INTONATIONAL VARIATION IN LIVERPOOL ENGLISH

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ABSTRACT

This paper investigates intonational variation in Liverpool English, a dialect of British English that is recognised as having a number of distinctive phonetic characteristics [15, 16]. One previously reported aspect of Liverpool intonation is the presence of rising contours in declaratives as part of the traditional dialect [7]. Here we present a phonological Autosegmental Metrical analysis [9] and a phonetic analysis of intonation in different sentence types from 9 speakers. Results suggest that traditional Liverpool rising nuclear contours are common among 20–22 year olds from Liverpool. Through analysis of these data, we aim to contribute to descriptions of intonational variation in the UK, and wider studies of intonational variation and typology.

Keywords: Intonation, Liverpool English, Nuclear pitch accent, Gender

1. INTRODUCTION

Phrase-final intonation contours across the World's languages are generally characterised by falling pitch in declaratives [6]. There are some notable exceptions to this tendency, such as a group of cities in the north of the UK, which have come to be referred to as the Urban Northern British (UNB) group [3, 9]. Previous research on intonation in UK English dialects has investigated northern cities such as Glasgow, Belfast, Newcastle in considerable detail [5, 4, 11, 13, 10], but few studies have analysed data from Liverpool, a city claimed to be part of the UNB group.

An early descriptive account of Liverpool intonation indicates that the UNB rising contours are common and come in three varieties: the 'step', 'step with downdrift' and 'rise' [7]. The first two of these correspond to the 'rise plateau' and 'rise plateau slump' described in [3]. Our corresponding labels would be L* H-H%, L* H-L% and L* L-H% respectively (see Figure 1 in Section 3).

1.1. Research aims

1. Provide a descriptive account of Liverpool intonation in a range of sentence types.
2. Examine how declaratives differ from questions since both are reported to use a 'rising' pitch.
3. Discuss individual and gender variation in the dataset.

2. METHOD

Data were collected from 9 speakers of Liverpool English aged 20-22 who were born and raised in the city (4f; 5m). All were from lower middle class backgrounds. Subjects read a list of 36 sentences in random order from a computer screen. These included different sentence types used in [4]: D - declaratives (8 sentences), YN - yes/no questions (4 sentences), WH - wh-questions (4 sentences), M - questions without morphosyntactic question markers (4 sentences), C - coordinating questions (4 sentences). Each sentence was repeated twice. The remaining 12 sentences were fillers of the same structure as the experimental stimuli. Examples of each kind of sentence are shown in Table 1. Each sentence used fully voiced sounds only and aimed to elicit two pitch accents. Here we concentrate only on phrase-final pitch accents and boundary tones. We also conducted a task aimed at eliciting more naturalistic speech: participants were asked to watch a 2 minute Mr Bean cartoon and then retell the story in their own words. These data are not presented here.

Table 1: Example stimuli used for the experiment.

Type	Sentence example
D	We were wearing some goggles.
YN	Were you drawing the library?
WH	Where is my dinner?
M	He's running the relay?
C	Are we going bowling or running?

The sentence data were subjected to two kinds of analysis: (1) phonological transcription of pitch

accents and boundary tones (Section 3); (2) phonetic analysis of pitch accent realisation (Section 4). The data were recorded by the third author using a Beyerdynamic Opus 55 headset microphone, and a Sound Devices USB Pre2 audio interface in a quiet room in the participant's house or other convenient location. Files were recorded at a sampling rate of 44.1 kHz. Prior to analysis, the data were low pass filtered at 11.025 kHz and down sampled to 22.05 kHz in Praat [2]. Labelling was carried out in Praat and further analyses were conducted in R [12].

3. PHONOLOGICAL ANALYSIS

3.1. Method

In total, we analysed 419 nuclear pitch accents and boundary tones. 16 utterances were excluded as unsuitable for analysis, mainly due to the presence of substantial creaky voice among some female speakers. Phonological labelling of the nuclear pitch accents and boundary tones was carried out using a system designed for rising contours in northern British English, Glasgow ToBI (GlaToBI) [11]. The major differences between GlaToBI and ToBI (as in [1]), are as follows: GlaToBI removes the intrinsic up-step cuing property of an H phrase accent such that H-L% represents a falling pitch, rather than a level pitch in conventional ToBI. Additionally, contra [11], we have retained the more conventional L* and L*+H labels rather than their suggested L*H. Labelling was carried out by the first author and 50% of tokens were checked by the second author and altered until agreement was reached if necessary. Schematised pitch traces of the contour types can be found in Figure 1, based on [11]. In the interests of space we have provided a pitch trace of the most common contour only in Figure 2.

Figure 1: Schematised pitch traces of each phonological labelling category based on [11].

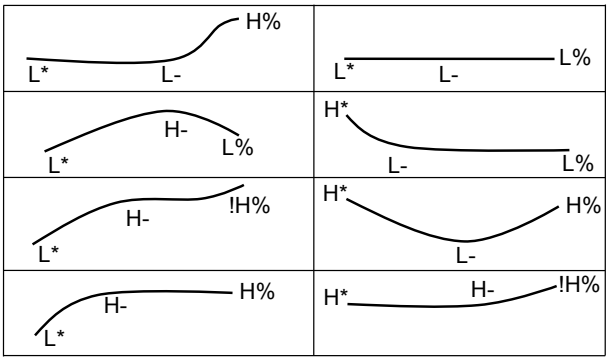
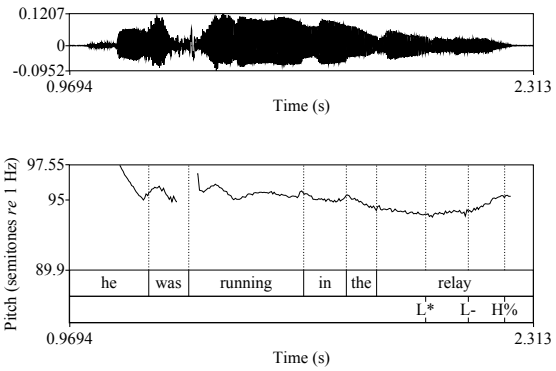


Figure 2: Example waveform and pitch trace of the most common nuclear contour: L* L-H%.



3.2. Results

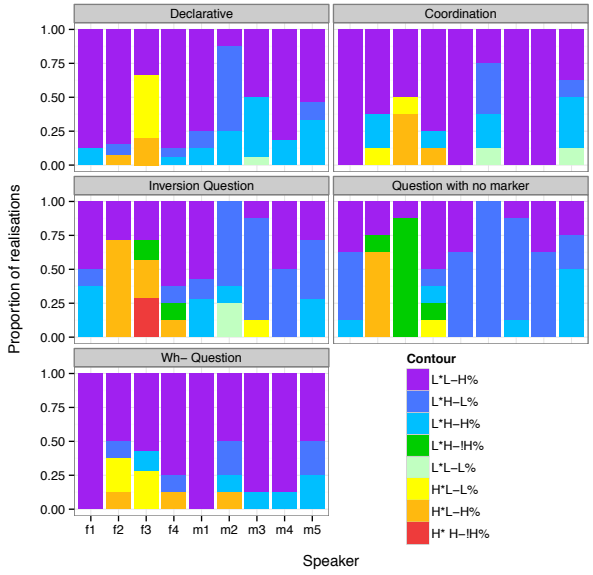
Results of the phonological labelling are in Figure 3. Contours with a L* pitch accent are in purple/blue/green colours and those with an H* pitch accent are in red/yellow/orange. The most common contour across the 5 sentence types was L* L-H% (55% of tokens overall). In terms of our second research aim, declaratives differ from questions without morphosyntactic markers in that the latter use more L* H-L% contours compared with the most common L* L-H% in declaratives ($p < .001$, logistic mixed effects regression modelling with speaker and accented word as random intercepts and sentence type and gender as fixed effects). L* H-L% contours were also more common among male speakers (main effect, $p = .01$).

Similarly, inversion questions used more of the L* H-L% pattern when compared with declaratives. The phonological data here show little difference between declaratives, coordinating questions and wh-questions. This apparent lack of difference between the sentence types is further explored in Section 4.

There was some variation amongst individuals, with speakers f2, f3 and m2 behaving differently from the rest of the dataset. f3 produced contours more typical of southern British English varieties; for example, H* L-L% contours in declaratives, and up-stepped rises in questions with no morphosyntactic markers. f2 did not follow f3 in declaratives but behaved similarly across other sentence types. The behaviour of these two females may be indicative of wider gender differences in Liverpool, but we cannot attest this with certainty from the current small-scale study. m2 used more L* H-L% than other speakers in declaratives, coordinating questions, inversion questions, and questions without morphosyntactic

markers.

Figure 3: Phonological labelling of nuclear pitch accents, phrase accents and boundary tones for each of the 5 sentence types.



3.3. Discussion

Informal descriptions such as those in [3] and [9] suggest that rising nuclear contours are part of the traditional dialect of Liverpool. Our research confirms these descriptions, and indicates that the most common contour in Liverpool declaratives is L*L-H%, or a late rise. This is the contour referred to as 'rise' in [7]. Interestingly, this is somewhat different from the kinds of rises reported in other dialects in the UNB group. For example, [11, 13, 10] report that the rise occurs earlier in the phrase in Glasgow and Belfast, leading [3] to refer to rises in this city as 'rise-plateau', here labelled as L* H-H%. However, our data confirm that Liverpool can be justifiably included in the UNB group, with some regional differences compared to other cities.

There was some variation within our dataset. For example, speaker f3 produced tonal patterns much more associated with southern British English varieties, as did speaker f2 to some extent. In general, Liverpool is reported to be less susceptible to sound changes currently ongoing in most of Britain [15], but there appear to be exceptions. We have no explanation for the divergent behaviour of speakers f2 and f3; for example, they are not from socially different backgrounds from the other participants, and have not spent long periods of time away from Liverpool. However, the data suggest that a wider-scale study could find interesting patterns in a larger dataset.

4. PHONETIC ANALYSIS

This section considers phonetic variation in the intonation contours described above. We consider three axes of variation: (1) global pitch *range* used by speakers; (2) *alignment* of tones in the most commonly occurring contour: L*L-H%; (3) *scaling* of the most commonly occurring contour (i.e. the difference in f_0 between L- and H% in L* L-H%).

4.1. Method

Previous descriptive work on Liverpool suggests that speakers exploit a small pitch *range* in their intonation, leading to the perception that they are somewhat monotone [7]. In order to investigate this phonetic aspect of intonation, we calculated the pitch range for each speaker as the median value in semitones of their L*, L- and L% values subtracted from the median of their H*, H- and H% values (semitones re. 127.09Hz [14]).

The aim of the *alignment* analysis was to consider phonetic variation in three sentence types that do not appear substantially differentiated along phonological lines: declaratives, coordinating questions, and wh-questions. All of these showed a large majority of L* L-H% contours (Figure 3). We consider here phonetic variation in the alignment of the L-phrase accent as a percentage of the total duration of the accented word. This analysis, and the scaling analysis below, considered 189 tokens.

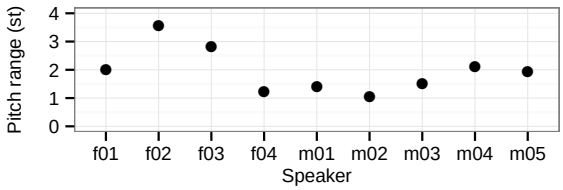
Finally, considering phonetic variation in the most common L* L-H% contour, we measured the difference in pitch (in semitones) between L- and H% (*scaling*). The sentence types investigated were declaratives, coordinating questions and wh-questions.

4.2. Results

The pitch range exploited by each speaker is shown in Figure 4. Liverpool speakers do indeed exploit a fairly narrow pitch range [7]. Humans are usually able to distinguish differences of around 1Hz (less than 1 semitone) at the frequency range of intonation [8], so the values in Figure 4 are small, but within this range. Again, f2 and f3 are somewhat different from the other speakers, using a larger pitch range. This appears to be individual variation in the context of this small-scale study (gender not significant, *t*-test), but would be an interesting direction for future work.

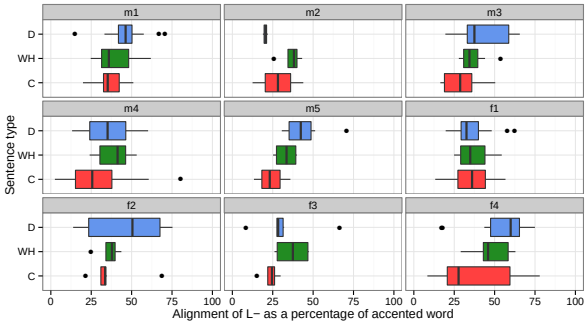
Alignment results are in Figure 5. The data

Figure 4: Pitch range: difference between median H tone value and median L tone value for each speaker (semitones).



suggest a tendency towards some phonetic differences between the three sentence types that were largely the same phonologically: L- is aligned latest in declaratives, suggesting that a final very late jump in pitch is most common. In contrast, the L- turning point occurs earliest in coordinating questions, where a gradual drift upwards in pitch is more common. However, mixed-effects regression on the alignment of L- with speaker and accented word as random intercepts revealed no significant differences according to sentence type or gender.

Figure 5: Alignment of L- in Declaratives, Wh-questions and Coordinating questions. Data are setted by speaker. Overall n = 189.

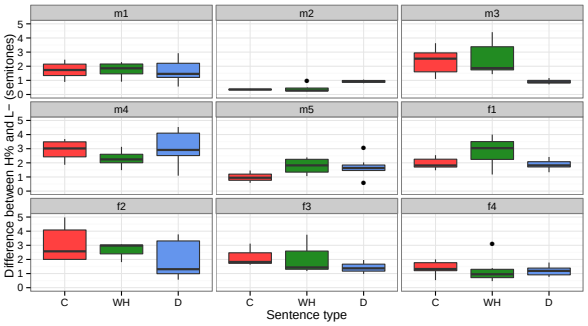


The results of the scaling analysis are shown in Figure 6. This analysis revealed no significant differences according to sentence type or gender.

4.3. Discussion

The results confirm that a small pitch range is used in Liverpool intonation [7]. There are indications of differences in terms of alignment in the L* L-H% between different sentence types that are the same phonologically, but these differences were non-significant and there were also no differences in scaling. It appears the difference between declaratives, coordinating questions and wh-questions may be realised on purely lexical grounds.

Figure 6: Scaling: difference in f_0 (semitones) between H% and L- in L* L-H% contours. Overall n = 189.



5. CONCLUSION

We have demonstrated that Liverpool is firmly within the group of northern British cities that typically use typologically unusual rising intonation patterns in declaratives. The most common rising pattern in these data is L* L-H%, where the final H% is reached relatively late after the nuclear accent. This is referred to as a 'rise' in [7] and is different from the Glaswegian or Belfast 'rise plateau' and 'rise plateau slump' where high pitch comes earlier [11, 3, 9, 13, 10]. Another characteristic feature of Liverpool intonation is the small pitch range, which may be behind perceptions that this dialect appears monotone [7].

Liverpool speakers commonly use rising contours in all sentence types studied here. Specifically, the L* L-H% is used almost exclusively in declaratives, coordinating questions and wh-questions. This begs the question as to how listeners tell these sentence types apart. We found no statistically significant difference in alignment or scaling, suggesting that lexical information is possibly most important in this contrast.

Our third research aim concerned whether there was evidence of any sociolinguistic variation in our dataset. There are some individual differences, such as the divergent behaviour of speakers f2 and f3. This could potentially represent gender-based variation and will be the subject of future larger-scale research.

6. ACKNOWLEDGEMENTS

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