

Dialect alignment signatures

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Abstract

This paper considers the hypothesis that dialects may have characteristic patterns in the alignment of the melodic contour with the segmental or syllabic tiers. Peak alignment was measured in initial prenuclear accented syllables for 3 dialects of Connaught Irish, Cois Fharráige, Inis-Oirr and Mayo. The size of the anacrusis varied as between two (PN2), one (PN1) and no (PN0) unstressed syllables before the accented one. Results support the hypothesis and indicate that the fine-timing of peak alignment does differ systematically among the three dialects. In the first, Cois Fharráige, peaks remain *fixed* across anacrusis conditions, being aligned to the right edge of the accented syllable. The two other dialects reveal more *variable* peak timing: Inis Oirr is *moderately variable* showing a tendency for the peak to fall within the stressed vowel, but shifting rightwards to the syllable boundary when there is no anacrusis (PN0). The Mayo dialect is *extremely variable* across the prenuclear conditions. It is argued that such fine time alignment differences may be important to the differentiation of even closely related dialects.

1. Introduction

This paper examines the hypothesis that dialects may have their own fine time-alignment properties which serve as “signatures” in cross-dialect differentiation. In an ongoing project on the Prosody of Irish Dialects [1] our first aim is to provide an account of the major structural characteristics of the main dialects of Irish and of the differences that emerge in their tonal systems. We are aware however that a structural account will not provide an adequate account of cross-dialect differentiation: dialects may share a common structure but be prosodically quite different. In the case of structurally similar dialects the linguist’s analysis often fails to capture differences that are evident to the lay person. The proposal pursued here is that the details of the realization of the structural elements are crucial to capture the layman’s intuition of difference, much as at the segmental level, cross dialect differences are typically more to do with the realization of phonemes than with structural differences. It is in this context that the time-realisation of structurally similar tones are examined here. Research by Bruce and his colleagues on varieties of Swedish [2, 3, 4] have shown that melodic alignment differences may be an important factor in dialect differentiation. Alignment differences between Northern and Southern varieties of German have also been demonstrated in [5].

The three dialects looked at in this study are all from the province of Connaught in the west of Ireland, see Figure 1. The first two, Cois Fharráige (in Connemara) and Inis Oirr (one of the Aran Islands), are geographically and linguistically very close: indeed segmental accounts tend to treat them as a single dialect [6, 7, 8]. The third dialect of

Mayo, is geographically distant, and is often thought to be more closely related to the Donegal dialect of Ulster. This is partly because of the provenance of the people, who are thought to have migrated from Donegal in Cromwellian times, partly because of the sustained contact that remained between the two regions as fishing communities, and partly because of similarities in the segmental and other aspects of the structure of Mayo Irish. Nonetheless, our account to date of the prosodic structure of Mayo Irish has suggested that it belongs structurally to the Connaught group [9], forming a single broad grouping with the South-Connaught dialects.

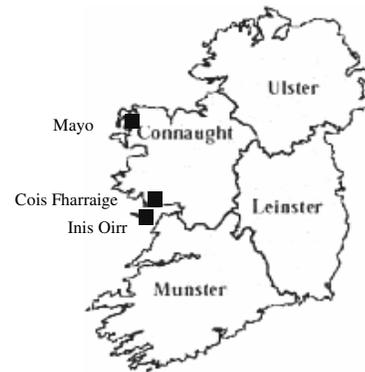


Figure 1: Map outlining the Gaeltacht areas of this study

Declarative sentences in these dialects are characterised by predominantly H*+L nuclear pitch accents and the dominant boundary tone is 0%. Prenuclear accents are typically sequences of H* or H*+L. The accent types which are the focus of this study are initial H* prenuclear accents in declaratives.

This study is an extension of an earlier pilot investigations of this theme, reported in [10]. In that study, two closely related dialects of Connemara Irish, Cois Fharráige and Inis Oirr were looked at to ascertain the timing characteristics of nuclear and initial prenuclear peaks, when the number of unstressed syllables following (the nuclear accent) or preceding the prenuclear peak was varied. Results suggested that there was a fundamental difference, as between *fixed* or *variable* realizations. Peaks in the Cois Fharráige dialect were strikingly *fixed* and peaks in the dialect of Inis Oirr were more *variable* across the conditions looked at. In that earlier study however, a difficulty arose in that the materials examined were non-optimal. In particular, the syllable chosen for the test materials had onset and coda stops, which although phonologically “voiced”, turned out to be fully

devoiced for both dialects. This made it difficult to ascertain with a high degree of precision where precisely the peaks fell.

2. Methods and Materials

The analysis was carried out within the framework of autosegmental-metrical phonology, using the IViE labeling system [11]. For transcription and annotation the PRAAT shareware [12] which provides acoustic displays of f0, with time-aligned labelling fields has been employed. Two speakers were recorded and analyzed for each of the Connaught dialects shown in Figure 1. The speakers were all between aged 28-60 years of age, and came from similar social backgrounds. None of the informants were professional speakers (actors, radio announcers etc.).

2.1. Materials

The test sentences for this analysis designed to elicit the stressed syllable /m^v ɪ ʌ/, /m^l ɪ ʌ/ or /v^l ɪ ʌ/ in initial pre-nuclear (PN) positions. The size of the anacrusis was varied from two (PN2), to one (PN1) to no (PN0) unstressed syllables. Randomized lists containing 8 repetitions of each sentence were recorded by each speaker. 5 representative utterances were chosen from the 8, which allowed for occasional errors, hesitations etc. Results presented here are thus for a total 30 utterances per dialect. The set of test sentences is illustrated in Table 1.

Table 1. *Test sentences elicited. PN = pre-nuclear. Numbers 0, 1, 2 indicate the number of unstressed syllables preceding the pre-nuclear accent. The initial pre-nuclear accented syllable is shown in bold.*

<u>Initial Pre-nuclear position</u>	
PN0	M illeann an bhean na madaf sa mbaile The woman spoils the dogs at home
PN1	Ní mh illeann muid ar na buachaillí é. We don't waste it on the boys
PN2	B'ag an mu ileann a casadh ar a chéile muid. We met each other at the mill

2.2. Measurements

For initial pre-nuclear accents the segments of the accented syllable as well as the preceding and following unstressed syllables were segmented. The duration of each segment was then measured and averaged. Three points in the contour were then labeled: (1) H* = the peak; (2) (H*)p = the end of the high plateau in the initial pre-nuclear accent; (3) l(H*) = the f0 minimum which precedes the H*. The f0 values at these timepoints were measured and averaged. The time location of these points were also measured relative to the nearest segmental boundary. The labels for the measured timepoints are shown schematically in Figure 2.

Prenuclear accent timepoints

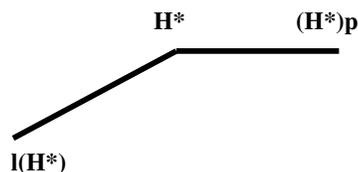


Figure 2: *Schematic illustration of the labels associated with the points measured for initial pre-nuclear accents.*

3. Results

The results for each dialect are shown in Figures 3, 4, and 5 below. In each of these figures the average values for the measured timepoints are shown in semitones, and located relative to the segmental string, shown in ms. In these data, the location of the pre-nuclear peak emerged as having distinctly different patterns for the three dialects. It should be noted that the pattern within each dialect showed little inter- and intrapersonal variation.

3.1. Cois Fharraige

For this dialect the peak was remarkably *fixed* across the three conditions of anacrusis size. It is clear in Figure 3 that the peak is in all cases associated with the right edge of the accented syllable. It should be noted that in De Bhaldraithe's [13] account of the Irish of Cois Fharraige, the syllable boundary for syllables such as the accented pre-nuclear syllables of this study (where the vowel is short) is after the intervocalic consonant.

This study clarified a question remaining in the early study [10] concerning the precise location of the peak. Because of the devoiced coda consonants, it was unclear in that study whether the peak was associated with the syllable boundary, or might occur at an earlier point in the coda consonant. The present results unambiguously show that the association is with the syllable boundary.

3.2. Inis-Oirr

The peak location in the Inis-Oirr dialect was more variable. As can be seen in Figure 4 the peak does not vary as between PN2 and PN1, where it is located early in the accented vowel. However in PN0, where there is no unstressed material preceding the pre-nuclear accent, the peak shifts rightwards, being located at the syllable boundary. The shift in peak for PN0 we would interpret as being probably due to "realisational pressure", and we would suggest that otherwise the default location is likely to be as evidenced in PN1 and PN2 – within the accented vowel.

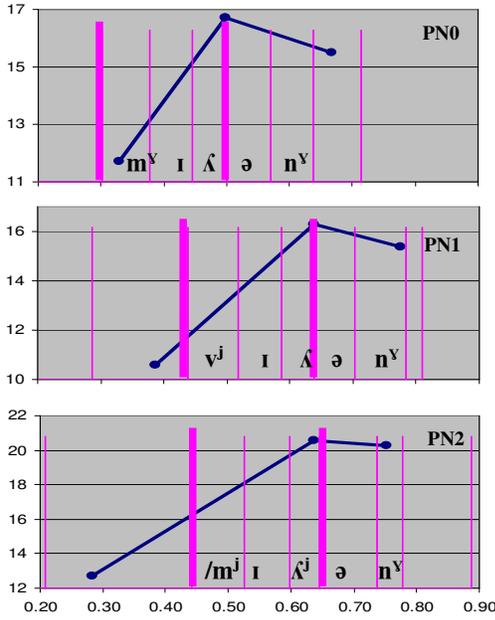


Figure 3. Tonal contours for prenuclear accents in Cois Fharráige with semitones on y-axis and x-axis in ms. PN0= no anacrusis, PN1= anacrusis of one, PN2= anacrusis of two.

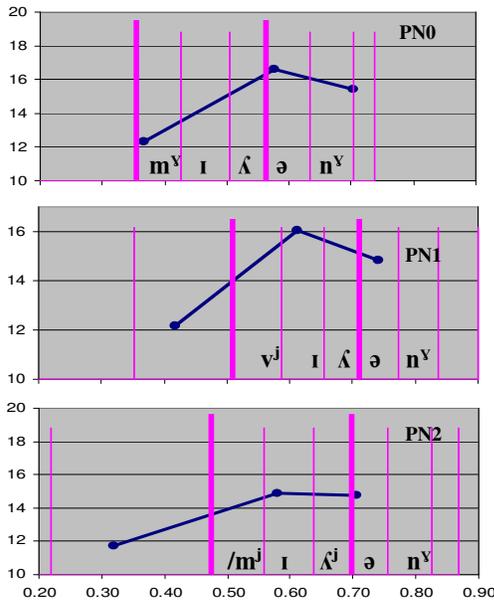


Figure 4. Tonal contours for prenuclear accents in Inis Oírr with semitones on y-axis and x-axis in ms. PN0= no anacrusis, PN1= anacrusis of one, PN2= anacrusis of two.

3.3. Mayo

This dialect emerged as having a highly variable peak location. As seen in Figure 5, while in PN1 the peak is located within the vowel of the accented syllable much as for Inis Oírr, in the two other conditions, the peak shifts from the accented syllable to adjacent unstressed syllables. In the case of PN0, the peak falls at about the end of the unstressed syllable following the accented one. In the case of PN2, the peak is associated with the preaccented unstressed syllable.

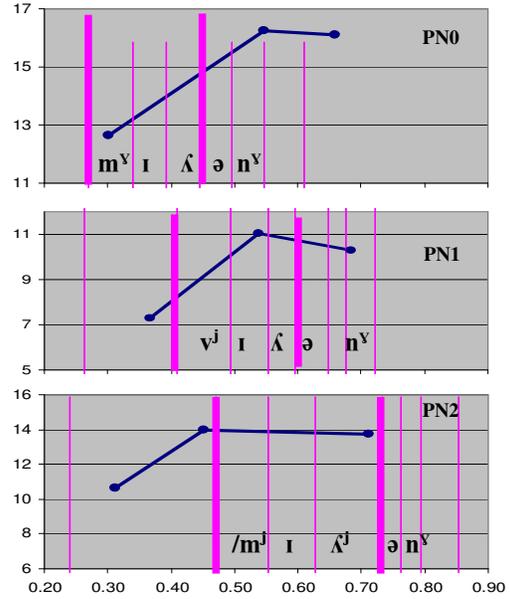


Figure 5. Tonal contours for prenuclear accents in Mayo with semitones on y-axis and x-axis in ms. PN0= no anacrusis, PN1= anacrusis of one, PN2= anacrusis of two.

4. Discussion

Analysis of further subjects and materials from each of these dialects will be needed to ensure that these findings are robust. Nonetheless, these data do strongly suggest that each of these three dialects has its own specific realization pattern for these initial prenuclear peaks. The schematized representation in Figure 6 compares results for the three dialects, showing the location of peaks relative to the accented syllable. The peak in Cois Fharráige is strikingly fixed, being aligned to the right edge of the accented syllable. In the closely related dialect of Inis Oírr the peak location is more variable and is affected by the number of unstressed syllables preceding the accented syllable. It appears nonetheless to be mainly associated with the stressed vowel, shifting (we would argue) under realisation pressures in PN0. The Mayo dialect exhibits the most extreme variability: across the three conditions looked at, the peak drifts from the preaccented syllable (in PN2), to the accented syllable (in PN1), to the postaccented syllable or beyond (in PN0).

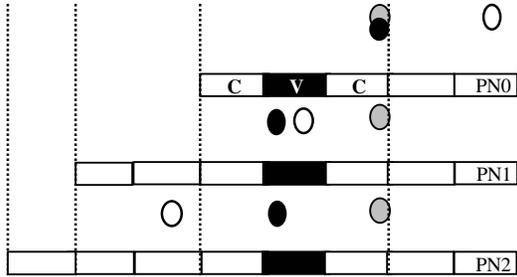


Figure 6: Schematic representation of peak locations in three prenuclear conditions for ○CF-C, ●IO-C and ○M-C. The dotted vertical line represents syllable boundaries, the white rectangles represent the segments and the dark rectangle represents the accented vowel.

These results support our initial hypothesis that each of these dialects has its own alignment “signature”. They further highlight the need for cross-dialect analysis to include this kind of fine-grained level of description, if we are to capture the features of dialect differentiation. This raises questions as to the extent to which these fine-grained alignment differences are utilized by listeners to localize accents and dialects with which they are familiar. This would be worth pursuing with a perceptual study.

It goes without saying that peak alignment is likely to be one of many phonetic features which may differentiate the prosody of dialects. Other features such as the dynamic range and scaling may be important. Informally, the data we have looked at so far suggest that a greater internal dynamic variation of pitch may characterize the Mayo dialect, relative to the other two Connaught dialects looked at here. We are also of the view that a number of other prosodic dimensions are also likely to be important, including temporal and rhythmic factors as well as features of voice quality.

5. Conclusions

In this pilot analysis of initial prenuclear peaks in three Connaught dialects of Irish, results support the hypothesis that individual dialects are likely to have characteristic alignment patterns, which serve as prosodic “signatures”.

6. References

- [1] Ní Chasaide, A., 2003-2006. *Prosody of Irish Dialects: the use of intonation, rhythm, voice quality for linguistic and paralinguistic signaling*. IRCHSS-funded project. www.tcd.ie/CLCS/phonetics/projects/prosody.html
- [2] Bruce G. 1977. *Swedish word accents in sentence perspective*. Lund: CWK Gleerup.
- [3] Bruce, G., & Gårding, E. 1978. A prosodic typology for Swedish dialects. In E. Gårding, G. Bruce and R. Bannert (Eds.), *Nordic Prosody*, 219-228. Lund University, Department of Linguistics.

- [4] Bruce, G., & Thelander, I. 2001. A pitch accent journey in southern Swedish. In *Working Papers*, 49, 18-21. Lund University, Department of Linguistics.
- [5] Atterer, M. and Ladd, D. R., 2004. On the phonetics and phonology of “segmental anchoring” of F0: evidence from German. *Journal of Phonetics* 32: 177-197.
- [6] Ó Murchú, S., 1991. Nótaí canúna ó Árainn, Co. na Gaillimhe. *Éigse* 25: 95-101.
- [7] Ó Murchú, S., 1998. *An Teanga Bheo: Gaeilge Chonamara*. Dublin: Institiúid Teangeolaíochta Éireann.
- [8] Ó Dochartaigh, L., 1973. “Muinn” in Árainn, Co. na Gaillimhe. *Éigse* 15: 124-5.
- [9] Dalton, M. and Ní Chasaide, A. (to appear). Tonal Alignment in Irish Dialects. *Language and Speech: Special issue on intonation in language varieties*. Kingston Press.
- [10] Dalton, M. and Ní Chasaide, A. (to appear). Melodic Alignment and Micro-Dialect Variation in Connaught Irish. In *Tones and Tunes: Studies in Word and Sentence Prosody*, edited by Gussenhoven, C. & Riad, T. Berlin: Mouton de Gruyter. To appear in the Series in Phonetics and Phonology, edited by Aditi Lahiri.
- [11] Grabe, E., Nolan, F., & Farrar, K., 1998. IViE - A comparative transcription system for intonational variation in English. *Proceedings of the 5th International Conference on Spoken Language Processing*, 1259-1262. Sydney, 1998.
- [12] Boersma, P., & Weenik, D., 2005. Praat: doing phonetics by computer [Computer program]. www.praat.org/
- [13] De Bhaldraithe, T., 1945. *The Irish of Cois Fhairrge, Co. Galway*. Dublin Institute for Advanced Studies.

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