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Donegal Irish rises – similarities and differences to rises in English varieties

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Abstract

Ulster (Donegal) Irish is strikingly different from southern varieties of Irish in having a dominance of rising tunes. In this paper we look at the prosodic characteristics (tunes and phonetic interrogativity markers) of utterance-final rising tunes in statements (ST) and questions (WHQ, YNQ) in four local varieties (RF, BF, GCC and RG) of Donegal Irish (DI), in order to shed light on possible differences and similarities to previous accounts of typically rising English varieties (Urban Northern British: Glasgow, Belfast, Liverpool). The rising tunes occurring frequently in certain UNB English varieties in the British Isles have often been attributed in the literature to a possible Irish influence. In DI and UNB English, rises constitute a standard declarative pattern unlike high-rising terminals (HRT) in a number of English varieties. Results for DI show, that declarative nuclear rises are much like DI question tunes. Prosodic sentence mode differentiation is achieved by fine-detailed phonetic features. In terms of these finer-grained phonetic measures, DI rises in statement and question tunes emerge as being overall more similar to those reported for Belfast than Glasgow English. Finally, DI rises are different in form and function to HRT rises described for Australian, New Zealand or some North American English varieties.

Index Terms: rising tunes, Irish Gaelic, cross-language rising tunes, Irish English comparison, intonation

1. Introduction

In intonational typology, rising nuclear tunes in neutral statements are considered atypical. In the literature, a link between sentence type and pitch accent type across a number of different languages (e.g. Dutch [1], Estonian [2]) has been suggested, where statements are commonly associated with falling nuclear tunes, and nuclear rising patterns are typically associated with question intonation [3-5]. In recent years, studies on within-language variation in English, however, have shown that phrase-final rises are not necessarily a universal marker for questions [6-8]. In several (Urban Northern British) varieties of English, e.g. Belfast [6, 9, 10], Glasgow [11, 12] or Leeds [13], rising nuclear tunes are a typical dialect feature and constitute standard declarative patterns. This is also the case in the northern dialect of Donegal Irish (DI), which is characterised by a sequence of rises (L*+H L*+H L*+H %) in neutral declaratives and similar features have been described for questions [14]. In the literature, there are many hypotheses concerning the possible origin of UNB rises, which to-date remain unclear. British intonation specialists have attributed their origin to a possible influence of Irish [15,16], even calling them "Irish falls" [16, p.239], but such assumptions were made in absence of virtually any formal descriptions of Irish intonation at the time. The 'Nordic prosody hypothesis" [17], on the other hand, has assumed that the UNB declarative rises could be a remanence of the Viking population in the northern areas of Ireland and Scotland. In contrast to DI and UNB rises, *uptalk* or high-rising terminals (HRT) in varieties of North American [18], Australian [19, 20] and New Zealand [21] English, are different in form and function, varying in use with gender, age and social status. There is also some variation in the description of HRTs in statements (L*+H) compared to questions (H*+H) in Australian English [20].

The Donegal Irish rising tunes then are likely to be of particular relevance and interest in relation to the rising patterns that have been attested in UNB English (Belfast, Glasgow, Leeds), and also in comparison to HRTs. In Ireland there is a general north/south divide between varieties of Irish and Irish English, where differences in the respective intonation systems (rising vs falling nuclear tunes) are one of the distinguishing features between the northern (Ulster/Donegal) and southern dialects [14, 22, 8].

In this paper we specifically look at tunes (phonological level) and defining phonetic features of statements (ST) and two question types (WHQ, YNQ) in four local varieties of Donegal Irish (see Figure 1), to provide ground for insights into the similarities and differences to the form of UNB English rises raised in the literature.

Figure 1: *Map showing the four local dialect areas (Rann na Feirste (RF), Baile na Finne (BF), Gleann Cholm Cille (GCC) and Ros Goill (RG) (green) in Co. Donegal examined in this study.*

Previous studies on sentence mode differentiation in DI have shown that the same phonetic markers are used across the three sentence modes (ST, WHQ, YNQ), regardless of tune differences [22, 23]. In this paper we revisit these findings for DI under a comparative aspect to studies on rises in English varieties. Additionally, the analysis of sub-dialect variation in DI is also particularly interesting in this context as the

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importance of including dialect variation in the investigation of intonation has been highlighted in [18], as such variation exists also in areas that have previously been described as uniform. And this is also the case for varieties of Irish.

2. Methods and materials

2.1. Materials

The data analysed in this paper are part of larger corpus collected for analysis of Irish. The utterances analysed here have also been examined in [23, 24], and partially also in [22]. The target sentences were designed in three sentence modes: statements [ST], wh-questions [WHQ] and yes/no-questions [YNQ], with varying IP-lengths (two and three stress-groups respectively), see Table 1.

Table 1. *Matched 2-accent ST, WHQ and YNQ.*

ST	Bhuail mé le Dónall. *met me with Dónall* 'I met Dónall.'
WHQ	Cár bhuail tú le Dónall? *where met you with Dónall?* 'Where did you meet Dónall?'
YNQ	Ar bhuail tú le Dónall? *q-part met you with Dónall?* 'Did you meet Dónall?'

Target sentences were embedded in a series of randomised mini-dialogues and read five times in pairs. A total of 560 tokens were collected (ST:240, WHQ:160, YNQ:160). Utterances not suitable for analysis due to the production of narrow focus or disfluencies were excluded (around 20%).
For each variety four informants were recorded, yielding a total of sixteen informants. Informants were recorded locally in the Donegal Gaeltacht, using digital recording equipment ZOOM Handy Recorder H4, and Edirol 25 USB audio interface via Audacity sound recording software [25].

2.2. Methods

As a first step in the analysis, tonal contours of each utterance type were determined by careful auditory analysis. Then, all data was analysed and annotated with Praat software [26], using IViE labelling [27]. Then, utterances were transcribed orthographically, stressed syllables were marked and tonal contours transcribed.

Secondly, four pitch points in the contour were annotated, as in [23, 24]: 2 *f0* points corresponding to the H and L targets in the phrase-initial pre-nuclear (L_{PN}, H_{PN}) and 2 in the phrase-final accent (L_N, H_N). This was done to ensure uniform treatment of all data, which consists of phrases with differing lengths (2 and 3 accent groups). The four target measurements were first converted to semitones and then served for deriving four further *f0* metrics: register span (*span*), topline declination slope (*H slope*), and scaling of the nuclear pitch accent (N excursion) and pitch slope (*f0 slope*), see Figure 2.
Declination slope values were obtained by calculating the difference between the corresponding targets in the IP-initial pre-nuclear and nuclear accent groups (H slope=H_{PN}-H_N). The global *f0* minimum and maximum were used for calculating span (M-m). These typically coincided with the L target of the nuclear accent group, and the H target of the IP-initial group, respectively. The exception was YNQ, where *f0* maximum was found in the IP-final accent group. F_0 slope was calculated as the difference between the IP-initial and the IP-final pitch points. The nuclear rise excursion (*N excursion*) was calculated as the difference between the absolute low (L) and high (H) in the IP-final accent.

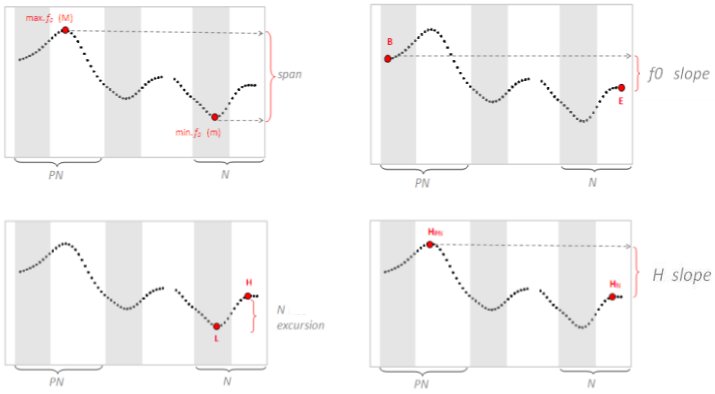

Figure 2: *Illustrations of derived metrics of phonetic features.*

3. Results

Results are presented for tune inventory analysis (Section 3.1), followed by the analysis of the specific *f0* measures (Section 3.2) across the four Donegal Irish varieties.

3.1. Tunes

The analysis of nuclear tunes (N) (see Figure 3) showed that the low rise L*+H % (navy) is the most common tune across statements (ST) and the two question types (WHQ, YNQ) in RF, BF and GCC. In RG, the rise with a falling pitch trajectory towards the IP end (L*+H L%) (green) is the overall dominant tune across the ST, WHQ and YNQ. The rise, however, is still a second choice. Rises with extra high peaks (L*+H^) (light blue) occurred in a small number of YNQ in BF, GCC and RG. Falls (H*+L) (red) were observed only in a minority of cases.

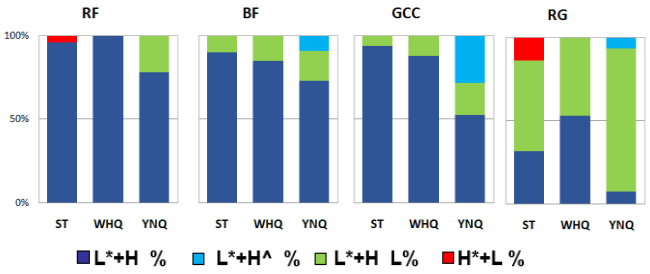

Figure 3: *Nuclear tune inventory across ST, WHQ and YNQ for the four dialects (RF, BF, GCC and RG).*

As to pre-nuclear (PN) tunes (see Figure 4), a more varied picture presents itself. Where the low rise (L*+H) (navy) is again the most common tune across the four varieties, it varies in frequency in each mode. In RG, however, it is only a second choice. In this local variety, H* (red) is the preferred PN

accent across the three modes, which is also a second choice in the other three varieties. Only minor instances of falls (H*+L) (yellow) were noted.

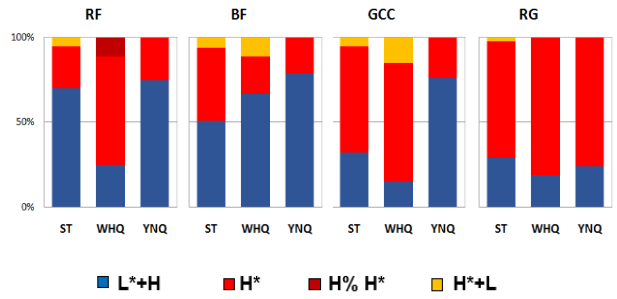

Figure 4: *Pre-nuclear (PN) tune inventory across ST, WHQ and YNQ grouped for RF, BF, GCC and RG.*

3.2. Phonetic markers

The analysis of phonetic markers across the four DI varieties showed that despite differences in preferred tonal patterns, RF, BF, GCC and RG are rather similar in the use of specific phonetic sentence mode markers, as also noted in [23, 24]. Results showed that register span (*span*) is widest in WHQ compared to ST. As to *H slope*, both WHQ and YNQ were differentiated from ST by this parameter. The significance of differences in the phonetic parameters across the four varieties was determined by a series of statistical tests [28,29]. The p-values were calculated using the method of Monte Carlo sampling by Markov chain [30]. Significance was set at pMCMC $\alpha < 0.01$. As regards the nuclear rise excursion (*N excursion*) this parameter distinguished both WHQ and YNQ from ST, see Figure 5. Across the four DI varieties, *N excursion* is significantly wider in WHQ (t=0, pMCMC=0.0001) and YNQ (t=0, pMCMC=0.0001) in comparison to ST. Whereas the varieties differ in the degree of the excursion of WHQ and YNQ, both these question types have, on average, a wider excursion than declaratives.

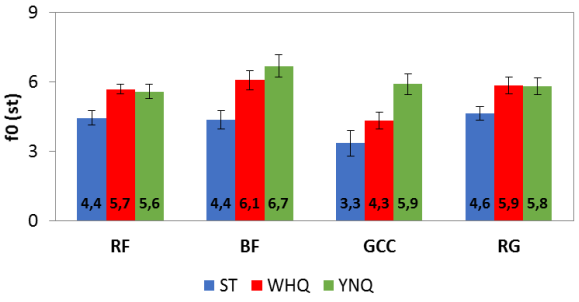

Figure 5: *Nuclear rise excursion for ST (blue), WHQ (red) and YNQ (green) grouped for each local variety on a semi-tone scale (st).*

In addition to the phonetic measures, the average scaling of IP-final low (L_N) and high (H_N) points of the rise (L*+H %) where measured for ST, WHQ and YNQ in each of the four local varieties. Figure 6 shows the boxplots for low (L_N) and high (H_N) targets of the nuclear rise L*+H in ST (blue), WHQ (red) and YNQ (green) grouped for RF, BF, GCC and RG. For each mode, the lower boxplot shows the L_N, the upper boxplot the H_N measures. The mean values are indicated as black dots. A series of one-way ANOVAs with Tukey's post-hoc tests were run for every variety to test the effect of sentence mode on each parameter. The α level was set to 0.05. Results show that across the four DI varieties, L_N is significantly higher in YNQ compared to ST and WHQ ($p<0.000$), but no significant differences emerged between ST and WHQ. As to the scaling of the nuclear peak H_N, all modes are significantly different in this parameter, which distinguishes between ST and WHQ, WHQ and YNQ, and also ST and YNQ ($p<0.000$).

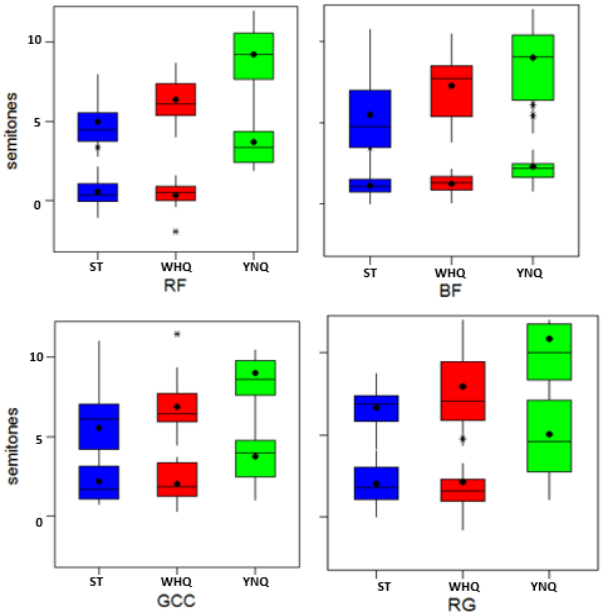

Figure 6: *Boxplots of mean IP-final L and H values of L*+H for ST (blue), WHQ (red) and YNQ (green) grouped for RF, BF, GCC and RG respectively on a semi-tone scale. Black dots inside the box plots indicate mean values. Asterisks indicate outliers.*

4. Discussion

The results from this study showed that, in terms of tunes, the low rise L*+H % is the overall preferred nuclear tune across the four local Donegal Irish varieties for both statements and questions. Where RF, BF and GCC use L*+H% across ST, WHQ and YNQ, the RG variety shows a preference for rise-falling nuclear tunes L*+H L% across the modes. Although varieties vary somewhat in the distribution of tunes in PN and N patterns, the same phonetic sentence mode markers are used to distinguish ST from WHQ and YNQ: differentiation includes a boosting of the pre-nuclear part of the phrase for WHQ and a boosting of the nucleus in YNQ.

4.1. Similarities and differences to UNB rises

The shape of the nuclear contour: In terms of declarative nuclear patterns, Belfast English (BelE) tunes have been described as rises [6] or rise-plateau-slumps [15]. Glasgow English (GlaE) nuclear tunes are described as rises [15], rise-plateau-slumps [32] and even rise-falls [11]. It is clear then, that in the literature there is considerable variation as to the concrete description of Belfast and Glasgow rises.

In DI, the typical tune associated with statements and questions is a rise, with a plateau when there is sufficient following material in the tail. The plateau slump pattern which

is described for both GlaE and BelE does not appear to be a feature of the DI dialects. Although a visible dip may appear at the very end of the f_0 trace, there is no audible slump at the end of the pitch contour. An exception to the general trend of rise/rise plateau contours in the DI dialects is presented by the RG variety, where more frequently a rise fall contour is found.

Alignment of L* and H elements: As to the precise timing of nuclear rises in UNB varieties, BelE rises are realised with L* aligned on the accented syllable, and the trailing peak H on the following unstressed material [31,32]. In GlaE, however, nuclear rises begin earlier than in BelE [31,12], with the low of the rise occurring even before the accented syllable itself, which is labelled as L*H, rather than the more "classic" L*+H, to indicate that neither tonal target is aligned within the accented syllable, see [31]. In this respect, DI rises are not at all similar to the GlaE rises. In DI declaratives as well as questions, the onset of the nuclear rise - the L* elbow - is typically aligned rather late, typically towards the right edge of the vowel of the accented syllable. The trailing peak H occurs outside of the accented syllable if following unstressed material is available (see Figure 7).

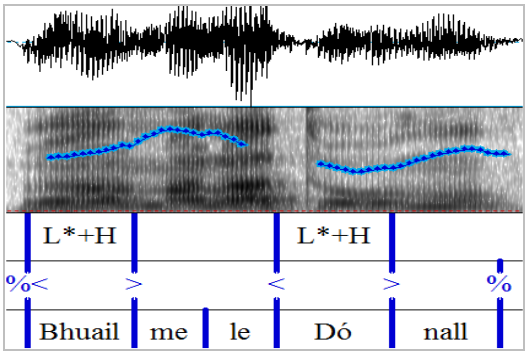

Figure 7: *A typically rising declarative Bhuail mé le Dónall /ˈwualʲ mʲe lʲə ˈdʸonʸəlʸ/* 'I met Dónall', *with two rising pitch accents L*+H L*+H % (RF variety). Panels below spectrogram: IViE transcription of tones; beginning/end (< / >) of accented syllables & boundary tones (%); orthographic transcription.*

As suggested in an earlier study on alignment in Irish dialects [33], the default 'rise-time' is two post-accented syllables, provided they are available. Shorter rises are "compressed" rather than "truncated". As to the rise-falling nuclear tunes (L*+H L%) in the RG variety, the onset of the rise is considerably earlier than in the other dialects [23] – although not as early as appears to be the case in GlaE [12,31]. Historically, there has been extensive emigration of DI speaking populations to Glasgow, and there remains an ongoing strong connection between Donegal and Glasgow. There is in fact much more contact than with Belfast, and it could have been expected that the strongest similarities would emerge here. Despite the fact that such longstanding and still ongoing contact patterns would lead to expectations of similarity, one concludes that, in terms of the timing of the nuclear contour, the rising tunes of DI are not very similar to those in GlaE, and seem to resemble rather more closely the BelE realisations.

The fine-grained phonetic measures: Looking now at the more fine-grained parameters, such as peak-scaling or nuclear rise excursion, further similarities and differences between the UNB and the DI varieties emerge. As described in [11] BelE and GlaE have consistently higher nuclear peak scaling in questions (WHQ and YNQ) than in the corresponding statements and this is also the case in the Donegal Irish varieties. BelE showed higher nuclear peak (H_N) scaling in YNQ than WHQ, but this difference did not emerge for GlaE [11]. Results from the DI varieties showed that H_N was also significantly higher for both WHQ and YNQ compared to ST. As to the scaling of the nuclear low (L_N), no systematic differences were found for GlaE or BelE between statements or questions. In the DI varieties, however, L_N was significantly raised in YNQ, compared to ST. It seems that in YNQ for DI, the entire nuclear accent is raised, rather than just the peak. In this regard, DI differs from both BelE and GlaE.

As regards the nuclear rise excursion in the DI varieties, WHQ and YNQ were significantly wider than ST. No such excursion differences between statements and questions, however, were observed in Leeds English (LeeE) [13], and this differentiates these rises from the DI ones. All in all, we can conclude that the rises found in the Donegal varieties of Irish are more similar to BelE than to either GlaE or LeeE.

4.2. Similarities and differences to HRTs

As regards tunes in high rising terminals (HRT), differences in statement (L*) and question (H*) onset have been noted in Australian English (AusE) [20]. This is not the case in the DI varieties, where the low rise L*+H is used for both statements and questions. As to boundary tones, the rises in HRTs in AusE, New Zealand (NeZE) and North American (NAmeE) English can typically reach the highest IP-final pitch point at the boundary, transcribed as H% [18,19,21]. Interestingly, a similar observation, has been made for LeeE [13].

This form of nuclear rise is not a typical pattern observed in the DI varieties, where the rise plateau L*+H % is the overall preferred tune across the three sentence modes in all varieties except for RG, where L*+H L% was more frequent. Our results show that in DI the nuclear pitch peak is realised as part of the accent rather than the boundary, which in DI is most typically 0% (or L% in RG). In this respect, DI rises are not similar to HRTs. This would also differentiate the DI patterns from those observed for LeeE [13].

5. Conclusions

This study examined tunes and fine-detailed phonetic parameters in statements and questions across four Donegal Irish varieties, to provide further insights into the similarities and differences to UNB English rises and HRTs. Despite some differences in tune preferences, the same phonetic interrogativity markers were used across all DI varieties. Results showed that DI rises are overall more similar to the rises found in Belfast than in Glasgow or Leeds. Unlike the high-rising terminals or *uptalk* in English varieties, which frequently convey semantic information such as turn taking or holding the floor, DI rises constitute standard declarative patterns.

6. Acknowledgements

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