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The Intonation of Native Accent Varieties in the British Isles: Potential for Miscommunication?

1. Introduction

Intonation has been described as the most difficult aspect of a foreign language to acquire and is held responsible for numerous instances of miscommunication between native and non-native speakers. In English, these are said to involve primarily the pragmatic impact of utterances and occasions when the 'wrong' intonation causes a difference in grammatical meaning or utterance type (cf. Setter, this volume, and Roach 1983: 141). In this chapter, we provide evidence of the 'right' intonation produced by speakers of English from the British Isles. Our data include Southern British English or Received Pronunciation, the variety that is usually taken as a model by non-native speakers and data from two northern dialects spoken in Newcastle and in Belfast. The investigation was based on the IViE corpus, a corpus of recordings from seven urban dialects of English spoken in Britain, Northern Ireland and the Republic of Ireland (Grabe, Post and Nolan 2002).

In section 2 below, we set the scene. The section contains background information on intonational variation in the British Isles and more detailed information on the IViE corpus.

In section 3, we describe the experimental investigation. We concentrated on two aspects of intonation: the shape of pitch patterns and the location of accented syllables. We examined these in four utterance types frequently listed in textbooks: statements, *wh*-questions, polar (yes/no) questions and echo questions. For each dialect, we tabulated the frequency of particular intonation patterns

and the location of accented syllables. Then we calculated intra- and inter-dialect variation scores. Variation scores for intonation were high. In each dialect, speakers produced a wide range of patterns. Inter-dialect scores for intonation were even higher. In some cases, we did not find any overlap between dialects in the usage of intonation patterns. Finally, we found that each dialect was characterised by a small number of frequent intonation patterns and a large number of infrequent alternatives.

Variation scores for the location of accented syllables were substantially lower than for intonation, especially in nuclear position. (The nucleus consists of the last accented syllable and any following syllables in an intonation phrase and it determines the focus structure of the utterance). Prenuclear accent locations were subject to minor variation.

In section 4, we summarise our findings and discuss the implications for learners of English.

2. Background

Intonation is fundamental: in combination with changes in syllable duration and loudness, it plays a role in all aspects of speech. For instance, intonation tells us how others feel towards us and towards the subject of the conversation (e.g. Uldall 1960, Scherer, Ladd and Silverman 1984, Grabe, Gussenhoven, Haan, Marsi and Post 1998 and Chen and Gussenhoven 2003). Intonation also provides linguistic information; speakers use it to highlight topics, hold the floor and express contrastivity (Schegloff 1998, Wichmann 2000). It provides auditory cues to the beginning and end of major syntactic constituents (Cutler, Dahan and Van Donselaar 1997) and it can cue utterance type. In particular, intonation can signal the distinction between questions and statements (a recent overview of intonation in questions is given in Gussenhoven 2002). Examples of acceptable intonation patterns on questions and statements are given in textbooks on English intonation such as O'Connor and Arnold (1973). In Southern British

English, statements are frequently accompanied by falling intonation and questions by a rise. An example is given in Figure 1.

Figure 1. Falling intonation on a statement and rising intonation on an echo question. Adapted from O'Connor and Arnold 1973, p. 203 and p.75.

The tadpole diagrams above the text in Figure 1 are part of the British tradition of intonation analysis. They are auditory transcriptions. The dot stands for the accented syllable; the tail describes the pitch movement following that syllable.

The patterns in Figure 1 are textbook patterns: they describe intonation contours produced by speakers of Southern British English, the dialect which has long served as a prestige norm. Other patterns are possible and listed in O'Connor and Arnold (1973) or in Cruttenden (1997), a more recent standard text on intonation. Data about the frequency of usage of different intonation patterns was provided by Grabe and Post (2002) and Grabe (2002). Grabe and Post showed that in a set of short statements, speakers of Southern British English produced two nuclear accent patterns: a fall and a fall-rise. The falling pattern was more frequent; it was produced in 94% of the data. In echo questions (i.e. questions without lexical or syntactic question markers), Southern British English speakers also produced two patterns, a fall and a high rise. The high rise was more frequent and produced in 89% of the data. In *wh*-questions and in polar questions, our speakers produced three patterns; a fall, a fall-rise and a high rise. In *wh*-questions, the fall was more frequent and produced in 61% of the data. In polar questions, the fall was more frequent but produced in only 44% of the data. Additional variation can be expected when prenuclear accents (i.e. the accents preceding the nuclear accent) are added into the equation.

English intonation is also subject to inter-dialect variation (Pellowe and Jones 1978, Knowles 1978, Wells 1982, Sutcliffe and Figueroa 1992, Tench 1990, Sebba 1993, Mayo, Aylett and Ladd

1996, Walters 1999, Grabe, Post, Nolan and Farrar 2000, Cruttenden 2001, Grabe 2002, Vizcaino-Ortega 2002, Grabe 2004). Native speakers from the North are familiar with the patterns shown in Figure 1, not least through radio and television, but the majority will use additional patterns. Some will never use the text–contour combinations shown in Figure 1. Speakers from Belfast, for instance, use statement intonation patterns that are 'upside down' versions of the patterns used in Southern British English (Jarman and Cruttenden 1976, Rahilly 1991, Cruttenden 1995, Wells and Peppé 1996, Ladd 1996, Lowry 1997, Cruttenden 1997). Figure 2 provides an illustration. Note that the utterance *It's Melanie!* in Figure 2(b) is an assertion.

      (a) Southern British English   (b) Belfast English

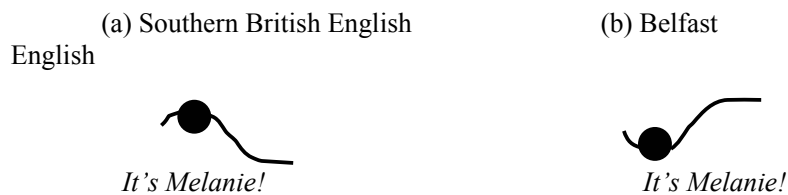*It's Melanie!*   *It's Melanie!*

Figure 2. Declarative intonation in Southern British English and Belfast English.

In this chapter, we present further examples of intonational variation in the British Isles. We document the range of intonation patterns and accent locations found in four utterance types: statements, *wh*-questions, polar questions and echo questions. We provide data for complete intonation phrases (i.e. not only nuclear accents) from three dialects: the southern 'standard', as spoken in Cambridge, the urban dialect spoken in Newcastle and the urban dialect spoken in Belfast.

3. Experimental investigation

We investigated two aspects of intonational variation: (a) the shape of intonation patterns, and (b) the locations of accented syllables. Our speech data were taken from the IViE corpus, a publicly available corpus of speech data, recorded between 1997 and 2002 (IViE =

Intonational <u>V</u>ariation <u>i</u>n <u>E</u>nglish, Grabe, Post and Nolan 2002). The corpus contains 36 hours of speech from seven urban dialects of English spoken in London, Cambridge, Leeds, Bradford, Newcastle, Belfast, and Dublin. In total, 108 speakers took part in the recordings. They were 16 years of age and the recordings were made in their schools. The speakers had grown up near the school, and as far as possible, we recorded speakers whose parents were also local. All speakers took part in the same battery of tasks. They began by reading a list of sentences and a familiar fairy tale. Then they retold the fairy tale in their own words. Two interactive tasks followed. First, the speakers participated in a map task (an interactive game, Anderson et al. 1991), then they took part in a five minute period of free conversation. In each location, six male and six female speakers contributed to the recordings. Approximately five hours of speech data have been annotated with intonation transcriptions. These will be illustrated in the methods section below. More information on the corpus, the recordings and the intonation transcriptions is given in Grabe (2004).

3.1. Method

3.1.1. Intonation transcriptions

We analysed transcribed intonation patterns and accent locations in 306 read sentences recorded in Cambridge, Belfast and Newcastle. Six speakers from each dialect produced eight statements and three *wh-*, polar and echo questions. A list of the sentences is given in Table 1. Transcribed examples are shown in Figure 3. The speaker was female and from Cambridge. Figure 3 shows two fundamental frequency traces, from the sentence *you remembered the lilies* spoken as a statement (top panel) and as an echo question (bottom panel). Fundamental frequency traces are graphic representations of the rate at which the vocal cords vibrate during voiced speech. They are extracted from the acoustic signal. If the vocal cords vibrate slowly, the fundamental frequency trace shows low values. Listeners hear low pitch. If the vocal cords vibrate quickly, values in the trace are high and listeners hear high pitch.

The words of each sentence and the intonation patterns were labelled, using a combination of auditory analysis and visual inspection of fundamental frequency traces. This approach is standard in the field of intonational phonology (e.g. Ladd 1996). Transcriptions were made using the xlabel tool, part of the ESPS/xwaves+ package developed by Entropic Research Laboratories. A complete transcription consists of an audio file, a time-aligned fundamental frequency trace and time-aligned text files containing transcriptions of intonation patterns, the location of accented syllables and the words spoken.

Statements	Wh-*questions*
We live in Ealing.	Where is the manual?
You remembered the lilies.	When will you be in Ealing?
We arrived in a limo.	Why are we in a limo?
They are on the railings.	
We were in yellow.	*Polar questions*
He is on the lilo.	
You are feeling mellow.	May I lean on the railings?
We were lying.	May I leave the meal early?
	Will you live in Ealing?
	Echo questions
	He is on the lilo?
	You remembered the lilies?
	You live in Ealing?

Table 1. Sentences included in the experimental investigation.

Intonation patterns were transcribed with a two-tone intonation transcription system. In phonetic research on intonation, these systems are widely used. Our data were labelled with the IViE system which was developed for multi-dialect transcription of intonational variation in English (Grabe, Post and Nolan 2001, Grabe 2004). As the name implies, two-tone systems reduce intonation patterns to two tones, high (H) and low (L), and (unlabelled) transitions between the tones. In this system, a '*' indicates the location of the stressed syllable (Ladd 1996, Beckman and Ayers 1997), and a '%' sign marks the end of the intonation phrase. Transcribed thus, the statement in Figure 3 is

H*L H*L %. The initial H*L transcribes a falling (i.e. high–low) accent on the stressed syllable -mem- in *remembered* and the second H*L describes a falling accent on the first syllable *li-* of *lilies.*
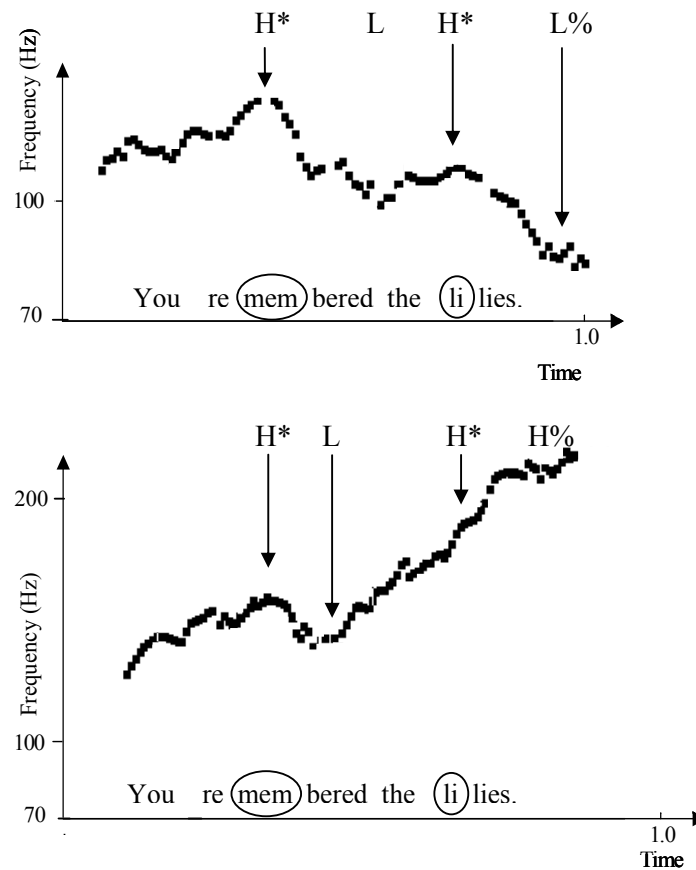

Figure 3. Fundamental frequency patterns produced by a female speaker of Cambridge English. Top panel: a statement, bottom panel: an echo question. An explanation of the intonation transcriptions is given in the text.

The question in Figure 3 (bottom) is labelled as H*L   H* H%. The tone combination H*L describes the falling accent on *remembered;* the combination H* H% describes the rising accent on *lilies.*

We exported the text files with the intonation transcriptions to Microsoft Excel and sorted them by speaker, utterance type and dialect. Then we counted the number of different patterns produced in each utterance type, per dialect, and calculated the frequency of each pattern. For the sake of data reduction, we counted patterns with repeated prenuclear accents as instances of the same pattern (e.g. H* H* H*L% and H* H*L%) pattern. Ladd (1996), for instance, argues that repeated prenuclear accents are the result of a single prenuclear accent choice. In the tables below, repeated accents are shown in brackets (e.g. H* (H*) H*L).

Our results are documented in section 3.2 below. Section 3.2.1 contains results for variation in the shape of intonation patterns. Section 3.2.2 contains results for variation in the location of accented syllables. In each section, we document findings for complete intonation phrases (IPs), and for nuclear accents, separately. This approach is motivated by the structure of intonation textbook drills. Nuclear accents are said to contribute most to the pragmatic impact of utterances and learners are frequently trained to imitate nuclear accent patterns on single words or short syntactic phrases. Then learners are taught to produce complete intonation phrases on longer sentences (e.g. O'Connor and Arnold 1973). Therefore, we give separate results for native speaker variation in nuclear accent patterns and intonation in complete utterances.

Variation in the location of accented syllables will also be reported for intonation phrases and for nuclear accents, separately. The location of a nuclear accent is as important, or possibly even more important than its shape; it determines the focus structure of the utterance (detailed information on the relationship between accent and focus in British English is given in Gussenhoven 1984). The contribution of prenuclear accents to focus is less clear cut: for a discussion, see Ladd (1996). In some utterances, prenuclear accents appear to signal a subordinate focus structure. In others, their function appears to be exclusively rhythmic and they make no contribution to the meaning of the utterance. Consequently, variation in the location of prenuclear accents has less impact on the meaning of utterances

than variation in the location of nuclear accents. Therefore, we document levels of native speaker variation in the location of nuclear accents on the one hand and accents in complete intonation phrases on the other.

3.1.2. Variation scores

This section provides intra- and inter-dialect variation scores for intonation and for accent placement. For intonation, variation scores were calculated from the frequency distributions of intonation patterns shown in section 3.2.1. Within each dialect and utterance type, frequency scores were squared and summed. The resulting values express the probability of agreement between two speakers from the same dialect, given the same utterance type. Each score was then subtracted from 1. The results express intra-dialect variation: the scores show how probable it is that two speakers from the same dialect will produce a different intonation contour, given the same utterance type.

Inter-dialect scores were calculated for each dialect pair (i.e. Cambridge–Newcastle, Cambridge–Belfast and Belfast–Newcastle). Within each utterance type, the frequency scores for each intonation pattern were squared and the results were summed. Again, the total was subtracted from 1. The resulting scores express inter-dialect variation: they show how probable it is that two speakers from different dialects will produce different intonation contours, given the same utterance type.

Variation scores for accent location were calculated similarly. The locations of accented syllables were given in the IViE transcriptions. In each test sentence, we numbered the words sequentially. Then we entered the numbers of accented words into a spreadsheet, separately per speakers (i.e. if speaker 1 accented the second and the fourth word in the statement *You remembered the lilies*, the accent location pattern was '2, 4'; if speaker 2 accented the first and the fourth word, the accent location pattern was '1, 4'). For each sentence, we computed the frequency distributions of each accent location pattern, squared and summed the results and took a mean

over sentences to obtain a score for the utterance type[1]. Then we subtracted the results for each utterance type from 1 to obtain variation scores for accent location. The scores express the probability that two speakers from the same dialect produce different accent locations, given the same sentence from an utterance type.

Inter-dialect scores for accent placement were calculated as for intonation, again, separately for each sentence. Scores were calculated for each pair of dialects and means were taken over sentences and subtracted from 1 to obtain a score for each utterance type.

3.2 Results
3.2.1 Intonational variation within dialects

Table 2 illustrates the range of intonation patterns produced by speakers of Southern British English from Cambridge in statements.
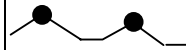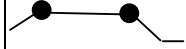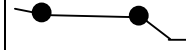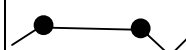
Prenuclear	Nuclear	Frequency	Stylisation
H*L (H*L)	H*L %	45.8%	
H* (H*)	H*L %	39.6%	
%H H*	H*L %	6.3%	
H*L H* H*L	H*L %	4.2%	
H* H*L	H %	2.1%	
H* L*H	H*L %	2.1%	

Table 2. Distribution of intonation patterns in statements in Cambridge English. The '%H' symbol transcribes a high prehead, i.e. IP-initial high pitch in the absence of a stressed syllable.

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[1]   Variation scores for accent location had to be calculated separately for each sentence. The lexical structure of a sentence affects the location of the accented syllable. Intonation behaves differently; in principle, a speaker can produce any intonation pattern on any sentence.

Table 2 shows, from left to right, a transcription of the prenuclear intonation pattern, the nuclear intonation pattern, the observed frequency of that pattern (expressed as a percentage of all statement tokens) and a stylised representation of the pattern. In the stylisations, big dots represent accented syllables and the lines show the direction of pitch. Alternative patterns are listed in order of frequency of occurrence.

Table 2 shows that we did not find any evidence of a unique intonation pattern in statements. In total, our six speakers from Cambridge read 48 sentences. In these, they produced six different intonation patterns. Five ended in a nuclear fall (H*L %) and one ended in a fall-rise (H*L H%). The most popular patterns consisted of a nuclear fall preceded by one or more prenuclear falls (H*L (H*L) H*L %) or preceded by one or more high prenuclear accents (H* (H*) H*L %).

Table 3 shows results from Newcastle English.

Prenuclear	Nuclear	Frequency	Stylisation
H* (H*)	H*L %	52.1%	
H*L (H*L)	H*L %	29.2%	
H*	L*H %	10.4%	
H*L	L*H %	2.1%	
H* H*L	L*H %	2.1%	
%H H*L	L*H %	2.1%	
%H H*L	H*L %	2.1%	

Table 3. Distribution of intonation patterns in Newcastle statements.

In Newcastle English, we observed seven intonation patterns in statements. The two most popular patterns (top rows) were the same as two most popular patterns in Cambridge. In addition, the Newcastle speakers produced intonation patterns not observed in Cambridge

English statements. Notably, we found nuclear rise-plateaux (L*H %), typical of northern varieties of British and Irish English.

Table 4 shows the distribution of intonation patterns in statements in Belfast English. The Belfast patterns were very different from the Cambridge patterns, but there was some overlap between Belfast and Newcastle. In Belfast, the most popular patterns consisted of a high prenuclear accent followed by a nuclear rise-plateau. Newcastle speakers also produced rise-plateaux but speakers from Cambridge did not. One Belfast pattern, the rise-plateau-fall (L*H L%) was not observed in Cambridge or in Newcastle English.
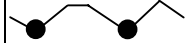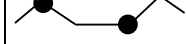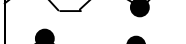
Prenuclear	Nuclear	Frequency	Stylisation
H* (H*)	L*H %	71.7%	
L*H	L*H L %	8.7%	
H*L	L*H L %	4.3%	
H* L*H	L*H L %	4.3%	
H* L*H	L*H %	2.2%	
H*L H*	L*H %	2.2%	
H*L	H*L %	2.2%	
L*	H*L %	2.2%	

Table 4. Distribution of intonation patterns in Belfast statements.

Tables 5–13 give results for *wh*-questions, polar questions and echo questions. The tables do not show alternative patterns that occur in less than 10% of the data. Instead, they give the number of low-frequency alternatives and their combined frequency of occurrence. Stylised patterns are given for the most popular choices only.

Tables 5–7 show results for *wh*-questions. In *wh*-questions, Cambridge and Newcastle speakers shared the most popular pattern, a so-called 'flat hat' ('t Hart, Collier and Cohen 1990). This pattern is

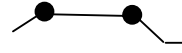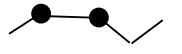popular in dialects of English, Dutch and German. Belfast speakers produce a pattern ending in a rise-plateau.

Prenuclear	Nuclear	Frequency	Stylisation
H* (H*)	H*L %	52.9%	
H*	L*H H %	29.4%	
H* (H*)	H*L H %	17.6%	

Table 5. Intonation in *wh*-questions in Cambridge English.
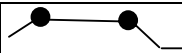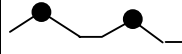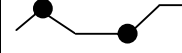
Prenuclear	Nuclear	Frequency	Stylisation
H*	H*L %	38.9%	
H*	L*H %	22.2%	
H*L	H*L %	16.7%	
H*L	L*H %	11.1%	
Alternatives below 10%	2	11.2%	

Table 6. Intonation in *wh*-questions in Newcastle English.
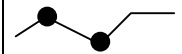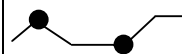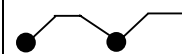
Prenuclear	Nuclear	Frequency	Stylisation
H* (H*)	L*H %	77.8%	
H*L	L*H %	11.1%	
L*H	L*H %	5.6%	
Alternatives below 10%	2	11.2%	

Table 7. Intonation in *wh*-questions in Belfast English.

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Tables 8–10 show results for polar questions. In polar questions, we observed many intonation patterns. Cambridge speakers produced nine, Belfast speakers produced ten and Newcastle speakers produced seven different patterns. In Cambridge English polar questions, the most frequent pattern ended in a nuclear fall, but we also found rising patterns with a number of different internal structures. Cambridge and Newcastle speakers did not share the most popular pattern, as in *wh*-questions. Instead, Newcastle and Belfast shared their most popular patterns.
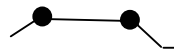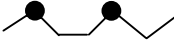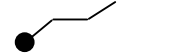
Prenuclear	Nuclear	Frequency	Stylisation
H* (H*)	H*L %	33.3%	
H*	H*L H %	16.7%	
H*L	H*L H %	11.1%	
	L*H H %	11.1%	
H*	L*H H %	5.6%	
Alternatives below 10%	4	22.4%	

Table 8. Intonation in polar questions in Cambridge English
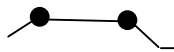
Prenuclear	Nuclear	Frequency	Stylisation
H* (H*)	L*H %	29.4%	
H* (H*)	H*L %	23.5%	
Alternatives below 10%	8	47.2%	

Table 9. Intonation in polar questions in Newcastle English
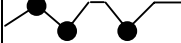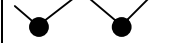
Prenuclear	Nuclear	Frequency	Stylisation
H* (H*)	L*H %	33.3%	
H*L	L*H %	27.8%	
H* L*H	L*H %	11.1%	
L*H (L*H)	L*H %	11.1%	
Alternatives below 10%	3	16.8%	

Table 10. Intonation in polar questions in Belfast English

Results for echo questions are given in Tables 11–13. In echo questions, we observed fewer intonation patterns than in polar questions, but nevertheless, variation was again high. Belfast and Newcastle shared the most popular pattern, a high accent followed by a rise-plateau.

Taken together, the results showed that intonational variation within dialects was high. They also showed that within the wide variety of possible patterns, there were one or two patterns in each dialect and sentence type that were substantially more popular than the other alternatives. Note, however, that the usage of this pattern frequently lay below 50%.
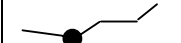
Prenuclear	Nuclear	Frequency	Stylisation
	L*H H %	44.4%	
H*	L*H H %	33.3%	
H*	H*L %	11.1%	
Alternatives below 10%	2	11.2%	

Table 11. Intonation in echo questions in Cambridge English

Prenuclear	Nuclear	Frequency	Stylisation
H* (H*)	L*H %	38.9%	
L*	L*H %	16.7%	
	H*L %	11.1%	
H* H*L	L*H H %	11.1%	
H*	H*L %	11.1%	
Alternativs below 10%	2	11.2%	

Table 12. Intonation in echo questions in Newcastle English

Prenuclear	Nuclear	Frequency	Stylisation
H* (H*)	L*H %	72.3%	
H*L	L*H %	11.1%	
H* L*H	L*H %	11.0%	
L*H	L*H %	5.6%	

Table 13. Intonation in echo questions in Belfast English

3.2.2 Intonational variation within dialects

We calculated intra-dialect variations scores for intonation. The scores show how probable it is that two speakers of a dialect will produce different intonation patterns in the same utterance type. A score of 0 means that that two speakers will produce the same pattern. A score of 1 means that two speakers will produce different patterns. Results are shown in Table 14. Table 14 confirms that within dialects, the probability of intonational variation was high. Variation scores ranged between 0.4 and 0.8. In all three dialects, the highest levels of variation were observed in polar questions. The table also shows that the speakers from Belfast did not produce as much variation as the

speakers from Cambridge or Newcastle. The speakers from Belfast displayed a strong preference for an intonation pattern consisting of a high prenuclear accent followed by a nuclear rise-plateau, regardless of utterance type.

Intonation phrases	Statements	*Wh*-questions	Polar questions	Echo questions
Cambridge	0.6	0.6	0.8	0.7
Newcastle	0.6	0.8	**0.8**	0.8
Belfast	0.5	**0.4**	0.8	0.5

Table 14. Intra-dialect variation scores for complete intonation phrases in Cambridge, Newcastle and Belfast English. Highest and lowest scores are marked in bold.

Table 15 shows intra-dialect variation scores for the intonation of nuclear accents. Nuclear accents are said to contribute most to the pragmatic impact of utterances. The table shows that variation scores for nuclear accents ranged between 0 and 0.6. An absence of variation was observed only once, in Belfast English echo questions.

Nuclear accents	Statements	*Wh*-questions	Polar questions	Echo questions
Cambridge	0	0.6	**0.6**	0.4
Newcastle	0.3	0.5	0.7	0.6
Belfast	0.4	0.1	0.1	**0**

Table 15. Intra-dialect variation scores for nuclear accents in Cambridge, Newcastle and Belfast English.

3.2.3 Intonational variation between dialects

Tables 16 and 17 show that the dialects in our study were characterised by intonational differences, despite the high levels of intra-dialect variation illustrated in Tables 15 and 16 (i.e. variation between dialects was greater than variation within dialects).

Table 16 shows variation scores for each dialect pair, separately for each sentence type. The table shows that the probability of two speakers from different dialects producing different patterns was very high.

Intonation phrases	Statements	*Wh-* questions	Polar questions	Echo questions
Cambridge – Newcastle	**0.7**	0.8	0.9	1
Cambridge – Belfast	1	**1**	**1**	**1**
Belfast – Newcastle	0.9	0.8	0.9	0.7

Table 16. Inter-dialect variation scores for complete intonation phrases.

Table 17 gives inter-dialect variation scores for the intonation of nuclear accents. These were ranged between 0.2 and 1.

Nuclear accents	Statements	*Wh-* questions	Polar questions	Echo questions
Cambridge – Newcastle	**0.2**	**0.2**	0.7	0.9
Cambridge – Belfast	1	1	1	**1**
Belfast – Newcastle	0.8	0.8	0.7	0.4

Table 17. Inter-dialect variation scores for nuclear accent patterns.

3.2.4 Variation in the location of accented syllables within dialects

In this section, we give results for variation in the location of accented syllables. We show whether speakers agreed on the location of accents in complete IPs and on the location of the nuclear accent. Again, we document the extent of intra- and inter-dialect variation.

On average, in each dialect, speakers produced 2.1 accented syllables per intonation phrase. There was no variation in this number between dialects. We did, however, observe variation in the location of accented syllables. In Table 18 we present intra-dialect scores.

Intonation phrases	Statements	*Wh-* questions	Polar questions	Echo questions
Cambridge	0.4	0.2	0.6	0.5
Belfast	0.3	**0**	**0.7**	0.4
Newcastle	0.4	**0**	0.6	0.5

Table 18. Intra-dialect variation scores for accented locations in intonation phrases.

The table shows the probability of two speakers from the same dialect picking different accent patterns, given the same sentence. Table 18 shows that in intonation phrases, variation scores for accent placement were generally lower than scores for choice of intonation

pattern. Also, for intonation pattern, we did not find any variation scores of 0 (i.e. no probability of variation). We <u>did</u> find scores of 0 for accent placement.

Table 19 shows that variation in prenuclear rather than nuclear accent position was responsible for the variation shown in Table 18. We found little or no variation in the location of nuclear accents. The scores in Table 19 contrast sharply with the variation scores for the intonation pattern of nuclear accents given in Table 18. For nuclear accent locations, we observed complete agreement between speakers within and across dialects for statements and *wh*-questions (marked in bold). In polar questions and echo questions, we observed some variation, but only a small amount[2].

Nuclear	Statements	*Wh*-questions	Polar questions	Echo questions
Cambridge	**0**	**0**	0.2	0.3
Belfast	**0**	**0**	0.3	**0**
Newcastle	**0**	**0**	0.3	**0**

Table 19. Intra-dialect variation in the location of nuclear accents.

3.2.5 Inter-dialect variation in the location of accented syllables

Table 20 shows that levels of inter-dialect variation in accent placement were considerably lower than for intonation pattern.

Intonation phrases	Statements	*Wh*-questions	Polar questions	Echo questions
Cambridge – Newcastle	0.4	0.1	0.4	**0.7**
Cambridge – Belfast	0.4	0.1	0.5	0.8
Belfast – Newcastle	0.4	**0**	0.2	0.5

Table 20. Inter-dialect variation in the location of accented syllables in complete intonation phrases.

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[2] The variation may be due to the relatively open focus structure of polar questions in English. In the utterance *May I leave the meal early*, for instance, a speaker can focus on *leave*, *meal* or *early* or a combination of the three (if the utterance is given without context).

Inter-dialect variation in the location of accented syllables in IPs was highest in polar and echo questions and lowest in *wh*-questions. *Wh*-questions have a particularly restricted focus structure (i.e. for native speakers, options for accent placement in eg. *Where is the manual?* are more limited than in *May I leave the meal early*?).

Table 21 shows that most of the inter-dialect variation shown in Table 20 was due to variation in prenuclear position (recall that the same observation was made for variation in accent placement within dialects). In nuclear position, inter-dialect variation was low. Scores ranged between 0 and 0.3. The results contrast with the results for the intonation pattern of nuclear accents. Variation scores for intonation pattern were high. In principle, this finding is not surprising: the location of a nuclear accent governs the focus structure of an utterance and *a priori*, there is no reason why speakers from different dialects should decide to produce different focus structures in our sentences. The intonation pattern of nuclear accents is a different matter. Here, we expect cross-dialect differences: intonation contributes to the pragmatic impact of the utterance, and the relationship between intonation and pragmatic functions is dialect specific. Nevertheless, it is worth noting that even if native speakers are unlikely to be consistent about intonation patterns, they are likely to put nuclear accents in the same place. This finding suggests that for second language learners of English, learning about the locations of nuclear accents may be more important than learning to reproduce intonation patterns.

Nuclear accents	Statements	*Wh*-questions	Polar questions	Echo questions
Cambridge – Newcastle	**0**	**0**	0.3	0
Cambridge – Belfast	**0**	**0**	0.3	0
Belfast – Newcastle	**0**	**0**	**0.3**	**0**

Table 21. Inter-dialect variation scores for nuclear accent locations.

4. Discussion and conclusion

We have provided quantitative evidence of intonational variation in the British Isles, within and between dialects. Our data show that in varieties of English spoken in Cambridge, Newcastle and Belfast, questions and statements can be accompanied by a wide range of intonation patterns. We observed less variation in the location of accented syllables. In particular, our speakers almost always agreed on where to place nuclear accents.

Our findings show that authors of textbooks cannot find it easy to decide which intonation pattern they should suggest for a particular utterance type. They may wish to point out that the pattern they provide is the frequent or typical option. Our results also show that learners of English need to be prepared for extensive variation in the intonation they might hear from native speakers, within and across dialects. Most of all, they need to be aware that variation in the southern 'standard' is as high or higher than in northern varieties of English spoken in the British Isles. In other words, the standard variety is no more uniform than non-standard varieties. In our data, the probability that two speakers of English from Cambridge produce a different intonation pattern in statements was 0.6. In polar questions, the chance was 0.8.

Secondly, despite the high levels of intonational variation in our data, we found common behaviours across speakers. In each dialect, some patterns were more popular than others. Frequently, these patterns were dialect specific. This finding shows that although there may not always be a default intonation pattern, there are popular patterns. Learners could adopt these as models, if they wished. The patterns need to be identified, however, and longer-term exposure to a particular dialect is a prerequisite.

We found less variation in the location of accented syllables. Within dialects, our speakers agreed on the location of nuclear accents (with a few exceptions) and we did not observe strong inter-dialect differences. Prenuclear accents were subject to higher levels of variation but since they rarely contribute to the focus structure of utterances, variation is not crucial.

Our findings add experimental support to the suprasegmental strategies for learners of English proposed by Jenkins (2000). Jenkins argues for a radical overhaul of English pronunciation teaching. Her 'Lingua Franca Core' approach focusses on mutual intelligibility between speakers of English rather than imitation of Southern British English or RP speakers. For intonation, the Lingua Franca Core includes nucleus placement: incorrect nucleus placement affects intelligibility. Pitch movement, on the other hand is excluded (Jenkins 2000: 151). The assumption is that 'mistakes' in pitch patterns are much less likely to have an effect.

Largely in accordance with Jenkins' view, we therefore suggest the following best-odds approach for learners of English:

1. It is worth learning where native speakers place nuclear accents and why. Native listeners are used to consistency in nuclear accent placement.

2. If the primary goal of teaching is to give the students the ability to reliably communicate, it is probably not worth learning many different intonation patterns. Native listeners are used to very high levels of intonational variation.

3. Advanced learners may find an awareness of popular patterns helpful. After longer-term exposure to the dialect, they may be able to identify popular patterns and adopt them for their own speech.

Finally, a comment on the role of intonation in the comprehension of utterance type. It is commonly assumed that intonation patterns can cue utterance type. Many learners are aware that in Southern British English, questions are likely to rise and statements are likely to fall. Our data show that in some instances, the correlation is not reliable. In some northern dialects, statements are as likely to rise as questions[3]. Do we need to conclude that intonation does not assist listeners in the

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[3] In the IViE sentence data, a question is more likely than a statement to end in a rise (Grabe 2002) but when faced with a falling question, statistical observations of this type are not likely to help.

comprehension of utterance types? We think not, for two reasons. First, native speakers may be aware of and use more complex correlations between intonation patterns and utterance type, correlations that go beyond a simple rise-equals-question formula. Learners may, perhaps passively, acquire similar information after longer-term exposure to a particular dialect. Second, in related research, we found that the questions and statements investigated were distinguished by a consistent prosodic feature (Grabe, Kochanski and Coleman to appear). This feature was not an intonation pattern as such. Rather, in Cambridge, Newcastle and Belfast English, *wh*-, polar and echo questions were spoken with overall higher pitch than statements, regardless of pitch patterning. This finding is in line with data from other languages. Higher pitch in questions is extremely common, in languages as diverse as Swedish, Standard Chinese and Hungarian (Bolinger 1978, Ohala 1983, Gussenhoven 2002). Consequently, many learners of English will be familiar with raised pitch in questions, whether subconsciously or consciously. Since we know that questions tend to have higher pitch in English and since the majority of learners will produce higher pitch in questions, the absence of a reliable melodic distinction between questions and statements is not likely to pose a major problem to communication. Overall higher pitch in questions may also be more readily teachable than particular intonation patterns.

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