Timing of high pitch in Munster Irish

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Abstract

A turning-point analysis of intonation in Munster Irish (Gaelic) investigated alignment between regions of increased F0 with metrically strong syllables defined by increased intensity. The data comprised recordings of story reading and retelling from 20 L1 speakers in 1928 (archived and digitised) and 14 in 2020-21, with 8487 F0 contours in total. Results show geographic and diachronic variability between speakers who achieve high pitch within +/-50ms of the strong-syllable vowel-midpoint, and those who prefer delays of 100ms or more. Greater delay characterises more conservative varieties in 1928, and this is reflected in the patterns of change between then and 2020-21.

Keywords: phonetics, prosody, turning points, bottom-up

Introduction

Munster Irish (MI) is considered prosodically distinct from the other regional macrovarieties of Irish by virtue of phonological lexical prominence (variably termed 'stress' or 'accent') occurring outside of initial position subject to weight sensitivity. This has been hypothesised to derive historically from high pitch occurring one or more syllables after lexical prominence (Blankenhorn 1981).

As part of a broader investigation of phonetic exponents of lexical and phrasal prominence, the timing relationship between metrically strong syllables and high pitch was examined. Naturalistic data from story reading and retelling by speakers of MI from two eras were collected for analysis. The Doegen Records (Royal Irish Academy 2009) provided digitised 1928 wax-cylinder recordings of 20 L1 speakers from Counties Kerry, Clare, Cork, Waterford, and Tipperary with birth years 1846-1892. Corresponding modern data (2020-21) were collected from 14 L1 speakers from the surviving Kerry, Cork, and Waterford varieties with birth years 1932-2001.

Background on Munster Irish prosody

Regarding intonation itself, previous work on MI comprises both British School descriptions and Autosegmental-Metrical (AM) approaches.

There is a general preference for falls and rise-falls described for MI varieties, generally given H*+L labels in AM work. A minority of L*+H accents have been described for Kerry and Cork, and may align with British School descriptions for Cork of high peaks systematically occurring out of phase with metrically strong syllables (Ó Cuív 1944).

Recent findings from a systematic statistical investigation in the author's PhD of prominence correlates across di- and trisyllabic words of different weight-structures, and of nonwords of controlled structure, indicate that F0- and intensity-prominence often diverge. Location of intensity-prominence generally varied as a function of weight structure, suggesting this to be a better diagnostic of lexical prominence location. Changes in F0 height were unrelated to item weight structure, consistent with proposals in the literature that in MI this is a property of phrasal prosody alone (Windsor *et al.* 2018).

Frequent occurrence of high pitch outside of metrically strong syllables is directly relevant for Blankenhorn's (1981) hypothesis of non-initial lexical prominence in MI deriving from intonational (mis)alignment. This further relates to issues of identifying the location of lexical prominence, and of the historical timeline for the purported MI system's development. For the present data, it was hypothesised that more conservative 1928 data would show more frequent late alignment of high pitch, whereas modern data with more English influence would show closer coordination between the two.

Methods

To investigate the timing relationship between hypothesised phrase-level F0 movement and lexical-level prominence, a modified form of Ahn *et al.*'s (2021) Points, Levels and Ranges (PoLaR) intonational transcription system was used. This is based on turning points (TPs) in the F0 contour, and was selected (i) for its modular nature, and (ii) to avoid prematurely attributing phonological labels (e.g. H*+L or L*+H) to contours. All annotations and extractions were carried out using Praat (Boersma & Weenink 2021).

In a PoLaR transcription, the midpoint of a metrically strong syllable's vowel is labelled with <*>, after which individual TPs in the F0 contour are identified in a separate tier. On a third tier, a local F0 range is specified in Hertz. A script is then used to automatically assign each TP a 'level' within the F0 range specified; any number of levels is possible, five – the system default – were chosen for this analysis.

Two slight modifications were made to this system to facilitate operationalisataion of annotation. First, on the basis of the aforementioned findings for lexical-level prominence, increased intensity was selected as the main criterion for identifying metrically strong syllables. Second, a maximum TP-count of 6 was set for individual contours. If a described contour was found to require more than 6 TPs for adequate definition of its shape, it either required division into two parts, or one or more TPs was superfluous. Intervals of high pitch were labelled in each contour, either as single TPs for 'sharp' peaks or as a stretch between two TPs for longer plateaux; these were either two TPs of the same PoLaR level, or within one level of each other.

Measurements for the annotated contours were extracted automatically. Each contour was then assigned to one of 7 timing categories based on where

the labelled high interval began relative to the strong-syllable vowel-midpoint: 'On-Time' (+/-10ms), and anticipations (-) or delays (+) of magnitudes 'Slight' (10-50ms), 'Moderate' (50-100ms), or 'Large' (>100ms).

Results

A total of 8487 F0 contours were transcribed and measured. The vast majority of described contours are declarative (rise-)falls, and patterning is roughly equivalent between prenuclear (non-final) and nuclear (final) position. The distribution of the contours across the seven timing categories is summarised in Tables 1-2, with colour-coding to indicate frequency of occurrence.

Table 1. Distribution of intonation contours across timing categories for the five regional varieties attested in the 1928 data (4782 contours).

		Region					Freq.
Timing		Kerry	Cork	Clare	Tipperary	Waterford	
Antic.	>100ms	3%	1%	7%	11%	8%	LEAST
	50-100ms	4%	3%	12%	8%	15%	
	10-50ms	10%	9%	23%	22%	25%	
	+/-10ms	8%	8%	14%	14%	14%	
Delay	10-50ms	15%	18%	18%	24%	19%	
	50-100ms	17%	20%	9%	15%	7%	
	>100ms	43%	40%	18%	5%	11%	MOST

Table 2. Distribution of intonation contours across timing categories for the three regional varieties attested in the 2020-21 data (3705 contours).

		Region			Freq.
Timing		Kerry	Cork	Waterford	
Antic.	>100ms	10%	18%	8%	LEAST
	50-100ms	12%	7%	14%	
	10-50ms	34%	19%	35%	
	+/-10ms	8%	7%	13%	
Delay	10-50ms	11%	8%	15%	
	50-100ms	6%	5%	6%	
	>100ms	20%	37%	9%	MOST

Two notable findings emerge. First, in the 1928 data (Table 1), there is a divide between Cork/Kerry and Waterford/Tipperary/Clare. Cork and Kerry exhibit a clear preference for large delays between strong-syllable vowels midpoints and the onset of high pitch (100ms or more). The remaining three subregions show closer coordination between high pitch and metrical strength, with most high intervals beginning within 50ms of the strong-syllable vowel midpoint. Second, the 2020-21 Cork and Kerry data (Table 2) show a change

towards the latter close-coordination tendency, while Waterford is virtually unchanged from 1928. Both Cork and Kerry retain a substantial minority of large delays, but these are now outnumbered or roughly matched by contours in the +/-50ms range.

Discussion and conclusion

Comparison of high-pitch timing in equivalent Munster Irish data from 1928 and 2020-21 shows subgrouping of regional varieties and change between eras.

I suggest that the variation evident in these findings relates to relative conservatism in these regions and eras. In 1928, Cork and Kerry supported robust Irish-speaking communities, including a limited number of remaining monolinguals. By contrast, Waterford, Clare, and Tipperary speaker-communities were already under heavy pressure from English, with only Waterford surviving into the 21st century. Meanwhile changes in the Cork and Kerry data in 2020-21 are in the latter's direction, correlating with the geographical and numerical decline of Irish as a robust community language.

Finally, I speculate that ambiguity from conservative phrase-level high-pitch misalignment has complicated identification of lexical-level prominence-location in previous accounts of MI. This calls phonological accounts of MI prominence-assignment based on traditional dialect descriptions into question. Systematic, critical examination of the phonetic basis for phonological accounts of lexical and phrasal prosody is relevant cross-linguistically beyond Irish.

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