# Abstract

This article uses regional attitude data with vowel trajectory modelling to analyse the impact of changing political borders on local accent variation. In exploring variation of the mouth vowel in Greater Manchester we find that while two of the boroughs, Wigan and Bolton, cannot be as easily distinguished from the others as expected, we do see age-correlated variation within Wigan and Bolton combined. This is explained by speakers’ own comments about their regional orientation in terms of their feelings towards ‘Greater Manchester’ as a label to describe where they live. Speakers with a positive attitude towards the term tend towards producing the regional norm—a mouth vowel with movement through F2— whereas speakers who express a neutral, mixed, or negative attitude towards Greater Manchester (often citing Lancashire to describe where they live) are more likely to produce the traditional Lancastrian form of the mouth vowel, with far less F2 movement.

# Introduction

In a chapter titled ‘Shifting borders and shifting regional identities’, Beal (2010:225) appeals to sociolinguists to ‘take further account of what the Office for National Statistics terms the ‘unstable nature of UK geography’ [and] the unstable nature of political boundaries at all levels’. What she is referring to is the effect of changes to administrative boundaries on people’s sense of regional and identity and, subsequently, their language. Beal draws on the work of Llamas (2007), who demonstrates the ways in which specific linguistic variants are employed to index new identities brought about by such administrative changes in Middlesborough.

The study presented here takes up that call and moves the focus onto Greater Manchester, in north-west England. Using data collected through the innovative Manchester Voices project (Drummond et al 2022), it brings novel analytical methods to explore the relationship between administrative boundary changes and language variation. In doing so, it strives to provide insights that serve to advance our understanding of what might drive, and what might inhibit, change in progress.

The choice of language feature, the mouth vowel, and the specific locality, Wigan and Bolton, emerged as a result of observations elsewhere in the Manchester Voices project, which was set up to explore the accents, dialects, and identities of people in Greater Manchester. Perception data, historical data, and anecdotal auditory data have provided insights into where specific examples of linguistic variation might lie, including a potentially different realisation of the mouth vowel in Bolton and Wigan, two neighbouring boroughs in the northwest of the region. Dialect perception work carried out as part of the wider project (Drummond, 2025; Drummond, Dann, Durkacz Ryan, Tasker, & Carrie, 2022) shows that participants in Greater Manchester identify Wigan in particular as being different from the other boroughs in terms of accent, with the realisation of mouth occasionally cited specifically as being an example of a distinct feature in both boroughs. Historically, the mouth vowel in Bolton is described as being quite different from that of the wider region (Shorrocks, 1998), and anecdotally, one only has to listen to old recordings of Bolton TV personality Fred Dibnah[[1]](#footnote-2), or current recordings of Bolton comedian Peter Kay to hear it. This paper seeks to acoustically verify this perceived difference in the mouth vowel and, in exploring the variation within Bolton and Wigan themselves, examine whether attitudes towards place and borders play a role in better understanding the variation within this part of the region. Specifically, we ask whether feelings around Bolton and Wigan being part of the traditional county of Lancashire (pre-1974) compared to being part of Greater Manchester (post-1974) have a measurable effect in vowel realisation. We start with three research questions.

1. Is there a measurable difference between the Bolton and Wigan mouth vowels and the mouth vowels in the other boroughs?
2. If there is a difference, what is the variation within that group?
3. Does a speaker's attitude towards Greater Manchester affect the realisation of their mouth vowel?

# Background

## Greater Manchester

Greater Manchester is a city-region and metropolitan county in the north-west of England with a population of 2.95 million over 493 square miles (Office for National Statistics, 2022). Historically, the region is not a unified whole as it is made up of areas which, prior to 1974 when the Local Government Act (1972) came into force, were part of the historic counties of Lancashire, Yorkshire, Derbyshire, and Cheshire (Figure 1). Greater Manchester is divided into ten boroughs: Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford, and Wigan, which variably have their own distinct social and cultural characters. Over the last decade, the city-region has become increasingly established and prominent nationally, electing its first mayor in 2017 and playing a key role in the UK Government’s Northern Powerhouse agenda.[[2]](#footnote-3) The city of Manchester itself is well-known nationally and internationally, in part due to its historic role as the centre of the cotton industry during the Industrial Revolution, but more recently due to its cultural (especially music) and sporting (especially football) influence. Other areas of the region have national prominence to greater or lesser degrees, particularly through the public profile of various local celebrities, but none have the reputation of Manchester itself.

A map of a city

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Figure 1: County Boundaries pre-Local Government Act (1972) and Greater Manchester (post-1974)

From a language perspective, there have been various detailed speech production studies carried out within certain areas of Greater Manchester (Baranowski, 2017; Baranowski & Turton, 2015, 2020; Dann, Durkacz Ryan, & Drummond, 2022; Durkacz Ryan, Dann, & Drummond, 2023; Moore, 2010; Shorrocks, 1998), and some of these will inform the analysis that follows where relevant.

## Lancashire

As the previous county home of some current Greater Manchester residents, and as a present neighbouring county, the language of Lancashire has some relevance here. Barras’ (2015) discussion of the Lancashire accent and dialect does not include the mouth vowel specifically but notes various aspects of Lancashire regional identity. In particular, it evidences the claim that the way people speak is a central part of Lancashire identity, as much as other stereotypes (Nevin, 2004), and this has pervaded through the border changes. Some people who now live in Greater Manchester still write ‘Lancashire’ as part of their postal address (see later examples), and a loyalty to Lancashire can be clearly seen in other areas of life, often through community groups and local organisations. Barras points to the website of the Friends of Real Lancashire, which displays the slogan in bold red text: “Our county is called Lancashire, not Cumbria, Greater Manchester, Merseyside or part of Cheshire” (FORL, 2024) and to the work of the Lancashire Society (previously the Lancashire Dialect Society) who secured funding to document the remaining Lancashire dialect. One entertaining example of the pervading dislocation felt by some older Greater Manchester/Lancashire residents is a winning entry from the Edwin Waugh[[3]](#footnote-4) Dialect Society poetry competition, written by Linda Rowe, and entitled “Still Lancashire!”. It includes the lines:

*The powers that be in 73*  
 *Said “Look you have no choice*  
*It’s Greater Manchester for you*  
*Why aren’t you overjoyed?”*  
*We felt we’d been abandoned*  
*For we loved our county name*  
*And being Greater Manchester*  
*Well it just was not the same.[[4]](#footnote-5)*

## Mouth Vowel

### Standard English

The modern English mouth vowel is derived from the Middle English /u:/ via the Great Vowel Shift. In written English it is typically spelled with *ou* (*mouse*) and *ow* (*now*). According to Wells (1982a) the citation form of the mouth vowel is /aʊ/ in Received Pronunciation (henceforth RP) and General American. It is a wide diphthong with an open unrounded onset (between [a] and [ɑ]) and a glide in the direction of [ʊ] but often not completely high and back. It can occur in open and closed syllables but does not occur before labials or velars except in proper nouns. Wells notes variation in both the onset (frontness and height) and the glide (frontness and speed) but none that is relevant to Greater Manchester or Lancashire.

### Northern English

In modern Northern English, Strycharczuk et al. (2020) find the mouth vowel to be stable across the cities they studied (Leeds, Sheffield, Manchester, Liverpool, and Newcastle). Trudgill (1999) and Beal (2004) separate the area Beal defines as the North into six dialect areas: Northeast, lower North, central Lancashire, Merseyside, Humberside and Northwest Midlands (the last of these includes Manchester). Despite the separation between Lancashire and Manchester, in these regional groupings Beal’s overview of the mouth vowel does not mention any difference in realisation. Tanner et al. (2022) note fronting of mouth but only in the Scottish context where it is /u:/; the north-west England variant is not noted as important in their dialect areas. Baranowski and Turton’s (2015) account of Manchester English (which draws the border of Manchester at the M60 ring road, therefore incorporating most of the Manchester borough, and small parts of Bury, Oldham, Salford, Stockport, Tameside, and Trafford) also does not note mouth as regionally important. In the absence of any specific mention of the mouth vowel in literature on particularly Manchester, it is reasonable to assume that Manchester has a similar mouth vowel to the rest of the north of England.

Shorrocks (1998) gives a detailed description of vowels in the Bolton area from fieldwork carried out in the early 1970s and 1980s, although it should be borne in mind that he was explicitly investigating the traditional local dialect. He does not work with lexical sets but describes a falling diphthong, /ɜʏ/, which is found in words which have [ɑʊ] in RP, therefore corresponding with the lexical set mouth. The diphthong is variable; the onset most frequently starts around [ɛ̈] to [ɜ] but can be found starting as far back as [ə] or [ɵ]. The glide can be in the area around [ʏ], [ʊ] and [ʉ]. Shorrocks (p. 280) describes the variation as mostly idiolectal, though a preceding bilabial can predict a rounded onset and suggests that a diphthong of the same or similar quality can also be found in some goat, thought, cloth, goose, strut, and bath words. Wells (1982b, p. 359) describes mouth as [ɘʏ] or [ʌʏ] in Bolton (and Oldham).

## Borders, Identity, and Accent Variation

Watt and Ingham (2000) study Berwick-upon-Tweed, a region that has had many border changes, resulting in its moving between England and Scotland. They don’t draw conclusions with regard to regional identity and its specific effect on accent but they do find that speakers in Berwick-upon-Tweed reject national identities of either Scottish or English. There is evidence of operation of the Scottish Vowel Length Rule (SVLR) and Voicing Effect (VE) but change over time is taking place with younger speakers tending towards neutralising the effect of the SVLR relative to the VE. Llamas (2000, 2007) looks at Middlesborough speakers constructing a new local identity after border changes that are not dissimilar to those that took place in Greater Manchester. The study involves both qualitative information from conversations with the participants regarding their regional connections and the quantitative study of glottalisation of voiceless stops. Llamas employs a language ideology framework to use speakers’ own comments about language, place, and their local identity to interpret the linguistic variation. This approach allows insight into social psychological motivations for sociolinguistic differences that may not be accessible to a researcher in any other way (2007, p. 581). Older speakers in this study are found to express regret at no longer being part of the Ridings of Yorkshire whereas younger speakers identify themselves with the urban area of Middlesborough (not with Newcastle or the North East more widely despite media changes and similar attempts to group them). In the patterns of glottalisation, there is an increase in its use over apparent time and Llamas concludes that younger speakers, who no longer identify with Yorkshire, are using the feature as a way of indexing a new Middlesborough identity.

# Methodology

## Data Collection

Data was collected primarily through The Accent Van, which was conceived as an innovative way of collecting spoken data from a wide range of people, some of whom might not otherwise take part in sociolinguistic research[[5]](#footnote-6). Essentially, the Accent Van was a mobile recording studio in which people are given the space to reflect on questions to do with language, place, and identity. However, it also served as a visible, public-facing symbol of a community-engaged research project that ultimately led to a community language resource (Drummond, Dann, Tasker, & Durkacz Ryan, 2022). It follows recent projects which have not only sought to explore more innovative methods of sociolinguistic data collection, but also ways to make sociolinguistic research a public resource. For example, Sneller et al. (2022) and Hall-Lew et al. (2022) discuss the use of self-recorded diaries (audio and audio-visual respectively) as both sociolinguistic research data, and as a method of recording and exploring different (often marginalised) groups’ experiences of Covid-19. Similarly, the QuakeBox Corpus (Clark, MacGougan, Hay, & Walsh, 2016; Walsh et al., 2013) consisted of audio and video recordings made in a transportable recording studio in a shipping container.

Our particular Van was a Volkswagen Caravelle Executive Vehicle equipped with a video camera and tripod (Sony Handycam HDR-CX405 Camcorder and a Hama Star 75 tripod), a voice recorder with a built-in microphone (Zoom H2n), a studio light (Neewer 176 LED Video Light), and a tablet (Samsung Galaxy Tab A). Between the end of July and the middle of November 2021, the Accent Van travelled around the ten boroughs of Greater Manchester visiting live events, parks, libraries, community centres, mosques, schools, and colleges. Participants were invited to climb aboard, where they were asked questions via the tablet and a separate speaker, with the voice recorder and video camera recording their responses. People took part individually or in pairs, but no researchers were in the van with them once consent was gained and the equipment was checked. The process of data collection for the Accent Van was scrutinised and fully approved by the Arts and Humanities Research Ethics and Governance Committee at [anon] University in April 2020, with amendments necessitated by the Covid-19 pandemic approved in June 2021. Ethics approval for the Virtual Van and the ‘Submit Your Vice’ initiative (both introduced below) were approved by the same committee in July 2021 and Sep 2020 respectively.

Participants faced 14 questions in all. The audio version of the questions used a local voice deliberately chosen for the purpose, with a view to reducing the social distance that might exist with a more typically ‘standard’ accent. The questions dealt with topics around the themes of language, place, and identity. For example, participants were asked about their own speech and how they feel it is perceived by others, for linguistic examples that were typical of where they live, and for their opinions on the concept and label of Greater Manchester. Additionally, they were asked some basic biographical questions to find out how long they had lived in different areas of Greater Manchester. The full list of the questions asked is provided in the appendix. At the end of the interview, participants were given the option to finish there or complete a further elicitation task in which they had to describe the route along a dotted line on a map, referencing items selected to elicit accent features that are known to vary across the region. Items included: *boat on a lake; long alley; ice-skating bear; bookshop; bike; farm house; school; dancing monkey; father and daughter; horse rider; little pier; bus; tyre swing;* and *two birds.*

In addition to the Accent Van, we also created a Virtual Van – an online version that replicated the experience as closely as possible through a specially-designed browser-based app. Originally set up as a contingency against Covid-19 restrictions, the Virtual Van allowed far greater accessibility all round. The app existed on a subdomain of the project website, and worked on most devices, including smartphones and tablets. Following the consent process and the user giving access to the device microphone, audio (not video) recording started automatically, with the file uploaded directly to the servers when the participant had finished and clicked “submit”. Regarding audio quality, a small selection of recordings had to be discarded due to audio distortions, although it was unclear whether this was due to the participants’ recording devices or an issue with the web-app. As indicated by Leemann (2021), we found that all remaining self-recordings were usable for, at minimum, the acoustic analysis of vocalic variation.

The only restriction to taking part in either version of the Van was that speakers had to be living in Greater Manchester at the time of recording. Overall, 200 people took part in the physical van, and 221 in the virtual van. 25 Virtual recordings were excluded due to incomplete consent forms or audio issues, and 1 physical van recording was excluded due to the person not living in Greater Manchester after all. This leaves 395 participants in total. However, the data presented here includes only those who had lived in the same borough for most of their lives (163 participants).

In addition to the Accent Van data, we also gathered recordings from an online version of the map elicitation task as a standalone activity. This ‘Submit Your Voice’ (SYV) initiative took place prior to the Accent Van going out, and, unlike the Van, specifically targeted people who had lived most of their lives in one borough of Greater Manchester. This resulted in 136 recordings.

When the data is filtered down to only the mouth tokens there are 289 participants total, 208 Accent Van Participants (some of whom also participated in the map task) and 80 Submit Your Voice participants (Table 1).

|  |  |  |
| --- | --- | --- |
|  | In Person | Online |
| Map | 52 | 75 |
| Van Interview | 82 | 89 |

Table 1: All participants, by Style and Medium

## Data Processing and Analysis

The data in this paper is a combination of the Accent Van and Submit Your Voice data. Only speakers who have lived the majority of their life in one borough were included.

### Phonetic Data

The data cleaning and analysis followed the order of functions in Stanley (2022). The interviews were transcribed by members of the research team and students trained in ELAN and exported as TextGrids. These were then aligned using the 'mfa adapt' Montreal Forced Aligner (henceforth MFA) version 3.0.5 (McAuliffe, Socolof, Mihuc, Wagner, & Sonderegger, 2024). MFA uses a pronouncing dictionary, acoustic model to match the transcription to the sound file, producing a TextGrid aligned by segment. The dictionary had missing words added and was edited using regular expression find and replace terms to include non-rhotic alternatives (Halfacre, 2023). Measurements were extracted using FAVE-extract (Rosenfelder et al., 2024). FAVE extracts trajectory measurements at 20%, 35%, 50%, 65%, and 80% through the vowel length. All measured vowels were recoded to lexical sets via a lexical set reference list created by the first author and checked by the second author. Data cleaning included removing personal names and a list of stop words (see scripts), then outliers were removed using the is\_outlier() function (Kassambara, 2023) which identifies outliers as above Q3 + 1.5xIQR or below Q1 - 1.5xIQR. After cleaning, the data was normalised by the formula y = scale(x)\* sd(x) + mean(x). The vowels were also coded for their phonological environment using the Plotnik (Labov, n.d.) method. To compare formant trajectories between groups Generalised Additive Mixed Models (henceforth GAMMs) were used. The final model was decided by using nested models and the compareML() function (van Rij, Wieling, Baayen, & van Rijn, 2020), the model with the lowest AIC is the preferred model.

### Attitude Data

Although the Accent Van questions were not designed to gather attitudinal data in the traditional sense (although for insights into perceptions of Greater Manchester speech see the perceptual dialectology strand of the project reported in Dann et al (2022)), one question did serve to explore a possible tension between people’s attitudes to their particular locality and the wider region. Question 2 *How do you feel about the term Greater Manchester? Do you use it, or do you use something else to describe where you live?* provided varied views on participants' feelings towards the wider region of which they are part, or at least how it is described. This question doesn't access the classic concept of positive or negative local orientation, but instead accesses a directionality in attitude. Any two participants living in Bolton, for example, do not necessarily share the same psychological reality and so might not experience ‘living in Bolton’ in the same way. Neither might they agree as to where Bolton is, in terms of wider geographical labels. Llamas (2007) states that an important question to ask is if two speakers from the same locality would identify themselves as being part of the same community and suggests that comments about linguistic identity can be used to interpret the speakers’ linguistic variation. Here, we are exploring the extent to which people identify with the more recently manufactured concept of Greater Manchester, or perhaps with the more traditional county boundary of Lancashire (or Cheshire, Yorkshire, and Derbyshire for some of the other boroughs) that dominated prior to 1974, and use the expressed allegiance to understand the linguistic variation found. That this allegiance differs between participants can clearly be seen in some of the answers provided:

‘*I never use it because I don’t like to feel that I’m part of Greater Manchester. As far as I’m concerned, I belong to Lancashire. That’s where I was born and that’s where I want to be identified with.’* [Bolton resident]

*‘No, I like ‘Greater Manchester’. I know lots of people prefer ‘Lancashire’ but I always felt like I was part of Manchester as well, rather than the hills and Lancashire’.* [Wigan resident]

*‘I don’t use it. I prefer Lancashire, the original district we were in, the original county’.* [Wigan resident]

*‘I use Greater Manchester. Yeah, I think I like it ... I think it’s really inclusive for everybody ... and it just sounds better’.* [Bolton resident].

*‘I don’t mind it now. I resented being in Greater Manchester, rather than Lancashire, for a while, but it doesn’t bother me as much now’* [Bolton resident]

There is a clear distinction between speakers who frame their community as part of Greater Manchester and those who maintain the older borders and maintain a position towards the county to the north.

For the purpose of further analysis, responses were coded using a three-point scale in terms of attitude towards the term ‘Greater Manchester’. A score of 1 represents a generally positive attitude such as ‘I just use Greater Manchester ... I feel quite proud of it now.’; a score of –1 represents a generally negative attitude such as ‘I really struggle with Greater Manchester and always have.’; and a score of 0 represents a neutral or mixed attitude, or no attitude expressed, for example ‘I’m a bit ambivalent about it to be honest’.

However, it is important to note that the meaning behind these attitudes is in part relative to the borough the person is from. For example, someone from Bolton is more likely to have a negative attitude towards the idea of Greater Manchester on the basis that they identify regionally with Lancashire, (see examples above) but someone from Manchester is more likely to have a negative attitude towards Greater Manchester because they identify more locally as Mancunian (similar to the comments by participants in (W. S. Barras, 2011)), for example:

*‘To be quite honest, I really hate the name Greater Manchester because I think the city of Manchester’s got its own very particular identity, and I get fed up with people saying they come from places like Oldham and Bolton. So I wish they were still in Lancashire and I wish Manchester was still Manchester and none of this Greater Manchester nonsense.’* [Manchester resident]

Therefore, we do not model attitudes from all the boroughs together.

# Results

## Research Question 1 – All Boroughs

Research question 1 asks if there is a measurable difference between the Bolton and Wigan mouth vowels and the mouth vowels in the other boroughs. Figure 2 shows the mean measurements at each trajectory point, plotted in the F1/F2 vowel space. It shows a likely difference between Wigan and Bolton and the other regions, and that this difference is predominantly in F2 movement.

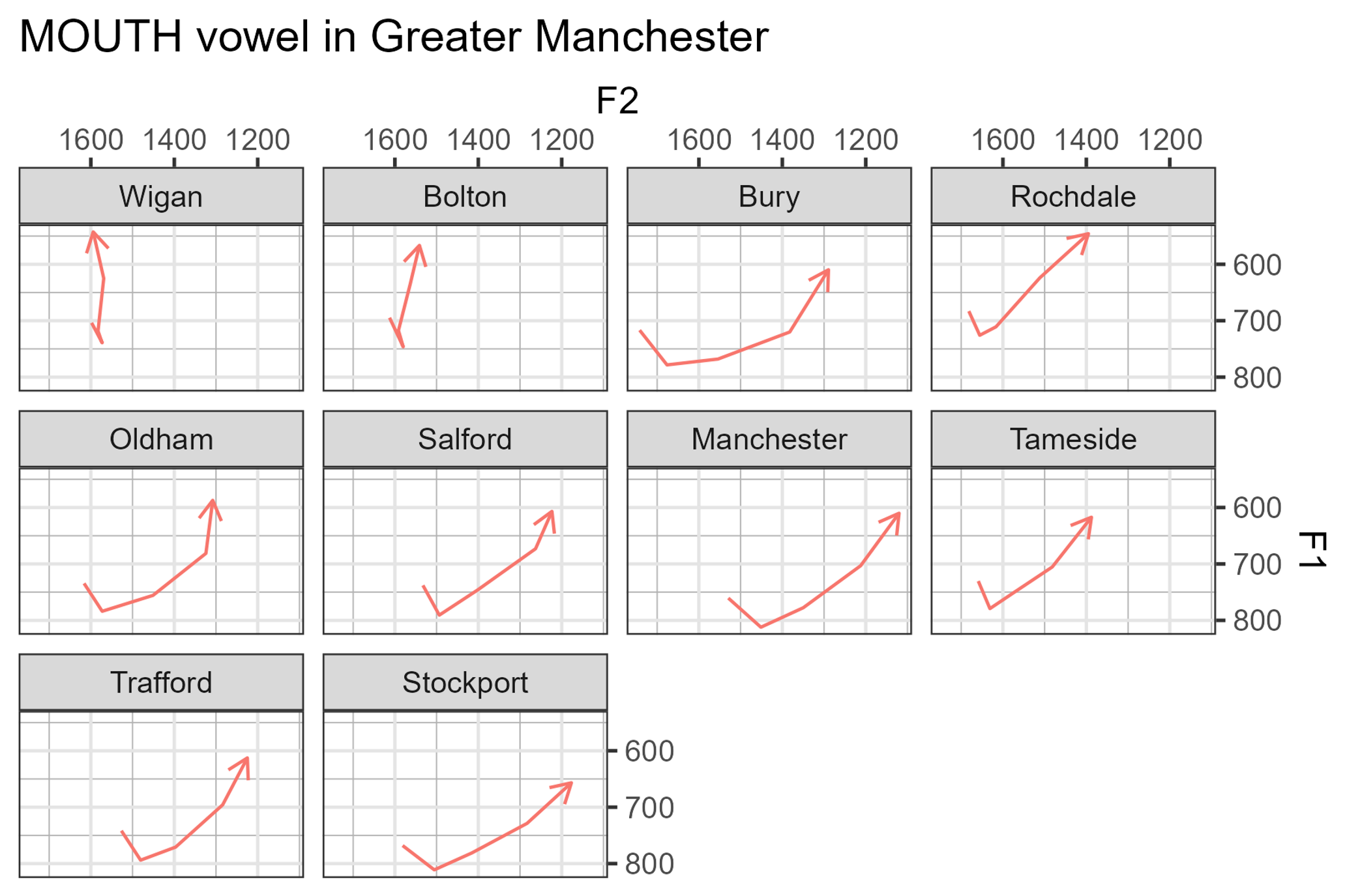


Figure 2: Trajectory means of mouth

To verify this variation, we modelled the F2 trajectory of the mouth vowel in all 10 boroughs. The best fit model includes the following terms. Parametric terms model the difference in the mid-point of the curve, difference smooths model the shape of the curve, and random smooths are included for random effects in a similar way to random intercepts in linear models:

* + borough (parametric term and difference smooth)
  + speaker age (parametric term and difference smooth)
  + interaction between style and medium of the interview (difference smooth, because parametric terms cannot be controlled for when extracting model predictions),
  + speaker sex (difference smooth, because parametric terms cannot be controlled for when extracting model predictions)
  + place of following segment (difference smooth, because parametric terms cannot be controlled for when extracting model predictions)
  + duration (tensor product interaction with percent)
  + individual speaker (random smooth), and individual trajectory (random smooth)

The model does not conclusively answer the research question. Visual inspection shows the highest F2 trajectories are found in Wigan, Bolton, and Rochdale but the degree of variation within the boroughs and the overlap between the trajectories (the confidence interval in Figure 3 and all following GAMM plots, is set to 0.66) means that clear statements of measurable difference cannot be made. With Bolton as the baseline (the model default), Bolton, Rochdale, and Wigan have the most similar midpoints (Table 2), and Wigan has the most different trajectory shape (Table 3).

A screenshot of a graph

Description automatically generated

Figure 3: GAMM plot of F2 in all boroughs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std.Error | t-value | Pr (>|t|) | *N* |
| (Intercept) | 1457 | 42.52 | 34.26 | <2e-16 |  |
| *Borough (baseline Bolton)* |  |  |  |  | *308* |
| Bury | -81.43 | 51.93 | -1.568 | 0.1168 | *153* |
| Manchester | -168.42 | 39.45 | -4.269 | 1.99e-05 | *468* |
| Oldham | -62.35 | 41.75 | -1.493 | 0.1355 | *395* |
| Rochdale | 6.313 | 40.56 | 0.156 | 0.8763 | *346* |
| Salford | -189.48 | 44.57 | -4.251 | 2.16e-05 | *262* |
| Stockport | -1.7.43 | 43.64 | -2.462 | 0.01385 | *307* |
| Tameside | -62.90 | 45.76 | -1.375 | 0.1693 | *225* |
| Trafford | -149.327 | 46.17 | -3.234 | 0.00123 | *337* |
| Wigan | 3.297 | 40.933 | 0.081 | 0.9358 | *354* |
| *Speaker age (baseline 18-25)* |  |  |  |  | *454* |
| 26-45 | 71.31 | 97.39 | 1.907 | 0.05654 | *1112* |
| 45-65 | 159.3 | 36.1 | 4.412 | 1.04e-05 | *1162* |
| 66+ | 226.5 | 39.30 | 5.764 | 8.66e-09 | *427* |
| *Speaker sex (baseline F)* |  |  |  |  | *1867* |
| Male | -16.75 | 20.30 | -0.8250 | 0.4094 | *1288* |
| *Place of following segment (baseline apical)* |  |  |  |  | *2636* |
| Interdental | 198.68 | 50.13 | 3.964 | 7.49e-05 | *10* |

Table 2: Parametric terms of model of F2 of MOUTH in all boroughs

|  |  |  |  |
| --- | --- | --- | --- |
|  | Edf | p-value | N |
| percent | 2.873 | 1.48e-05 |  |
| *Borough (baseline Bolton)* |  |  | *308* |
| Bury | 1.000 | 0.2289 | *153* |
| Manchester | 2.575 | 0.02560 | *468* |
| Oldham | 1.000 | 0.3408 | *395* |
| Rochdale | 2.241 | 0.1755 | *346* |
| Salford | 2.685 | 0.01640 | *262* |
| Stockport | 2.411 | 0.07500 | *307* |
| Tameside | 1.00 | 0.2184 | *225* |
| Trafford | 1.003 | 0.2060 | *337* |
| Wigan | 2.865 | 4.88e-05 | *354* |
| *Speaker age (baseline 18-25)* |  |  | *454* |
| 26-45 | 1.000 | 0.9844 | *1112* |
| 45-65 | 2.591 | 0.0818 | *1162* |
| 66+ | 1.502 | 0.4621 | *427* |
| *Speaker Sex (baseline female)* |  |  | *1867* |
| Male | 1.000 | 0.8167 | *1288* |
| *Place of following segment (baseline apical)* |  |  | *2636* |
| Interdental | 2.685 | 0.08230 | *10* |
| *tensor product interaction – percent & duration (continuous)* |  |  |  |
|  | 8.844 | <2e-16 |  |
| *random smooth (by speaker)* |  |  |  |
|  | 630.8 | <2e-16 |  |
| *random smooth (by trajectory)* |  |  |  |
|  | 6776 | <2e-16 |  |

Table 3: Smooth terms of model of F2 of mouth in all boroughs

## Research Question 2 – Wigan and Bolton

The second research question asks that if there is a difference [between Bolton/Wigan and the other boroughs], what is the variation within that group? The best fit (by AIC, see 3.2.1) model of the trajectory of F2 of the mouth vowel includes:

* age (parametric term and difference smooth)
* interaction between style [van interview or map task]/ and medium [online or in person] (difference smooth, because parametric terms cannot be controlled for when extracting model predictions)
* duration (tensor product interaction with percent)
* individual speaker (random smooth)
* individual trajectory (random smooth)

Tables 1 and 2 show the parametric and smooth terms respectively. The midpoint measurements (as modelled by the parametric terms, table 1) vary from 1402Hz for the youngest age group to 1662Hz for the 26-45 age group. The random smooths and tensor product interaction between percent and duration make a difference to the trajectory shape. The interaction between style and medium, while improving the model fit, makes very little difference to the shape of the trajectory. With respect to age, the 45-65 group has the most different trajectory shape. The effect of age can be most clearly seen in Figure 5, (plotted from predicted values, excluding the terms that are not of interest, and with confidence intervals of 0.66 probability). This figure shows that with 66% certainty, the middle two age groups have the highest F2, followed by the 66+ group, then by the 18-25s. The 46-65 age group shows a different shape but with almost complete overlap with the 26-45 age group this is not a difference we can be confident in.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std.Error | t-value | Pr (>|t|) | *N* |
| (Intercept) | 1402 | 58.28 | 24.054 | < 2e-16 |  |
| *Speaker age (baseline 18-25)* |  |  |  |  | *161* |
| 26-45 | 260.3 | 71.98 | 3.620 | 0.0003080 | *223* |
| 45-65 | 256.8 | 66.94 | 3.840 | 0.0001290 | *350* |
| 66+ | 129.9 | 76.23 | 1.700 | 0.08849 | *82* |

Table 4: Parametric terms in the model of F2 in Wigan and Bolton

|  |  |  |  |
| --- | --- | --- | --- |
|  | Edf | p-value | *N* |
| percent | 1.001 | 0.4066 |  |
| *age (baseline 18-25)* |  |  | *161* |
| 26-45 | 1.000 | 0.6679 | *223* |
| 45-65 | 2.760 | 0.009370 | *350* |
| 66+ | 1.000 | 0.7658 | *82* |
| *Interaction style-medium (baseline map – in person)* |  |  | *184* |
| van interview – in person | 1.000 | 0.4880 | *182* |
| map – online | 1.000 | 0.02446 | *131* |
| van interview – online | 1.000 | 0.3983 | *319* |
| *tensor product interaction – percent & duration (continuous)* |  |  |  |
|  | 6.901 | 0.04506 |  |
| *random smooth (by speaker)* |  |  |  |
|  | 164.4 | < 2e-16 |  |
| *random smooth (by trajectory)* |  |  |  |
|  | 2139 | < 2e-16 |  |

Table 5: Smooth terms (by percent) of the model of F2 in Wigan and Bolton

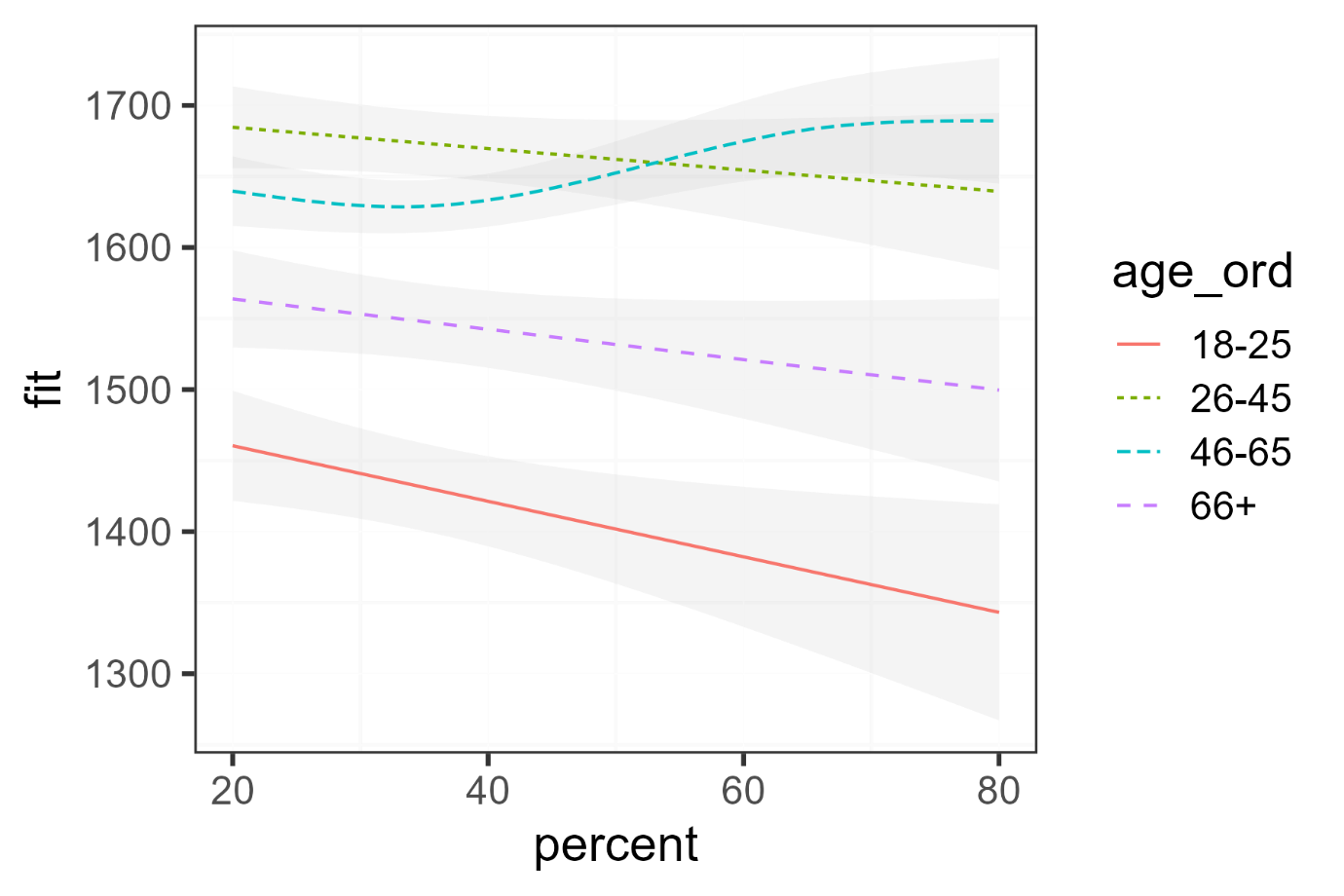


Figure 4: GAMM plot of F2 in Wigan and Bolton, by age

The model shows that there is variation by age group in the mouth vowel in Wigan and Bolton. The youngest age group are producing a vowel that is less traditionally ‘Lancastrian’ and more similar to the vowel in the rest of Manchester, with a lower F2, and more F2 movement. This suggests that at least some regional levelling is occurring. However, age alone does not explain the variation in the other three age groups; it is not a change in time or a rise in standard usage in middle age groups. This leaves a question as to whether there are factors missing that would explain the variation better.

## Research Question 3 – Attitude

The final research question asks if a speaker's attitude towards Greater Manchester affects the realisation of their mouth vowel?

### Attitude and age

The variation relating to age discussed above led us to consider what else had changed in the region over time. As discussed in section 2, the county borders in the area were moved in 1974 and Wigan and Bolton, having previously been in Lancashire were brought into a metropolitan area called Greater Manchester. While the city of Manchester itself was also previously in Lancashire there are two additional factors to consider with regard to this change. First, Manchester already had a city identity that was separate from Lancashire, the county of which it was a part. Second, the name of the new city-region specifically includes the word ‘Manchester’, potentially leading to the impression that the other areas had been taken out of their county and enveloped into Manchester. This impression is evidenced by some of the answers to Q2, such as:

*‘I think ‘Greater Manchester’ sounds like we’re sort of being white-washed away a little bit. So, it’s like we’re a sub-section of Manchester rather than being our own autonomous town’.* [Bolton resident]

In addition, we have already seen how some participants categorically reject the Greater Manchester name in favour of ‘Lancashire’.

As discussed in section 3.2.2, responses to Question 2 of the Accent Van data (*How do you feel about the term Greater Manchester? Do you use it, or do you use something else to describe where you live?)* were coded as ‘negative’ (-1), ‘neutral’ (0), or ‘positive’ (1). A summary of the responses, by participant age group can be seen in Table 6. Overall, older participants tend to speak positively about Lancashire and negatively about the change in border (similar to older speakers in Middlesborough; Llamas, 2007); as a result, they don’t identify themselves with Greater Manchester. Conversely, younger speakers are more likely to speak positively about Greater Manchester, or to have mixed or neutral feelings about it; they don’t consider themselves outside of it.

|  |  |  |  |
| --- | --- | --- | --- |
|  | -1 | 0 | 1 |
| 18-25 | 0 | 3 | 3 |
| 26-45 | 1 | 11 | 3 |
| 46-66 | 7 | 12 | 2 |
| 66+ | 6 | 4 | 1 |

Table 6: Coded attitude responses of the Wigan and Bolton speakers, by age group

We modelled by age in an ordinal Bayesian regression model using the brms package (Bürkner, 2021). This model (Table 7 and Figure 5) shows that although a mixed/neutral attitude towards Greater Manchester is overall most likely, if participants did express an attitude, then this is strongly correlated with age (95% certainty). Older participants are more likely to express a negative attitude, younger participants are more likely to express a positive attitude.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Estimate | Est.Error | l-95% CI | u-95% CI | Rhat | *N* |
| (Intercept [1]) | -0.37 | 0.02 | -0.40 | -0.33 | 1.00 |  |
| (Intercept [2]) | 1.95 | 0.02 | 1.90 | 1.99 | 1.00 |  |
| *Age (baseline 18-25)* |  |  |  |  |  | *8* |
| 26-45 | 0.61 | 0.02 | 0.56 | 0.65 | 1.00 | *16* |
| 46-65 | 1.53 | 0.03 | 1.48 | 1.58 | 1.00 | *27* |
| 66+ | 2.15 | 0.03 | 2.09 | 2.21 | 1.00 | *13* |

Table 7: Ordinal Bayesian regression of attitude by age

A graph with different colored dots

Description automatically generated

Figure 5: Bayesian model of Attitude to 'Greater Manchester', by age

### Vowel by attitude

Figure 6 shows the F2 trajectory of the mouth vowel modelled by attitude towards Greater Manchester. The model includes attitude (parametric term and difference smooth), style (difference smooth, because parametric terms cannot be controlled for when extracting model predictions), duration (tensor product interaction with percent), individual speaker (random smooth), and individual trajectory (random smooth). The model shows that speakers with a positive attitude towards Greater Manchester have far more change in F2 through the vowel trajectory, and the speakers with neutral or negative attitudes towards Greater Manchester have very little change through the vowel trajectory. In both the parametric terms (Table 8) and the smooth terms (Table 9) the difference is between the -1 and 0 categories and the 1 category.

The speakers with neutral or negative attitudes towards Greater Manchester are producing the traditional Lancastrian variant of the vowel, with little F2 change through the vowel trajectory. While the speakers with a positive attitude towards Greater Manchester produce a front vowel that moves backwards through the trajectory, more like the modern northern England variant. This pattern suggests that **difference in attitude** towards ‘Greater Manchester’, which itself patterns with age, rather than age in and of itself, is influencing the variation in the production of the mouth vowel in Wigan and Bolton.

A graph with lines and numbers

Description automatically generated

Figure 6: GAMM plot of F2 in Wigan and Bolton, by attitude to 'Greater Manchester'

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std.Error | t-value | Pr (>|t|) | N |
| (Intercept) | 1606 | 41.96 | 38.27 | <2e-16 |  |
| *attitude (baseline -1)* |  |  |  |  | 165 |
| 0 | -28.64 | 50.66 | -0.5650 | 0.5719 | 404 |
| 1 | -165.58 | 68.54 | -2.417 | 0.0158 | 116 |

Table 8: Parametric terms in the model of F2 by attitude

|  |  |  |  |
| --- | --- | --- | --- |
|  | Edf | p-value | *N* |
| percent | 1.000 | 0.899 |  |
| *attitude (baseline -1)* |  |  | *165* |
| 0 | 2.283 | 0.480 | *404* |
| 1 | 1.000 | 0.167 | *116* |
| *style (baseline map – inperson)* |  |  | *184* |
| van interview – in person | 1.000 | 0.373 | *182* |
| van interview – online | 1.000 | 0.3650 | *319* |
| *tensor product interaction – percent & duration (continuous)* |  |  |  |
|  | 6.034 | 0.071 |  |
| *random smooth (by speaker)* |  |  |  |
|  | 141.3 | < 2e-16 |  |
| *random smooth (by trajectory)* |  |  |  |
|  | 1757 | < 2e-16 |  |

Table 9: Smooth terms (by percent) of the model of F2 in Wigan and Bolton

We therefore suggest that the variation seen in this group of speakers is evidence of change in the locally constructed speech community (Llamas, 2007), driven by change in attitude towards place. Previously, the speech community was Lancashire-oriented and their speech included with Lancashire- specific variants (see also Dann *et al.*, 2024 for discussion of another Lancashire feature, rhoticity, that has changed over time in the area). Strycharczuk et al. (2020) show evidence of regional levelling across the north of England, particularly involving the urban centres of Leeds, Sheffield, and Manchester. The younger groups of speakers in our analysis identify themselves with the urban conurbation of (Greater) Manchester leading a sound change towards the pan-regional norm that has been created by that levelling (Strycharczuk et al., 2020). The speakers who do not associate with a Mancunian identity (even if not overtly against it, the neutral speakers are in this group) are resisting the overall change and continuing to produce variants associated with Lancashire. Arguably, this process is particularly prevalent in the mouth vowel because it is socially salient and overtly associated with Lancashire (Drummond, 2025; Drummond, Dann, Tasker, et al., 2022).

# Conclusion

Regarding research question 1, we find that due to a high degree of variation within each borough it is not possible to determine that Wigan and Bolton have a measurably and consistently different mouth vowel realisation form the other boroughs. However, there is a clear pattern of variation within Wigan and Bolton itself as a combined area. In answer to research question 2, we find that there is some evidence of variation by age group, but that this is not sufficient in explaining what is happening. This leads to research question 3, where we find a far clearer predictor of mouth variation in the speakers’ attitude towards the label and idea of ‘Greater Manchester’, with speakers who express a positive attitude towards Greater Manchester producing a vowel with more F2 movement than the traditional Lancashire variant produced by the rest of the speakers. We propose that the variation in Wigan and Bolton is evidence of a change in progress towards a localised norm. The speakers who have a positive attitude towards Greater Manchester are driving the change, and the speakers without a positive attitude (neutral or negative) are not yet taking part in the change or are resisting the change. Since attitude towards Greater Manchester is so strongly correlated with age, we can predict that over time there will be more speakers who identify with the Greater Manchester area and participate in the change.

These results are evidence of the impact of border changes on local community identity (Llamas, 2007) and sound change, with added impact of changes in regional identity, as seen through a language ideology framework, that comes with using a city name for a metropolitan area.

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# Appendix

The interview consisted of 14 questions and an optional structured elicitation task. First, there were two introductory questions. The second of these was important, as while this strand of the project was open to anybody who lives in Greater Manchester, it was useful to know if somebody had lived in the same location for most of their lives.

1. Tell me something about yourself. For example, what’s your name and how old are you?
2. Tell me a bit about where you grew up, and where you live now.

Question 3 explored people’s attitudes towards the concept of “Greater Manchester”, to determine whether people from different demographics tended to identify more with the historic county that their borough would have been part of prior to 1974.

1. How do you feel about the name ‘Greater Manchester’? Do you use it? Or do you prefer another name for your part of the country?

Questions 4, 5 and 6 asked for people’s thoughts on their local area, the people in it, and how it compared to other areas of Greater Manchester.

1. How do you feel about your local area within Greater Manchester? Is it a good place to live? Is there anything unique about it?
2. How would you describe the people that live in your community?
3. What do you think of other parts of Greater Manchester? Which areas and people are similar to yours, and which are different?

Questions 7, 8 and 9 explicitly asked about participants’ own speech and how it relates to both the region, and to other people. Question 9 attempted to gather linguistic examples.

1. How would you describe the way you speak - your accent and dialect?
2. Is your accent typical of where you are from? How does it compare to the accent of your family and friends?
3. Do you think people can tell where you are from in Greater Manchester by the way you speak? For example, are there any pronunciations, words or grammar you use that are typical of where you live?

Questions 10, 11, 12 and 13 tried to explore the relationship between accent and identity beyond that of region. Question 11 asked participants to consider situations in which they might style-shift, and question 12 invited examples of prejudice.

1. Do you think they can tell anything else about you by the way you speak?
2. Do you think you speak differently in different situations and with different people? If so, in what ways?
3. Do you think the way you speak has ever caused you any problems? Or perhaps it has worked in your favour?
4. Do you think the way you speak is linked to who you are? If so, in what ways?

The final question simply asked how people feel about the way they speak.

1. Do you like the way you speak? Would you ever want to change it?

1. Fred Dibnah (1938-2004) was a steeplejack and TV personality from Bolton. There are numerous videos of him and his work available online. [↑](#footnote-ref-2)
2. See: https://northernpowerhouse.gov.uk/. [↑](#footnote-ref-3)
3. Edwin Waugh (1817–1890) was an English poet from Rochdale, Lancashire. [↑](#footnote-ref-4)
4. The full poem can be seen on the Edwin Waugh Society website here: https://www.edwinwaughdialectsociety.com/t-kissin-shuttle-winning-entry.html [↑](#footnote-ref-5)
5. For a fuller description of the Accent Van and the decisions that brought it into being, please see Drummond, Dann, Tasker and Ryan. 2022. ‘The Manchester Voices Accent Van: taking sociolinguistic data collection on the road’. Linguistics Vanguard. 8(1), 263-277. https://doi.org/10.1515/lingvan-2022-0050 [↑](#footnote-ref-6)