-mobile Older Rural Males (Chambers & Trudgill, 1998: 47)

in small isolated communities. NORMs are considered more likely to resist change (Schilling, 2013: 36) and to produce non-standard, conservative vernacular speech in both Britain (Orton, 1962: 15) and America (Kurath, 1940), though this is not always the case (Stoddart, Upton & Widdowson, 1999).

Subsequent Labovian work accepts that dialects are social as well as geographical (Chambers & Trudgill, 1998: 45). Labov's (1963, 1972) celebrated Martha's Vineyard study explored the retention of traditional features in an isolated island community. Exploring the social dynamics of the community, Labov linked the differentiation of the speech patterns he observed with islanders' changing norms and conflicting attitudes towards the island compared to the US mainland, showing specifically that highly localised pronunciations can reflect orientation to traditional lifestyles.

The role of geography in variationist research has been revitalised in recent years, with a renewed focus on "historical dialect enclave communities" (Wolfram, 2003: 143) and small neighbouring localities, both urban (Britain, 1991, 2005) and rural (McNair, 2002), and also across physical and perceptual borders (Llamas, 2007, 2010; Llamas, Watt & Johnson, 2009). Alongside work on the role of dense and multiplex social networks (Milroy, 1987), Wolfram (2003: 143) classifies "geographic remoteness", "limited in-migration" and "a strong sense of "insiders" and "outsiders"" as characteristics of communities where heritage variants are often used.

Recent discussions of place have highlighted the role of social influences on its construction (Eckert, 2000; Becker, 2009; Lawson, 2009). Subjective human agency is now recognised as crucial to the creation of place, with speakers "constructing place as they experience physical and social space, and different speakers may orient to place, linguistically, in very different ways for very different purposes" (Johnstone 2004: 66), as shown in Llamas' (2001, 2007) study of Middlesbrough English.

The Middlesbrough study shows how speakers' identity can be influenced by changes to political or administrative boundaries and how this impacts speakers' sense of place. Middlesbrough, a large town around 20 miles (32 kilometres) south of the research site of the present study, has been subject to shifting civic identity due to changes to administrative boundaries imposed on it in the second half of the twentieth century. Over the course of its existence, the town switched from forming a northerly part of the Yorkshire dialect region to being considered a southerly part of the distinct North East England dialect region. Using an innovative methodology, Llamas (2007) was able to index Middlesbrough speakers' variant distribution with their level of allegiance to the competing regional identities. The correlation of phonological analysis and participants' attitudinal responses argued for a broadly parallel

shift in orientation from Yorkshire towards the North East in terms of increased usage of local North East voiceless stop variants [p̥] and [k̥]. However, the proportion of usage of the alveolar [t̥] variant was much smaller and was disfavoured compared to the dominant non-local glottal [ʔ] form. These differing trends reflect the conflicted nature of Middlesbrough identity, suggesting that its identity simultaneously lies within the regional category of ‘North East England’ while retaining distinctions from other North East towns and cities where [t̥] is more common than [ʔ].

Other studies have explored the linguistic effects of depopulating, economically deprived areas due to changes in employment opportunities, like the Appalachian mining area of West Virginia (Hazen & Hamilton, 2008). The migration of six million workers en masse led to the establishment of a series of closed Appalachian ex-patriate enclaves which preserved West Virginia culture and linguistic forms in new communities (Smith Jones, 1997: 257), including the preservation of certain heritage features. The study authors speculate that migration brings about gradient differences in forms of pronunciation according to the degree of sociolinguistic awareness speakers have about each feature and its linguistic prevalence, such as whether these forms are stereotyped or stigmatized. Examples are provided of features which non-Appalachians might consider to be unintelligent and uneducated, but which nevertheless construct a “down-home” sociolinguistic identity which highlights speakers’ West Virginia origins (Hazen & Hamilton, 2008: 113). However, the authors find that highly localised features are most susceptible to change in the geographically-mobile speakers: “the more local the feature, the more it is affected by migration” (Hazen & Hamilton, 2008: 114).

Comparing the results of their migrant data to speakers who never left the Appalachian area, Hazen & Hamilton (2008: 116) do not find a neat distinction, with highly individual results; while fewer migrants retain local Appalachian forms than non-migrants, some migrants produce the same range of Appalachian features at a similar rate to those who never left the area. They attribute this to the particularly insular character of these migrant communities, with the settlement of entire groups of speakers together creating potential opportunities for the “concentration” (Wolfram & Schilling-Estes, 1999) of Appalachian heritage features in the new environment.

### 3. Topic as a predictor of variant use

Research into the effect of conversational topic on speech production traditionally concentrated on code-switching between different varieties (Ervin-Tripp, 1964). However, studies investigating the occurrence of phonetic shifts within the same dialect variety in accordance with the localness of the

topic of conversation also date back to the early days of variationist sociolinguistics (Blom & Gumperz, 1972). More recent approaches to topic shifting are couched in a more agentive framework where, rather than shifting pronunciation across different conversational topics according to formality (Labov, 1972), language is employed by speakers to create and enact linguistic identity (Eckert, 2000; Schilling, 2013). A shift may be influenced by someone else (Mendoza-Denton, Hay & Jannedy, 2003), or may relate to the speaker's own identity (Becker, 2009; Lawson, 2009). Contextual priming effects of the topic can also affect production (Sanchez, Hay & Nilson, 2015).

Recent work has explored fine-grained acoustic phonetic variation: Glasgow teenagers have been shown to produce a retracted /æ/ form associated locally with the speech of violent gangs when discussing violent conversation topics (Lawson, 2009); the appearance of a traditional rhotic variant in a local conversational topic in a New York neighbourhood has been interpreted as a response to the perceived loss of the neighbourhood's "authentic" local accent over time (Becker, 2009: 653); and the degree of rhoticity in the speech of US sports fans is shown to shift significantly according to whether the talk is about English association football clubs or American football teams (Love & Walker, 2013).

Exploring the historical change in medial /t/ from [t] to [d] in New Zealand English, Hay & Foulkes (2016) show that situating the conversational topic in different eras affects variant realization, with more frequent usage of the older [t] variant in conversations about older events and discussions of more recent events eliciting the innovative [d] variant. Exemplar-based models of speech production suggest that this is due to people storing and accessing linguistic representations based on phonetic detail (for example, a particular pronunciation) as well as social and contextual information (such as the situation in which the exchange occurs) from each encounter they have with a particular token of word in spoken interaction. This links the pronunciation of a feature with the environment in which it is uttered - which may include the topic of conversation - meaning that certain variants may associate more readily with certain situations (Goldinger, 1997; Hay & Drager, 2010).

Investigating the time depth of these linguistic representations, Hay & Foulkes (2016) argue that as the number of encounters an individual has with different variant forms builds up over time, so the variant form used by that individual may shift. They posit that this accounts for the replacement of speech forms found in one geographical region for another in speakers who move to a different dialect area. Equally, the fact that these geographically-mobile speakers have been shown to revert back to the pronunciation found in the previous location during interactions with speakers who have not left the

area (Howell, Barry & Vinson, 2006) suggests that older exemplars of interactions with speakers from the native location are still accessible to these speakers even after a considerable length of time living in the new location. Hay & Foulkes (2016) label this ‘remembered time’ of distant events.

Hay & Foulkes (2016) account for their results by suggesting that older topics might reflect a shift in identity towards a historical representation of the speaker, so that the speaker might be projecting a version of herself at the time of the event being discussed, which includes contemporary speech patterns. The authors draw a parallel between using an old pronunciation form in a conversation about an old event and using a regional accent form in a conversation about the same region, which has been shown, for example, when US speakers discuss British sport (Love & Walker, 2013).

This effect may also interact with addressee-influenced shift, whereby particularly old topics might be most likely discussed with older speakers, meaning that forms associated with these events are biased towards older pronunciations associated with these older speakers (see Bell, 1984). Research has shown that certain topic-specific groups of words, overwhelmingly used in restricted speaker groups or situations, can be the last to change in a historical phoneme shift (Yaeger-Dror, 1996; Yaeger-Dror & Kemp, 1992). For example, French-Canadian words associated with old, bygone times (*‘glacière’*, ice-box) were produced with the most conservative vowel variants.

In investigating the preservation of traditional pronunciations in nostalgic topics, a useful distinction can be drawn between a conversational topic shift and a topic-specific vocabulary shift. Research on the derhoticization of New Zealand English found the latter to be the relevant shift (Gordon, Campbell, Hay, Maclagan, Sudbury & Trudgill, 2004). Lexical items were categorised according to topic, with specialist vocabulary associated with “old-time” or “settler” New Zealand lifestyles, such as farming and mining terms, shown to be more likely to retain the conservative, declining feature of coda /r/ than other, non-specialist words (Gordon et al., 2004: 182). The study found that only topic-specific vocabulary – and not words with more general currency produced in the same conversational topic – demonstrates a significant increase in usage of the traditional rhotic form (Gordon et al., 2004: 281). The role of conversational topics which are relevant to speaker identity are examined in the present study in relation to the preservation of traditional features.

#### **4. The community context**

The four villages sampled in this study – from north to south: Dawdon, Easington, Horden, Blackhall – are adjacent former colliery communities which lie on the County Durham coast (henceforth East

Durham) on a north-south line stretching 9 miles (15km) between two urban centres and dialect zones: Sunderland to the north and Hartlepool (Teesside) to the south.

The four villages are socially and economically homogeneous according to a variety of objective measures, including indices of ethnic diversity, average household income, and level of business activity (Office for National Statistics, 2012), and have been depopulating since the 1970s (Historical Geographical Information System Project, 2014). All four villages have similar population sizes of between 4,000 and 8,000 inhabitants, with population densities of between 0.025 and 0.181 people/km<sup>2</sup>, well below the UK average of 256 people/km<sup>2</sup> (Office for National Statistics, 2012).

The research site sits within the once extensive Durham coalfield. Coal extraction is recorded in County Durham as early as the thirteenth century, with significant development from the 1830s onwards (Wilkinson & McCay, 1998). The expansion of the Durham coalfield out to the North Sea coast at the turn of the twentieth century brought the first major development to East Durham. Pits were sunk at Easington in 1899, Horden in 1904, Dawdon in 1907 and Blackhall in 1909 (Durham Records Office, 2012) and the villages grew around the mines. Figure 1 shows that during the twenty-year census period when these collieries opened, the population of the entire district increased by 67% from 44,351 to 74,036 (Historical Geographical Information System Project, 2014).

**Figure 1: Population change of East Durham district 1811-1991**

By 1911, 152,000 men were employed in a coal mine in County Durham, which represented 30% of the county's total workforce (McCord, 1979: 111). Almost all the pits in North East England closed following the decline of the British coalmining industry in the latter half of the twentieth century, with the collieries in the four villages studied in this research among the last to shut between 1981 and 1993. Yet Pearce (2009: 176) states that "the influence of coal mining on both the physical and internal mental landscapes of County Durham has been enormous", noting that respondents to his dialect perception survey consider that the dialect of East Durham differs from other local areas due to its mining heritage; one respondent states that "people who are from a village or a colliery have a different twang than those who live in the town centre a couple of miles from these pit villages". There is also an important interaction between linguistic production and coalmining. Pearce (2009: 176) provides attitudinal evidence that the term "pitmatic", conceived as a nineteenth-century industrial glossary of coalmining techniques, has grown to cover not only the dialect of pitmen (Griffiths, 2007:10) but also speakers living in the general geographic area where coal mines once stood.

## 5. The MOUTH vowel

The MOUTH vowel varies on a region-to-region (Ellis, 1889) or even town-to-town (Britain, 1991) basis. It has been analysed in many varieties of English (Britain, 2008; Chambers, 1973) including in the UK (Kerswill, 2003). The British standard form is generally agreed to be a diphthongal variant approximating [aʊ] (Wells, 1982: 151), with a common non-standard variant containing a frontier, closer nuclei approximating [ɛʊ] (Britain, 2008: 189; Kerswill, 2003).

The earliest record of MOUTH variation in North East England from Ellis (1889) finds no evidence of a low nucleus diphthong similar to [aʊ]. Usage in the region at this time seemed to vary geographically between the unshifted monophthong [u:],<sup>2</sup> found to the north and west of the region, and a high diphthong [ɤʊ],<sup>3</sup> found further south and east (Ellis, 1889: 649). A representation of this boundary is presented in Figure 2, showing that the four villages examined in this study are situated geographically with the categorically [ɤʊ]-producing group.<sup>4</sup> This dividing line remains intact at the time of the Survey of English Dialects seventy years later (Orton & Dieth, 1962-71), with zero instances of any open nuclei (such as [aʊ]) reported in any of the six Durham locations surveyed.

**Figure 2: Map of MOUTH pronunciations recorded in locations surveyed by Ellis (1889), with circle markers indicating [u:] usage and square markers indicating [ɤʊ] usage (South Shields has both), and Survey of English Dialects (1962-71) Durham locations indicated by star markers (Bishop Middleham is sampled by both Ellis and SED) with the villages sampled in this study marked with balloons (Google, 2019)**

More recently, many traditional dialects like those found in North East England have undergone change towards supralocal forms covering a wider geographical area at the expense of highly local variants (Watt, 2002). As illustration, Kerswill (2002: 192) finds “an almost total change, over two generations” from monophthong [u:] to a closing diphthong with a low, back nucleus ([aʊ]) in two villages 16 miles (26 kilometres) west of Durham, with speakers born in the 1940s alternating [u:] and [aʊ], compared to speakers born in the 1980s generally using the diphthong only. [u:] usage is now restricted to a smaller geographical area centring on more northerly Newcastle-upon-Tyne (Beal, 2000: 348; Pearce, 2009: 184). In the absence of [u:], the main alternative variant to [aʊ] in Sunderland English is the raised, fronted [ɛʊ] diphthong, with these two forms recorded as being used roughly equally (Beal, Burbano-Elizondo & Llamas, 2012: 35). In contrast, only the fully open [aʊ] form is found in Hartlepool, meaning that the variation between MOUTH production either side of the East Durham villages depends upon the presence or absence of a raised diphthong [ɛʊ].

There is some evidence that the [ɛʊ] variant is salient, at least in Sunderland. Beal (2000: 352) highlights a series of cartoon strips from a local newspaper which focused on the inter-city rivalry between Newcastle-upon-Tyne and Sunderland, which show repeated use of [ɛʊ] phonetic spellings<sup>5</sup> in speech of stereotyped characters from Sunderland. Given the research site's location between Sunderland, where [ɛʊ] and [aʊ] compete, and Hartlepool, where [ɛʊ] is not found, the present study explores the distribution of East Durham speakers' usage of [ɛʊ] and [aʊ] variants.

## **6. Data collection**

### **6.1 Participants**

Table 1 shows how thirty-two males were divided into two emically-defined cohorts (Friedman & Schustack, 2003: 448) according to an objectively-defined shared life stage. The cohorts in this study roughly represent the life stages of young adulthood and retirement. An intermediate middle age group was not used due to the history of coalmining locally, with the two extreme age ranges deliberately chosen to reflect the changing identity of East Durham in terms of the availability of coalmining as a local occupation – with the older generation growing up when mining was a major local employer, and the younger generation raised since the closure of all of the local collieries. From the two age groups, apparent time variation and its connection with the demise of the local coal industry was examined in terms of speakers' attitudes towards mining and other aspects of life in the local community.

#### **Table 1: Design of fieldwork sample**

The young adult group (hereon “younger”) comprises sixteen speakers born between 1979 and 1993 (aged 18 to 32 years, mean = 23.5 years, at the time of recording) – providing an almost direct match with the timeline of pit closures in East Durham (1981 to 1993). This confirms that none of the younger cohort were able to work in a coalmine locally and suggests that even the oldest participants in the younger group grew up with the coal industry in the throes of terminal decline. There are also sixteen speakers in the retirement group (henceforth “older”), born between 1925 and 1950 (aged 61 to 86 years, mean = 71.2 years), when the mining industry thrived in East Durham. These speakers had the opportunity to work at one of the many pits in the region for up to an almost entire working life.

### **6.2 Method of data elicitation**

Using a Zoom H4 mobile digital solid-state recorder with DPA 4066 headset microphones and adapters, participants were recorded speaking to the lead author, whose East Durham roots minimised accommodation effects (see Llamas, Watt & Johnson, 2009 discussing the interviewer effect). The

completed 16-bit stereo recordings, sampled at 44,100Hz, were transferred, unedited and uncut, from the recorder's memory card and saved as .wav files on a computer.

Interviews were conducted in locations familiar to the participants, like their homes or community centres, in order to try to create a relaxed atmosphere conducive to eliciting casual speech (Feagin, 2013). A structured sociolinguistic interview to test for the effect of conversational topic on variant production was devised, incorporating two tasks eliciting read speech: a word list which included four tokens of the MOUTH vowel<sup>6</sup> and a passage of text which included thirteen MOUTH tokens.<sup>7</sup> Conversational data was obtained through an oral discussion of an Identity Questionnaire (IdQ), divided equally into three sections: about coalmining, other local topics, and general topics. Table 2 shows a full list of topics discussed, and coding of these sections is explained in §6.3, below.

**Table 2: List of topics in each interview section category**

This study adapted Llamas' (1999) IdQ from the Survey of Regional English methodology. Although the original questionnaire was designed to be applicable to all varieties of British English, the questions were augmented in this study to elicit data specifically pertaining to coalmining and the local area. The design of the questionnaire for use in the East Durham study was consistent with Llamas' (2001: 88) original objective to "obtain an insight into informants' attitudes towards their language and their area ... [which] can be correlated with linguistic variation found".

The IdQ incorporates spontaneous responses from participants about their attitude towards their local area and the language used therein (Johnston, 1985: 83). Among other topics, questions cover perceptual dialect boundaries (Preston, 1989; Montgomery & Beal, 2011) and linguistic identity (Le Page & Tabouret-Keller, 1985; Bucholtz, 1999), and an exercise based on the Sense-Relation Network data elicitation method evaluates respondents' awareness and usage of dialect-specific synonyms for standard notion words, in terms of distribution and social meaning locally (see Llamas, 1999: 98).

### 6.3 Data analysis

2092 tokens were coded for vowel quality, conversational context (Gordon et al., 2004), recency of topic (Hay & Foulkes, 2016), and the age (Kerswill, 2002), geographical origin (Williams & Kerswill, 1999), orientation (Labov, 1963) and occupation of the speaker. Following Britain & Sudbury (2007), triphthongs (*power*, *towel*) were excluded from analysis, due to the potential for "smoothing" (Wells, 1982: 238-242). A limit of five tokens of a lexical item was enforced per speaker per interview topic.

As the MOUTH vowel varies locally between [ɛʊ] to [aʊ], the acoustic F1 value is taken to reflect how open the nucleus of the diphthong is. Age may affect first formant frequencies: repeated tracking of a speaker shows F1 values following a V-shaped curve of decrease followed by increase over time (Reubold, Harrington & Kleber, 2010), though corner vowels such as [a] are much less likely to change (Eichhorn, Kent, Austin & Vorperian, 2018). Reference F1 values for males from nearby Newcastle-upon-Tyne are reported at around 515 Hz for [ɛ] and 695 Hz for [a] (Ferragne & Pellegrino, 2010).

Recordings were opened and played using Praat software (Boersma & Weenink, 2012) with the first two formants of each token measured at points in the spectrogram where the formants appeared to be stable. The spectrogram was set to display frequencies up to 5000Hz. Assuming that adult males typically produce speech sounds containing one formant per 1000Hz (Ladefoged, 2003), the ‘number of formants’ command which seeks and plots the formants on the spectrogram was set at 5.0, but sometimes found formants more clearly at a setting of 4.5 formants. Following transition from any preceding segment, one reading was taken near the start of the nucleus. The other measurement was made towards the end of the offglide. Measurements were executed manually by cursor movements, with the in-built measuring tool disabled due to inaccurate measurements being provided for formants (see Adank, Van Hout & Smits, 2004). If one or more formant bars were not clearly plotted, these tokens were excised from the analysis as it was not possible to confidently take a formant reading. All measurements were rounded to the nearest 5Hz.

The impact of coalmining on variant usage is explored in terms of mining as a traditional conversational topic (mining topic/other local topic/non-local topic) and a local identity marker (speaker was/not a miner) As Hay & Foulkes (2016) found that older topics tend to elicit more traditional pronunciations, tokens were also coded according to whether the discussion related to either the present or past time. Due to the demise of the coal industry in the late 20<sup>th</sup> century, mining topics were based entirely in the past, with even the (relatively few) tokens elicited from younger speakers referring to recollections of stories related by grandfathers who had worked in the industry. Interviewees were also asked about their outlook about East Durham, and specifically whether they felt positively or negatively towards the two larger urban areas of Sunderland and Hartlepool, in order to explore participants’ identity and orientation to the local area. A full breakdown of the numbers of tokens elicited from different topics in the past and present time is provided in Table 2.

## 7. Results

Table 3 shows the linear mixed effects model produced in RStudio version 3.5.0 (R Foundation for Statistical Computing, 2018) to test significance of the dependent variable of F1 values. In order to test which independent variables significantly improve the model, an analysis of variance was carried out between the full model shown in Table 3 and models which excluded particular factors from the full model in turn. This yielded a Chi square and a p-value, providing statistical significance for each factor. External factors considered potential predictors of variant usage based on the MOUTH literature were shown to be significant, with the remainder of this section focusing on each trend in turn.

- Interaction: speaker age (old/young) and location (Dawdon/Easington/Horden/Blackhall)
- Speaker orientation towards local areas (Hartlepool/East Durham/Newcastle/Sunderland)
- Interaction: age and interview section (word list/passage; mining/local/non-local talk)

External factors related to recency of conversational topics, older speakers' occupations within the mining industry, and whether tokens were part of mining vocabulary, as well as internal factors based on manner and voicing of adjacent segments, did not significantly improve the model. The 49 different words were modelled as a random effect, with interview section modelled as a slope on a random intercept of the 32 speakers, to show variation outside the control of the experiment.

**Table 3: Output from the mixed effects model for MOUTH data**

**Table 4: Relevelled location:age group output from the mixed effects model for MOUTH data**

**Table 5: Relevelled age group:interview section output from the mixed effects model for MOUTH data**

**Table 6: Relevelled orientation group output from the mixed effects model for MOUTH data**

### 7.1 Interaction of age and location

Figure 3 shows that speakers in Dawdon, the village closest to [ɛʊ]-retaining Sunderland, produce a greater proportion of variants with closer F1 values – closer to [ɛʊ] – than villages further away among both younger and older speakers. Older speakers in Horden produce an average F1 value of around 710 Hz, compared with an average F1 value of around 670 Hz among older speakers in more northerly Easington, and a mean F1 value of around 630 Hz among older speakers in northern-most Dawdon. A gradual shift is thus demonstrated across geographical space from Horden north to Dawdon, although Blackhall does not participate in this trend because older speakers in this village produce a median F1 value of about 660 Hz, lower than more northerly Easington and Horden (see §8 for discussion of this).

The younger speakers show a more marked difference with a range of more than 200 Hz between the average F1 value found among younger speakers in northern-most Dawdon (630 Hz) compared to Easington (735 Hz), Horden (760 Hz) and most southerly Blackhall (835 Hz). This means

that while younger and older speakers from Dawdon have very similar F1 scores, younger speakers' F1 values tend to be an average of 50 Hz more open than their older counterparts from the same village in both Easington and Horden, and this generational change is enlarged considerably in Blackhall, with a difference of around 175 Hz between the two age groups. An interaction between location and age group was therefore a highly significant improvement to the model ( $\chi^2(6)=48.322, p<0.001$ ).

**Figure 3: Overall distribution of MOUTH variants by age and location (N = 2092)**

## 7.2 Orientation

**Table 7: Speaker orientations by number**

Speakers were coded according to which local place they most affiliated. This information was gleaned from the IdQ data which asked respondents about their local identity, pride in their hometown, and where they chose to spend their leisure time. As well as the four villages, which have been merged as 'East Durham' in order to avoid replication with the speaker location factor in the model, speakers also discussed their connections to the two larger urban areas surrounding East Durham: Sunderland and Hartlepool, and a minority of speakers oriented to Newcastle-upon-Tyne. Full data is shown in Table 7.

**Figure 4: Overall distribution of MOUTH variants by speaker orientation (N = 2092)**

Figure 4 shows that speakers who orient to Newcastle-upon-Tyne or Hartlepool – two locations where [ɛʊ] is not associated – produce more open mean F1 scores than those who orient to Sunderland or the East Durham villages, where MOUTH diphthongs with raised nuclei have historically been found (Beal, Burbano-Elizondo & Llamas, 2012; Ellis, 1889). With reference F1 values for males from nearby Newcastle-upon-Tyne reported at around 515 Hz for [ɛ] and 695 Hz for [a] (Ferragne & Pellegrino, 2010), the mean F1 score among speakers orienting to Newcastle is 735 Hz, compared to 765 Hz for those affiliating with Hartlepool. These scores are around 50 to 100 Hz lower than the values recorded among those affiliating with Sunderland (650 Hz) or East Durham (680 Hz). Speaker orientation is therefore shown to significantly affect F1 score ( $\chi^2(3)=13.747, p<0.01$ ).

## 7.3 Interaction of age and intra-speaker variation

**Figure 5: Overall distribution of MOUTH variants by age and interview section (N = 2092)**

As discussed in §6.2, read and interview speech were demarcated into five sub-sections, resulting in two read speech sub-categories encompassing the word list and the passage of continuous prose, and three conversational contexts covering mining, local topics other than mining, and non-local topics. Figure 5 shows that both age groups have similar distributions of F1 score between the two non-mining conversational topics, with mean values in the range of 700 to 715 Hz. The older speakers' F1 values

are closer in the mining discussion than in the other two conversational topics, with mean mining F1 values nearly 100 Hz lower than both other topics at 625 Hz among the older speakers. The older speakers also produce closer F1 values in both read speech sections than in non-mining conversations.

The younger speakers do not shift towards closer F1 values in the mining topic. In fact, their average F1 value is more open in the mining topic (mean F1 score: 750 Hz) than in both the general, non-local topic (mean F1 score: 700 Hz) and the local topic (mean F1 score: 715 Hz). An interaction of age group and interview section therefore significantly affects F1 score ( $\chi^2(8) = 57.256, p < 0.001$ ).

## 8. Discussion

### 8.1 Discussion of geographic patterns

Previous research reports that [ɛʊ] does not occur in Hartlepool English and is used less frequently than both a different local variant [u:] and a non-local variant [aʊ] in Newcastle-upon-Tyne (Beal, Burbano-Elizondo & Llamas, 2012: 35) but is considered a “shibboleth” of Sunderland English (Beal 2000: 353) and the results of this study suggest that MOUTH vowel nuclei are generally more raised among speakers who are located near or affiliate strongly to Sunderland – the city where the raised form, [ɛʊ], is locally associated (Beal 2000: 353; Beal, Burbano-Elizondo & Llamas, 2012: 35).

The location results show that [ɛʊ]-like F1 values are found in the speech of speakers in all four East Durham villages, resembling a “mixed lect” (Chambers & Trudgill, 1998: 110) between the Sunderland variety, where both [ɛʊ] and [aʊ] variants compete, and the Hartlepool variety, where the [aʊ] form dominates. However, the distribution differs in each village, which supports the perceptual finding from Pearce (2009: 165) that distinctive speech patterns can be found in neighbouring places. The village of Dawdon, nearest Sunderland, shows a significantly different variant distribution to all of the other three villages, although the findings suggest a gradual change from north to south in general, with F1 values incrementally more open as geographical distance from Sunderland increases. However, this pattern does not extend to the most southerly village, with a closer average F1 value found among older speakers in southern-most Blackhall than in the middle villages of Easington and Horden.

In line with perceptual dialectology work which shows that people construct and relate to regions differently (Montgomery & Beal, 2011; Preston, 1989), Atkinson (2011: 245-255) suggests that dialect zone boundaries can overlap, which may provide an explanation for the different geographical and linguistic patterns observed among older speakers in Easington and Horden compared to Blackhall. Assessing the north of England more broadly, he claimed that Teesside speakers are linguistically

diverging from the rest of North East England in producing vocalic variants more characteristic of varieties of the neighbouring region of Yorkshire, to the south of the North East region (cf. Kerswill & Williams, 1999, Watt & Tillotson, 2001). In contrast, speakers in the North Yorkshire city of York (around 60 miles/96 kilometres south of Hartlepool) are said to converge more with the North East than the rest of Yorkshire (Richards, Haddican & Foulkes, 2009), suggesting that the northern boundary of the Yorkshire dialect region and the southern boundary of the North East zone intersect.

Attitudinal data from the IdQ shows that the older Blackhall speakers are more likely to orient away from Hartlepool than those from Horden. When asked: ‘What do you think of Hartlepool as a place and an accent?’, none of the four older informants in Horden gave a negative depiction:

“People from the pit villages would go to maybe the town, Hartlepool...there used to be a fair bit of rivalry...but it was always a friendly sort of rivalry.” Older Horden speaker, aged 75

In contrast, three of the four older Blackhall speakers considered their village to be different from Hartlepool and its accent, stressing the difference between Blackhall miners who were labelled “pit yackers” and Hartlepool steel workers, and recalled strained relations between the two places:

“The lingo – total different, cultural change and everything from just two mile down the road to Hartlepool. People worked in different industries, they talked different – a different dialect altogether...it was pretty hostile when we were young’uns.” Older Blackhall speaker, aged 69

“When we used to go down as teenagers down to Hartlepool from the pit villages, we were called the yackers coming and invading, looking for their girls, because the rink and the dances were down there, but when you used to go down there you were cast as invaders.” Older Blackhall speaker, aged 68

The differences in perceptions of Hartlepool revealed in these comments are consistent with the results of the speaker orientation factor analysis in Table 7 which shows that none of the older Blackhall speakers affiliate with Hartlepool, compared with one older Horden speaker who is the only member of the older cohort to speak warmly of Hartlepool, having been schooled there and supported their football team. Figure 4 shows that speakers who orient towards Hartlepool, including one older Horden speaker but no older Blackhall speakers, produce more open F1 values than those who affiliate with East Durham or Sunderland. This lack of affiliation with Hartlepool may explain why older speakers in Blackhall produce less open F1 values than older speakers in Horden, despite their closer geographic proximity to the area where more open MOUTH vowels are found.

Exploring speakers' regional orientations in this way provides a deeper understanding of the influence of the urban centres bookending East Durham. As coalmining did not extend south of Blackhall to Hartlepool – which instead has a nuclear power plant that was for many years in direct competition with the East Durham mines (Davenport, 1984) – many older speakers considered the role of the nuclear industry in Hartlepool to be a considerable bar to their shared mining identity, and thus did not include Hartlepool as an in-group status marker:

“They should never have built that nuclear power station at Hartlepool. That should’ve been a pit, that.” Older Easington speaker, aged 64

“When they built that power station that sped things up [closing down the mines]. They were competing against us then, and I didn’t like it.” Older Blackhall speaker, aged 69

These findings echo Britain's (1991: 612-13) study of MOUTH variation in the Fens in Eastern England, which reported the emergence of a linguistic boundary between two locations which have categorically different realisations of the feature. As in the Fens, culturally-constructed boundaries affect East Durham: the county border ends between Blackhall and Hartlepool, and the aversion to Hartlepool's nuclear industry among Blackhall miners suggests the creation of a pair of socially-determined outgroups. These combine with physical obstacles within the built environment, as can be seen in Figure 6, which shows Crimdon Dene, a valley situated between Blackhall and Hartlepool divided by a body of water (known locally as a beck),<sup>8</sup> to explain the presence of F1 values indicating raised nuclei in Blackhall but not in Hartlepool. Despite the contiguity between Blackhall and Hartlepool, the older Blackhall speakers conceive a place identity in opposition to Hartlepool.

**Figure 6: Map of notable physical and perceptual boundaries between Blackhall and Hartlepool**

## **8.2 Change over time**

The age-correlated data suggest a change in progress away from local [ɛʊ] realisations to the unmarked [aʊ] variant, indicating dialect levelling in common with other areas of the North East such as Newcastle-upon-Tyne (Watt, 2002) and Durham City (Kerswill, 2002). The increase in more open F1 values among younger speakers in all locations but Dawdon results in speech which is less like Sunderland English, representing a divergent linguistic trend. The age results in Dawdon suggest that the local [ɛʊ] pronunciation is largely being preserved across the age groups, in line with Wolfram & Schilling-Estes' concentration model of dialect maintenance (1999). This seems to be explained by the speaker orientation data, as all but one of the older and younger speakers from Dawdon affiliated with

[eʊ]-producing Sunderland, demonstrating a considerably higher level of uniformity than the other three villages, where orientations were much more diverse; in response to the IdQ question ‘What do you think of Sunderland as a place and an accent?’, only one of the four younger informants in Dawdon felt that Sunderland’s accent was different from that of their own village:

“I think Newcastle’s sort of got their own language but Hartlepool and ‘Boro [Middlesbrough] I think have got a bit of a difference. I think Sunderland, Dawdon, Easington, Horden, all of them places, we’re all relatively the same.” Younger Dawdon speaker, aged 18

In contrast, five of the eight younger respondents from the two middle villages of Easington and Horden felt that Sunderland’s accent was different to their own:

“I would say they’re [Dawdon] exactly the same as us. I think Easington’s categorised with [them]. I think maybe once you get to after Ryhope way [Sunderland] it starts to change.” Younger Easington speaker, aged 23

“If you put me in a room with somebody from Dawdon and somebody from Horden I don’t think I’d be able to tell the difference [but] you can tell the difference with Sunderland.” Younger Horden speaker, aged 25

These responses also claim similarity in the accents of these three villages, despite the large difference between F1 values in Dawdon compared to the other villages. However, two of the four younger Dawdon speakers perceive the accent of the southern-most village, Blackhall, to be different:

“I’ve got a mate from Blackhall and I think he sounds slightly different.” Younger Dawdon speaker, aged 21

“Blackhall: I think if you go any further than that it definitely changes there. It’s more like Hartlepool.” Younger Dawdon speaker, aged 21

This seems to be borne out in the production data which shows younger Blackhall speakers to produce F1 values more than 200 Hz more open than younger Dawdon speakers, and almost 100 Hz more open than the nearest village of Horden. The attitudinal data point to potential convergence with the Hartlepool variety, with all four of the younger Blackhall speakers perceiving the accent of their village to be indistinguishable from Hartlepool, and considering the village to be a part of Hartlepool:

“I would say I have a typical Hartlepool accent.” Younger Blackhall speaker, aged 30

“I think Blackhall’s part of Hartlepool, yeah.” Younger Blackhall speaker, aged 32

### **8.3 Coalmining and a sense of place**

Although places are physical spaces (Entrikin, 1991: 10), they are also socially constructed, experienced and given meaning by speakers (Anderson, 1983), and both of these facets can affect linguistic behaviour (Britain, 2000). Delimiting a place can be focused by political, historical and economic criteria as well as shared experiences (Johnstone, 2004: 66-69). In this way, being a “pit yacker” or talking “pitmatic” requires someone from East Durham to adopt a stance in relation to the coal mines which formerly peppered the local landscape.

“It’s still important. It’s the reason our ancestors came to live here and we’re still here but the community has lost something pretty major. We still organise things at the Welfare [Hall] and go into the schools to talk about the pit to keep it alive but it’s not the same obviously.” Older Easington speaker, aged 64

“I don’t know much about it [mining] really. I’ve been down where the pit was but there’s no trace of it any more. It’s all just walkways and beach fronts now.” Younger Easington speaker, aged 23

Although these two speakers can both be considered representative of Easington in the demographic sense of being brought up and currently resident there, economic change affecting the local area may have led them to inhabit different “lifestyle enclaves” within the same geographic space (Giddens, 1991: 147) and their disparate orientations to the mining heritage of the village provide two distinct interpretations of what being from Easington really incorporates.

Certain forms index particular meanings, including local and supralocal identity (Johnstone, 2010). In research on the working class, deindustrialising community of Pittsburgh, a parallel is found between old working-class forms and perceptions of localness:

“Forms that once only sounded working-class have come, for some speakers, to sound local as well, or for some, only local, and these forms become useful resources in the discursive calibration of people’s sense of place”. (Johnstone, 2010: 395)

Given the presence of [aʊ] across the North East region and other parts of the UK, [ɛʊ] can be interpreted as both non-standard (working class) and local (at least to Sunderland). Schilling-Estes (2002) showed that speakers faced with economic and social change shift towards old variants associated with local place identity in certain styles. Although there is little in the extant literature to suggest that [ɛʊ]-like pronunciations are heritage mining forms, it may be that, when older speakers discuss the highly locally-resonant topic of coalmining, these forms reflect their local identity, which indexes both East Durham geographically and mining historically as components of place. The fact that

these local pronunciations are most clearly seen in a topic style shift contradicts Hazen's (2000) study correlating local variant usage with local place affiliation in North Carolina, which found that speakers who orient to the local area are less likely to style-shift because they use local features in all situations and to all audiences. Although it has been shown that longstanding local forms may persist among speakers if they become markers of local identity (Johnstone, Bhasin & Wittkofski, 2002), usage of [ɛʊ] was not mentioned by any of the speakers in the qualitative data to be especially noticeable to them as a marker of local speech. However, Beal (2004) found that local people's perceptions of linguistic features were not a bar to them becoming local identity markers, with monophthongal [u:] MOUTH forms said to be highly stigmatised in nearby Newcastle-upon-Tyne but nevertheless prevailing as a marker of that place. Furthermore, speakers have been found to use a local form even when they are unaware of that they produce the variant (Johnstone & Kiesling, 2008), which may also be the case with [ɛʊ]-like realisations in East Durham.

Dyer (2002) showed that the social associations of a variant can be reallocated by speakers in order to reflect a different place identity from previous generations, with short [o] GOAT realisations signifying Scottish origin among older speakers who had migrated to Corby, Northamptonshire and simultaneously indexing affinity to Corby over a nearby rival town among younger males. Thus, even within one geographic community, the same forms may refer to different social characteristics, such as participation in different social categories, depending on the speaker group. The [ɛʊ] form has appeared in Newcastle media as a negative stereotype of Sunderland English (Beal, 2000), and perhaps – like [o] in Corby – has been reallocated to assert positive Sunderland place identity by locals, which has spread to nearby East Durham through contact. Alternatively, it may simply be the case that variant usage and speaker orientation do not correlate neatly, as found in nearby Middlesbrough where increased usage of glottalised /p/ reflected convergence with production patterns in Newcastle-upon-Tyne, even though Middlesbrough speakers did not evaluate Newcastle positively as a place or an accent (Llamas, 2007).

It is possible to infer that the shifting identity of East Durham brought about by the demise of coalmining has changed how residents identify with their local area. Among younger speakers, the increase in more open F1 values, reflecting greater usage of a supralocal feature like [aʊ], might reflect a broadening of East Durham inhabitants' geographic horizons in terms of where they spend their time. Speakers from small localities may come into contact with speakers from larger urban areas if they commute for work or study or to make use of the greater cultural and entertainment opportunities

generally afforded by cities (Britain, 2011). These regular and repeated patterns of geographic movement from villages to larger cities and back create conditions ripe for diffusion of linguistic features across the geographic span of the area through face-to-face contact with speakers of other varieties (Labov, 2003: 15), which might consequently lead to an increase in a less localisable feature.

Contact-based factors as well as attitudinal data from the sample contextualise the change from [ɛʊ] towards more open F1 values resembling [aʊ] in East Durham. In terms of public transport provision, the older speakers bemoaned the reduction in opportunities to access the wider area over their lifetime as local rail stations connecting three of the four villages to Newcastle-upon-Tyne, Sunderland, Hartlepool and Middlesbrough closed in the 1960s (Evening Chronicle, 2013), and more recently the local government cuts initiated by the 2010-2015 Tory-led coalition government led to several local bus services connecting the villages to other locations being withdrawn (Hartlepool Mail, 2011). Although the impact of this poor service has been mitigated by a 15.3% increase in car ownership between the 2001 and 2011 censuses, almost one in three households in East Durham still have no access to a car (31.9% - higher than county, region and national averages) (Office for National Statistics, 2011; cited in Durham County Council, 2016: 65), augmenting the sense of isolation similar to that found in Wolfram's (2003: 143) "historical dialect enclave communities".

Irrespective of the availability of transport, there nevertheless appears to be a trend towards younger speakers spending more time outside of their hometowns on a longer-term scale, and this is reflected in their more supralocal pronunciation of the MOUTH vowel. Whereas only four of the sixteen older speakers had worked outside of the four villages, with the remainder spending almost their entire careers in a pit-related job in East Durham, nine of the sixteen younger speakers were working or studying in Durham City, Hartlepool, Newcastle-upon-Tyne, Sunderland, or further afield, representing a 125% increase across the two cohorts. As well as making use of the wider region's leisure facilities, working outside of East Durham brings the younger speakers into daily contact with speakers of other varieties of regional North East English. Indeed, one younger Easington speaker, who affiliated with Newcastle-upon-Tyne in the speaker orientation factor analysis, remarked that many of his colleagues in his workplace in Gateshead (a town between Newcastle-upon-Tyne and Washington (see Figure 2)) mocked linguistic features of his accent which were uncharacteristic of theirs – showing that, although this feature appears to be levelling at a local level in the East Durham area, language users are aware that intra-regional variation across the North East as a whole continues to exist:

“I just thought I had a Geordie accent, like if I’d go on holiday that’s what people’d say, but then I work through Gateshead, and everyone from Gateshead like can’t believe how much I sound like a Mackem [someone from Sunderland]. Got the mick taken out of me like so badly. They’d definitely group Easington with Sunderland.” Younger Easington speaker, aged 23

“The return to the local is often a response to globalization” (Hall, 1991: 34) but younger speakers in East Durham, who are starting their working lives in a more globalized world without large employers in their hometowns, do not appear to be using local forms in the same ways as their older counterparts. Johnstone (2010) describes how increased geographical mobility (such as earning enough money to holiday regularly) as a consequence of economic globalisation, leads to greater awareness of local dialects and outsider perceptions of them (through meeting vacationers from other areas who comment on accent differences), which, in turn, can lead to speakers expanding their range of speech styles (either reinforcing local identity, levelling to a supralocal variety, or standardising, according to audience or situation). Whereas it seems that older speakers index their local identity by using highly local MOUTH pronunciations when talking about coalmining, this is not mirrored in younger speakers’ speech. This may be for a variety of reasons, including the lack of familiarity or affiliation with the area’s coalmining heritage, but it may also point to a shift away from local identity.

There is some evidence suggesting that certain North Eastern accents have become more overtly prestigious recently by gaining greater exposure in local and national media and popular culture. For example, Beal (2004: 37) quotes a national survey of accent appreciation which rates Newcastle-upon-Tyne’s accent as the fourth “sexiest” in the UK and Llamas (2001: 228-229) notes an increase presence of Newcastle-born broadcasters on UK television. Foulkes & Docherty (2001) suggested that socially influential varieties well-represented in the media are more likely to influence the speech patterns of speakers of similar varieties more than those whose native dialect is markedly different. It could therefore be that younger East Durham speakers are inclined to use forms from other nearby accents which they consider socially attractive, but which are not part of their local variety, such as the levelled [aʊ] form used across much of North East England (Kerswill, 2002; Watt, 2002).

Nevertheless, these increases in opportunities for exposure to other varieties and potential contact with speakers of them can all be viewed in light of the erosion of traditional lifestyles through industrial change. The decline of coalmining and its impact on local work and leisure opportunities has

clearly affected place identity. The effects of this industrial and social change are examined here in the context of East Durham, but similar changes can be observed throughout the world.

The results show that older speakers' F1 values were nearly 100 Hz closer when discussing mining compared to conversations about non-local topics, regardless of whether the speaker worked as a miner or oriented to the local area. This suggests that topics with a highly local resonance entail a greater usage of highly local variants, supporting previous findings (Love & Walker, 2013). It also expands work into traditional or 'old-time' topic areas which previously concentrated on effects at the word level (Yaeger-Dror, 1996; Yaeger-Dror & Kemp, 1992) by exploring instead the subject matter of the conversation in which the phonetic token occurs, and showing that topic shift can lead to increases in usage of a variant which is otherwise in decline in all words in which the variant appears within the conversational topic, rather than just topic-specific mining words (as found in Gordon et al., 2004). Furthermore, while all of the discussions of coalmining were situated in the past, there was no significant difference between past and present-day discussions of local and non-local topics, which makes it difficult to discuss whether the present data supports or challenges Hay & Foulkes's (2016) finding that tokens occurring in 'remembered time' are more likely to shift to an older variant: the mining topic tokens were categorically discussed in 'remembered time' and underwent a shift, but whether that is due to the local resonance or the time-depth of the topic is not clear. Given the link drawn by Johnstone (2010) between old working-class variants and localness, both history and geography could be playing a role in the mining shift. What can be clearly seen is that the discussion of locally-resonant traditional industries and lifestyles provokes in the speakers engaged in the conversation a shift to a traditional form appropriate to the subject matter.

Older speakers also demonstrated significantly more local pronunciations in both of the read speech tasks than the non-mining topics. While this might seem surprising, it is not without precedent, with FACE vowel variants highly localised to locations in the North East region also being found more frequently in reading style compared to conversational data. This has been found in Newcastle-upon-Tyne males in the 1990s (Watt, 2002) and Durham City males in the 1980s, where such variants are emphatic pronunciations which lend themselves readily to read speech (Kerswill 1984: 24-25).

Younger speakers' responses to the relationship between accent and identity were different from the older participants. In answering the IdQ question 'How well do you remember your village's pit?', only one of the sixteen respondents had any vivid memory of their village having a colliery (6.25%),

and he was the oldest participant in the cohort (aged 32). They did not draw a connection between features of their accent or dialect and mining: only two of the sixteen younger speakers were able to respond to the IdQ question ‘What effect has the pit had on the local accent and dialect?’ with evidence that they were aware of and understood mining terms (12.5%) and in both cases they did not profess to use these terms in their own speech. Although more of the cohort perceived mining to have affected the local language and culture, at least partially, they struggled to provide any examples and considered this influence to be historic. The following response was typical:

“My grandad was a miner but that’s about all I know.” Younger Horden speaker, aged 20

This lack of familiarity with the industry perhaps illustrates why the younger speakers’ F1 values increase towards [aʊ] in the mining topic compared to the other conversational contexts, in contrast to the findings of their older peers, who shift significantly to lower F1 values approximating [ɛʊ]. In response to the question, ‘Do you think your village is still seen as a colliery town now?’ all sixteen of the younger respondents unanimously viewed mining as something which had been lost from their local area and their identity and commented on the many negative effects of this.

The study made use of conversational topic as an explanatory framework through which to explore intra-speaker variation. Specifically, speakers were asked to talk about mining and also about non-local topics in order to see whether they shifted their realisations of the MOUTH vowel according to the topic of conversation. The significant shift in the mining conversation topic occurs according to the age of the participant. Speakers in the older cohort – some of whom were miners, some of whom worked elsewhere – collectively demonstrate a significant lowering in F1 values towards [ɛʊ] in the mining topic. In contrast, speakers in the younger cohort, who grew up with mining in decline locally, produce higher F1 values in the mining topic compared to the other conversational topics.

The topic of mining, with its special resonance locally, thus seems to contribute to the sound change. The shifting social context of life and work in East Durham reflected by the loss of the mining industry and a swing to working outside of one’s hometown has occurred in tandem with the replacement of a declining local form by a non-local form: [aʊ]. Yet despite participating in a sound change, the recessive local [ɛʊ] form persists in topic-specific speech about traditional, locally-relevant heritage topics – but only when the speakers involved are familiar with the topic, by virtue of being old enough to remember it. If this result is to be explained by speaker identity, it must be in terms of local place identity, as evidenced by the significantly different distributions among speakers who orient to

Sunderland or East Durham compared to Hartlepool or Newcastle; speakers' level of orientation to the mining industry was not shown to be significant, either in terms of having worked in the industry, or in terms of attitudinal data, where all older speakers considered mining to be important to their identity.

In terms of place, the research suggests speaker identity plays a role in constraining variant usage (Mendoza-Denton, Hay & Jannedy, 2003) because the speakers who affiliate more strongly with areas where the localised form is most typical shift most towards that feature. However, the factor which most significantly improved the model was the shift to the local form by all older speakers, regardless of any identity factors, during the mining conversation. This supports the view that exposure to the "pitmatic" variety – which the older speakers are, regardless of speaker identity, but younger speakers are not – best explains the topic shift (Love & Walker, 2013). As the younger speakers have grown up in contact with their older counterparts only since the mining industry ended (and therefore have not been exposed to the variety while the mines were still open), they are less likely to produce closer F1 values indicative of the highly local [ɛʊ] form than the older speakers. The consequences of change in the social context of a speech community on the progression of sound change are clearly seen.

#### **9. Summary conclusions**

The East Durham data offer three main sets of findings. Geographically, speakers' pronunciations are generally closer to [aʊ] the further they are physically located from [ɛʊ]-producing Sunderland. This shift is fairly abrupt after most-northerly Dawdon, which most closely mirrors the distribution reported in Sunderland, with more of a mixed lect between the Sunderland and Hartlepool varieties in the more southerly villages, Easington, Horden and (among older speakers in) Blackhall. Furthermore, speakers who affiliate with the local areas of East Durham and Sunderland produce more local forms than those who orient towards places where [ɛʊ] is not typically found.

The age-correlated variation suggests change in progress in apparent time from [ɛʊ] to [aʊ]. The decline in usage of a highly local pronunciation in favour of an unmarked variant points to dialect levelling, in line with other North East English varieties. This sound change can be analysed in light of increased opportunities for contact with speakers from a wider regional area caused by social change over time, with the loss of mining as a major local employer forcing the younger East Durham speakers to seek work and leisure prospects further afield than previous generations. This experience is one which is presumably shared by speakers in many different industrial contexts over many geographical areas. By taking a micro-linguistic perspective on the potential outcomes of the large-scale social

change brought about by the demise of this industry in this region, this paper highlights the broader issue of the interdependence of social change and linguistic change.

Finally, this research adds to the literature on the effect of conversational topic on fine-grained phonetic style shifts. That the older speakers most frequently produce a highly local variant when discussing coalmining suggests that the locally-resonant topic conditions a highly local pronunciation. Despite sharing the same geographical space, the younger speakers' conception of local identity differs from their elders, and they do not participate in the same shift, predominantly using the unmarked, non-local [au] form. Examining the role of conversational topic – and particularly the locally-relevant topic of mining – provides further evidence of the connections between shifting social contexts and sound change. The findings specifically show that recessive local forms being replaced by less localisable variants can persist in speech focused on the vestiges of traditional, locally-relevant heritage topics.

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**Tables**

**Table 1: Design of fieldwork sample**

	Dawdon	Easington	Horden	Blackhall
Younger (18-32)	4	4	4	4
Older (61-86)	4	4	4	4

**Table 2: List of topics in each interview section category and the number of tokens produced per village**

	Older speakers	Younger speakers
Mining	Dawdon: 102 Easington: 90 Horden: 78 Blackhall: 88	Dawdon: 13 Easington: 9 Horden: 12 Blackhall: -
Total: 392	358	34
Non-mining local topics: Past		
Childhood growing up in local area, including school days	Dawdon: 25 Easington: 2 Horden: 19 Blackhall: 34 (Total: 80)	Dawdon: 6 Easington: 24 Horden: 1 Blackhall: - (Total: 32)
Going out locally in the past for entertainment	Dawdon: 34 Easington: 7 Horden: 6 Blackhall: 10 (Total: 57)	
Old local accent and dialect features	Dawdon: 4 Easington: 5 Horden: 4 Blackhall: - (Total: 13)	
Total: 182	150	32
Non-mining local topics: Present		
Local amenities in the present day (jobs, sport, media, attractions and facilities)	Dawdon: 46 Easington: 54 Horden: 42 Blackhall: 32 (Total: 174)	Dawdon: 100 Easington: 36 Horden: 33 Blackhall: 37 (Total: 206)

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Local accent and dialect in the present day	Dawdon: 6 Easington: 13 Horden: 7 Blackhall: 1 (Total: 27)	Dawdon: 13 Easington: 4 Horden: - Blackhall: 21 (Total: 38)
Total: 445	201	244
Non-local general topics: Past		
Trips away (past holidays in the south and abroad)	Dawdon: 19 Easington: - Horden: 29 Blackhall: 9 (Total: 55)	
Memories of historical events (international sport, national politics, royal weddings, war)	Dawdon: 14 Easington: 11 Horden: 14 Blackhall: 17 (Total: 56)	
Total: 111	111	
Non-local general topics: Present		
Contemporary arts and culture (including TV shows, films, music)	Dawdon: 37 Easington: 11 Horden: 4 Blackhall: 19 (Total: 71)	Dawdon: 16 Easington: 9 Horden: 16 Blackhall: 4 (Total: 45)
Current affairs (national news and political debates, and international sport)	Dawdon: 34 Easington: 41 Horden: 15 Blackhall: 24 (Total: 114)	Dawdon: 52 Easington: 26 Horden: 15 Blackhall: 20 (Total: 113)
Plans for future travel	Dawdon: - Easington: 13 Horden: - Blackhall: 3 (Total: 26)	Dawdon: 37 Easington: 22 Horden: 2 Blackhall: 16 (Total: 77)
Total: 446	211	235

**Table 3: Output from the mixed effects model for MOUTH data**

RANDOM EFFECTS		Variance	Standard deviation	Correlations

Vowel change across time, space and conversational topic 35

Word	(Intercept)	337.8	18.38				
Speaker (in interaction with interview section, baseline: mining)	(Intercept)	18.75	43.30				
	Local	499.1	22.34	-0.56			
	General	889.1	29.82	-0.69 0.66			
	Passage	3930.3	62.69	-0.64 -0.07 0.20			
	Word list	3245.6	56.97	-0.36 0.19 0.32 0.75			
Residual		2760.2	52.54				
FIXED EFFECTS	Estimate	Standard error	t value	2.5% CI Wald	97.5% CI Wald	Mean F1	Token count
(Intercept)	971.74	34.64	28.05	903.84	1039.64		
Location:age group interaction (baseline: younger Blackhall speakers)							
Location (Dawdon): Age group (older)	-355.31	31.56	-11.26	-417.17	-293.45	632.58	399
Location (Easington): Age group (older)	-314.34	31.44	-10.00	-375.95	-252.72	670.48	314
Location (Horden) Age group (older)	-254.06	31.36	-8.10	-315.52	-192.61	709.77	265
Location (Blackhall) Age group (older)	-277.53	27.61	-10.05	-331.65	-223.42	661.37	316
Location (Dawdon): Age group (younger)	-274.55	26.46	-10.38	-326.42	-222.69	630.62	317
Location (Easington): Age group (younger)	-208.46	30.10	-6.93	-267.45	-149.47	734.32	169
Location (Horden): Age group (younger)	-179.62	27.95	-6.43	-234.39	-124.84	760.06	143
Age group:interview section interaction (baseline: mining topic)							
Age group (older): Section (local)	80.69	6.95	11.61	67.07	94.32	705.85	351
Age group (young): Section (local)	-18.87	12.94	-1.46	-44.23	6.49	714.06	276
Age group (older): Section (general)	94.28	8.57	11.00	77.48	111.08	714.75	322
Age group (young):	-23.47	14.14	-1.66	-51.18	4.24	702.49	235

Vowel change across time, space and conversational topic 36

Section (general)							
Age group (older):	-35.95	16.82	-2.14	-68.91	-2.99	595.43	198
Section (passage)							
Age group (young):	-30.34	20.35	-1.49	-70.23	9.55	729.08	197
Section (passage)							
Age group (older):	-3.35	16.29	-0.21	-35.27	28.57	632.08	65
Section (word list)							
Age group (young):	-6.03	20.53	-0.29	-46.27	34.21	762.23	56
Section (word list)							
Orientation (baseline: Newcastle)							
Orientation(Sunderland)	-41.66	15.84	-2.63	-72.7	-10.63	652.89	935
Orientation(E Durham)	-36.85	15.89	-2.32	-67.99	-5.71	680.05	620
Orientation(Hartlepool)	-111.57	26.10	-4.28	-162.71	-60.42	765.57	248
Preceding manner (baseline: post-pausal)							
Preceding approximant	4.04	11.35	0.36	-18.21	26.29	668.38	338
Preceding fricative	1.77	8.88	0.20	-15.65	19.18	685.22	489
Preceding nasal	13.77	10.86	1.27	-7.51	35.05	707.29	393
Preceding plosive	9.68	8.96	1.08	-7.87	27.23	686.34	786
Following manner (baseline: pre-pausal)							
Following approximant	7.11	11.10	0.64	-14.64	28.86	716.48	182
Following fricative	-5.28	11.34	-0.47	-27.5	16.94	686.36	360
Following nasal	7.12	13.70	0.52	-19.74	33.97	692.74	772
Following plosive	-7.87	10.83	-0.73	-29.10	13.36	667.86	731
Preceding voicing (baseline: voiceless)							
Preceding voiced	-10.24	6.82	-1.50	-23.62	3.13	683.04	1327
Following voicing (baseline: voiceless)							
Following voiced	-9.00	6.44	-1.4	-21.62	3.61	694.46	1142

**Table 4: Relevelled location:age group output from the mixed effects model for MOUTH data**

Location:age group interaction (baseline: older Blackhall speakers)							
	Estimate	Standard error	T value	2.5% CI Wald	97.5% CI Wald	F1 mean	Token count
(Intercept)	788.49	23.90	32.99	741.65	835.33		

Location (Blackhall):	159.78	23.98	6.66	112.78	206.77	836.34	169
age group (young)							

**Table 5: Relevelled age group:interview section output from the mixed effects model for MOUTH data**

Age group:interview section interaction (baseline: general topic)							
	Estimate	Standard error	T value	2.5% CI Wald	97.5% CI Wald	F1 mean	Token count
(Intercept)	948.27	32.46	29.21	884.65	1011.89		
Age group (older): Section (mining)	-94.23	8.57	-11.00	-111.08	-77.48	623.28	358
Age group (young): Section (mining)	23.47	14.14	1.66	-4.24	51.18	751.62	34

**Table 6: Relevelled orientation output from the mixed effects model for MOUTH data**

Orientation (baseline: Sunderland)							
	Estimate	Standard error	T value	2.5% CI Wald	97.5% CI Wald	F1 mean	Token count
(Intercept)	652.55	21.13	30.88	611.13	493.96		
Orientation (Newcastle)	41.66	15.84	2.63	10.63	72.70	733.94	289

**Table 7: Speaker orientations by number**

	Newcastle-upon-Tyne	Sunderland	East Durham	Hartlepool
Dawdon young		3	1	
Dawdon old		4		
Easington young	3	1		
Easington old	1	1	2	
Horden young	1	2	1	
Horden old		1	2	1
Blackhall young				4
Blackhall old		1	3	

Figures

Figure 1: Population change of East Durham district 1811-1991

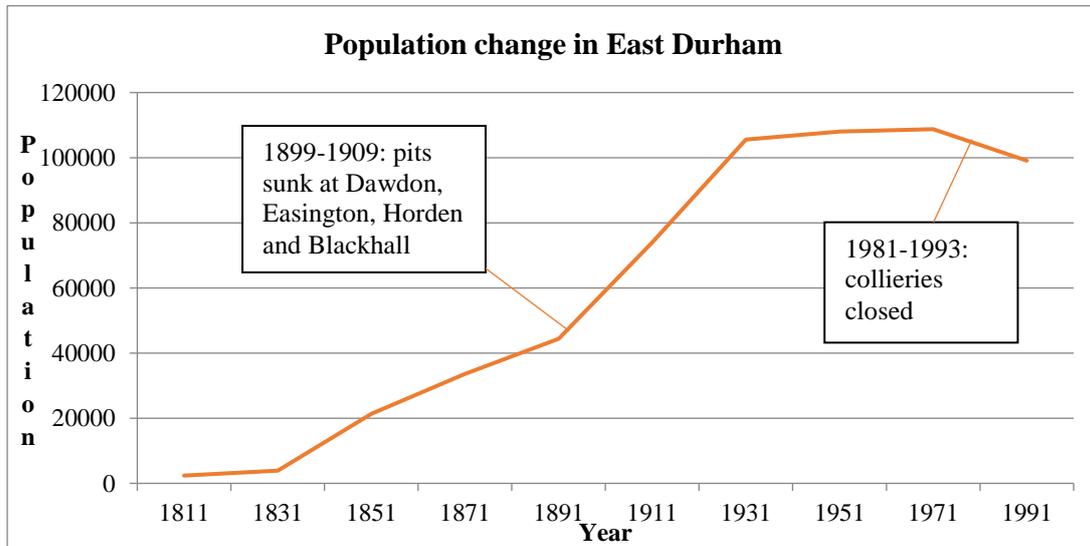


Figure 2: Map of MOUTH pronunciations recorded in locations surveyed by Ellis (1889), with circle markers indicating areas of [u:] usage and square markers indicating [ʊ] usage, and Survey of English Dialects (1962-71) Durham locations indicated by star markers (Bishop Middleham is sampled by both Ellis and SED), with the villages sampled in this study marked with balloons (Google, 2019)



Figure 3: Overall distribution of MOUTH variants by age and location (N = 2092)

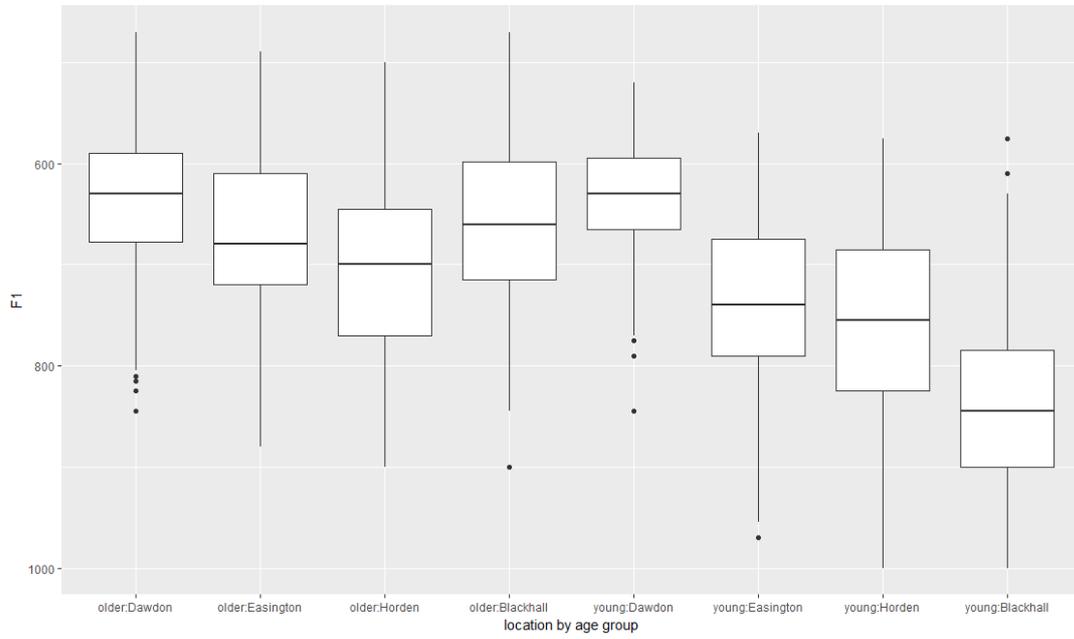


Figure 4: Overall distribution of MOUTH variants by speaker orientation (N = 2092)

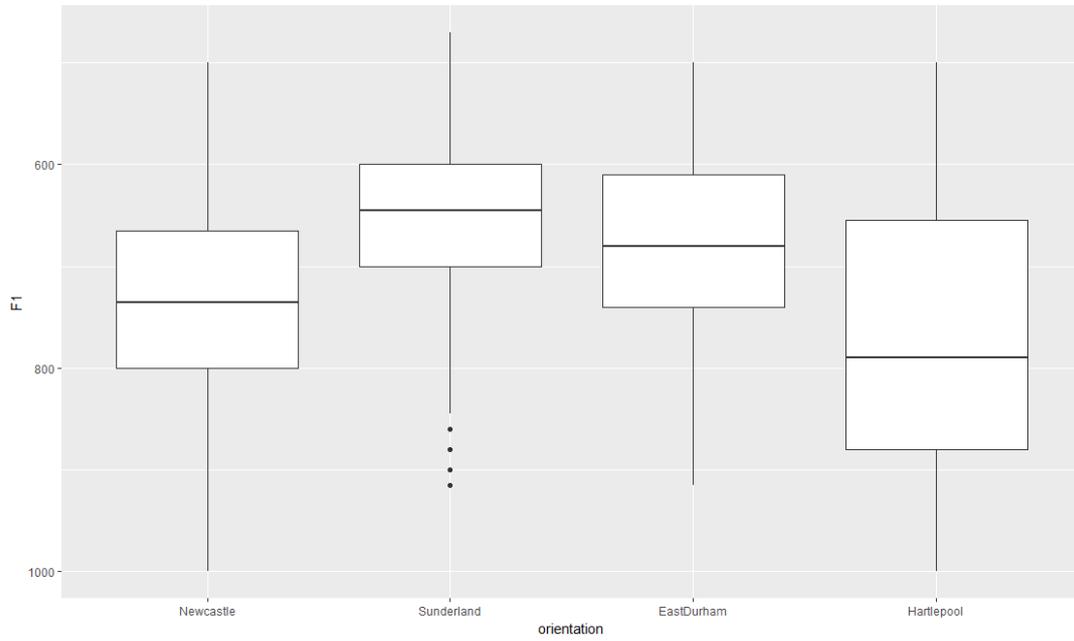


Figure 5: Overall distribution of MOUTH variants by age and interview section (N = 2092)

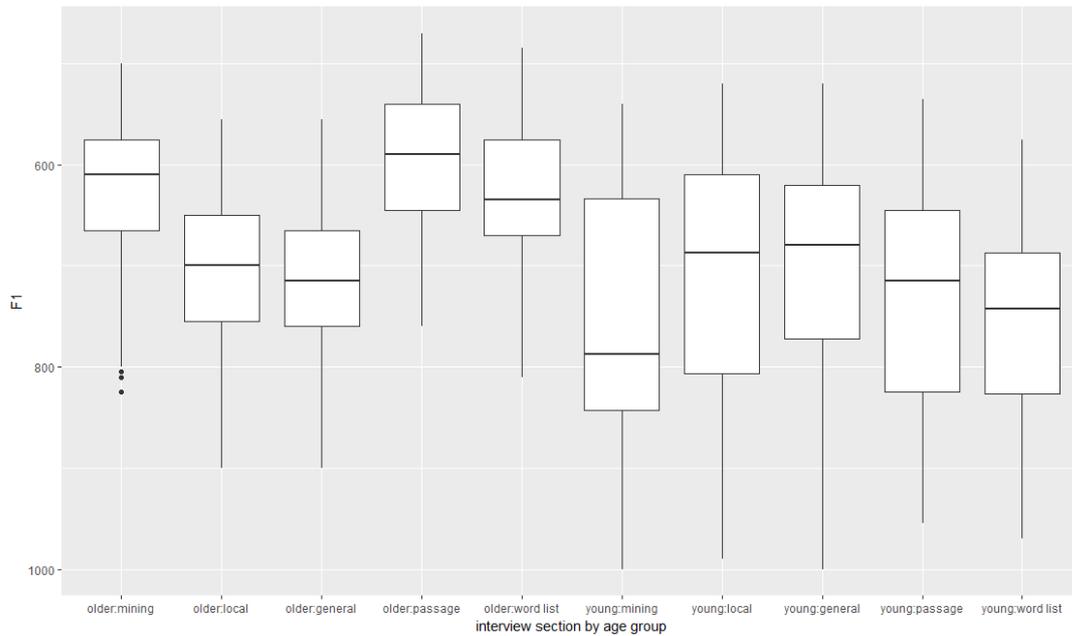


Figure 6: Map of notable physical and perceptual boundaries between Blackhall and Hartlepool



<sup>1</sup> For brevity, and following sociophonetic convention, the standard keyword MOUTH proposed by Wells (1982: xviii-xix) is used to represent the lexical set containing the wide closing diphthong with the British Received Pronunciation citation form [aʊ]: examples include *out*, *house*, *loud*, *count*, *cow*.

<sup>2</sup> Ellis (1889) uses palaeotype (uu), but modern translations are provided by Eustace (1969: 67).

<sup>3</sup> Palaeotype (óu) (Eustace 1969: 56).

<sup>4</sup> In light of this study's focus on differences between small, geographically proximal locations, it is worth emphasising that Lanchester and Annfield Plain, which are recorded as producing categorically different pronunciations, are barely 3 miles (5 kilometres) apart.

<sup>5</sup> For example, "Ah'll give yer 50 pewnd for yer match ticket" referring to the vowel in 'pound', from *Newcastle Evening Chronicle*, 5 April 1997.

<sup>6</sup> The words 'mouth', 'house', 'down' and 'town'.

<sup>7</sup> Three instances of the word 'out', as well as 'outside', 'down' and 'downstairs', 'house' and 'farmhouse', 'however', 'south', 'shouted', 'thousand' and 'proud'.

<sup>8</sup> Figure 6 also shows the nuclear power station used by Blackhall speakers to outgroup Hartlepool.