Shifting the blame: An instrumental re-evaluation of stress-shift in Munster Irish

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Munster Irish (MI) is noted for its apparently weight-sensitive lexical stress, which diverges from the simple initial stress of other Irish varieties. A ternary weight-hierarchy and conflicting head-directionality have attracted attention in the phonological literature. Formal and instrumental analyses [1,2,3,4,5,6] have uncritically assumed 20th century descriptions of MI stress location [7,8], comprising L2 Irish scholars' personal impressions. Reliability of such descriptions cross-linguistically is increasingly in question, given ambiguity in terminology, personal usage-preferences, and perceptual biases [9]. Investigation of 1928 recordings of MI speakers [10] suggested 'stress-shift' was not uniformly present, even in straightforward, prototypical cases such as light-heavy disyllables, with diverging pitch and intensity prominences frequently emerging. Further, the productivity of weight-based stress assignment in contemporary MI has been called into question by data on nonword production [11].

On this basis, the relationship between prosodic parameters and syllable position was examined statistically – independent of assumptions around stress-location – using story (re)tellings from 1928 (22 speakers) and the present day (14 speakers). All recordings comprised story readings or retellings. Initial analysis has been restricted to disyllables (4,109 from 1928, 3,739 from 2021). 8 of 9 possible weight-type pairings were represented, with light-light predominating due to frequency in the lexicon. Syllables were labelled in Praat and measured for F0 (Hz) and intensity (dB). Measures were standardised (z-scored) by speaker.

Two binomial logistic regressions were fitted in R using Bayesian methods [14,15], which allow for greater inferential flexibility and more lenient model convergence than frequentist equivalents. Maximum intensity and pitch mean and range, plus their respective interactions, were used as predictors of syllable position. Duration was excluded due to its robust contrastive status. The model was supplied with weakly informative, normally distributed priors. Random slopes were specified by item weight structure and speaker for the three basic measures. Each model used 4 chains of 2000 iterations with a 1,000-iteration warm-up. Trace plots and R-hat values indicated satisfactory convergence. Specific estimates and 95% credible intervals (CIs) are reported in Figures 1-2 below.

Results for the two models diverge notably, unsurprising in light of the social and linguistic changes undergone by Irish-speaking communities over the 20th century. For the 1928 data, the intercept is neutral; syllables with increased F0 activity are more likely to be final, while increased intensity favours initial syllables. Mean and range of F0 in interaction with maximum intensity favour final and initial syllables, respectively. This may reflect the difference between F0 excursion en route to a high target, and the location of the high target itself. For the 2021 data, however, the intercept is dramatically lower, suggesting a general initial-syllable preference for prosodic prominence(s). Increased F0 range only further decreases log-likelihood of a syllable being final; all other population-level CIs overlap substantially with 0.

Given the non-contrastive nature of stress in Irish, and the complexity and historical obscurity of the alleged MI stress-shift, these preliminary results suggest that the status of this historical change should be treated with caution. Further, the clear disparity between equivalent data from 1928 and 2021 indicate that it is unreliable to use modern data as implicitly compatible with generations-old impressionistic descriptions. This is relevant beyond Irish as a contribution to the growing body of evidence against 'stress' as an opaque, universal, and pre-theoretical gestalt (as opposed to prominence at various levels), and against uncritical reliance on traditional descriptions of stress location and status. Within Irish-specific research, I contend that it is necessary to re-evaluate the validity of basic featural descriptions before prematurely building formal accounts of processes such as stress-assignment.

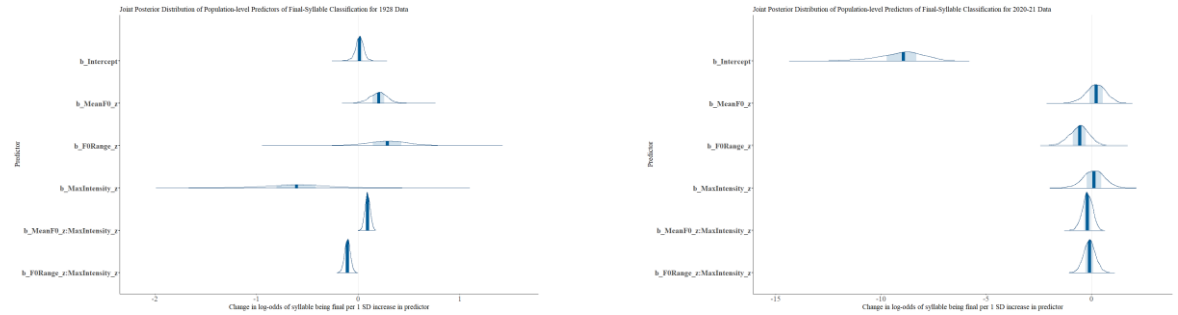

Fig. 1 Joint posterior distribution of population-level effects for models of 1928 data (left) and 2021 data (right), showing 95% credible intervals as density plots.

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Group-Level Effects:
~Speaker (Number of levels: 22)
                Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
sd(Intercept)       0.02      0.02     0.00     0.06 1.00     3176     1675
sd(MeanF0_z)        0.26      0.05     0.17     0.38 1.00     1609     2863
sd(F0Range_z)       0.21      0.05     0.12     0.32 1.00     1534     2451
sd(MaxIntensity_z)  0.32      0.06     0.22     0.47 1.00     1417     2331

~WeightStructure (Number of levels: 9)
                Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
sd(Intercept)       0.05      0.05     0.00     0.19 1.00     1804     2219
sd(MeanF0_z)        0.13      0.09     0.03     0.37 1.00     1446     1213
sd(F0Range_z)       0.56      0.21     0.29     1.10 1.00     1834     2203
sd(MaxIntensity_z)  0.85      0.30     0.43     1.57 1.00     1646     1899

Population-Level Effects:
                      Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
Intercept                 0.01      0.04    -0.08     0.10 1.00     3187     2140
MeanF0_z                  0.20      0.09     0.01     0.38 1.00     1807     1927
F0Range_z                 0.28      0.23    -0.21     0.72 1.00     1577     1895
MaxIntensity_z           -0.61      0.32    -1.28     0.03 1.00     1425     1792
MeanF0_z:MaxIntensity_z   0.09      0.03     0.04     0.14 1.00     6474     3063
F0Range_z:MaxIntensity_z -0.11      0.03    -0.16    -0.05 1.00     8276     3138
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Group-Level Effects:
~Speaker (Number of levels: 14)
                Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
sd(Intercept)       1.59      0.58     0.51     2.81 1.00     1882     1050
sd(MeanF0_z)        0.69      0.39     0.04     1.53 1.00     1312     1735
sd(F0Range_z)       0.34      0.28     0.01     1.05 1.00     2553     1515
sd(MaxIntensity_z)  0.83      0.41     0.10     1.69 1.00     1441     1001

~WeightStructure (Number of levels: 8)
                Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
sd(Intercept)       0.54      0.43     0.02     1.61 1.00     2624     1782
sd(MeanF0_z)        0.67      0.42     0.04     1.62 1.00     1895     1488
sd(F0Range_z)       0.48      0.39     0.02     1.45 1.00     2430     1853
sd(MaxIntensity_z)  0.69      0.46     0.03     1.72 1.00     1684     1289

Population-Level Effects:
                      Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
Intercept                -9.06      1.11   -11.53    -7.21 1.00     2429     2472
MeanF0_z                  0.22      0.49    -0.80     1.13 1.00     3007     2882
F0Range_z                -0.58      0.47    -1.52     0.31 1.00     4118     3163
MaxIntensity_z            0.12      0.52    -0.93     1.13 1.00     3502     3314
MeanF0_z:MaxIntensity_z  -0.19      0.24    -0.69     0.27 1.00     3674     3053
F0Range_z:MaxIntensity_z -0.09      0.28    -0.62     0.47 1.00     4058     3250
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Fig. 2 Summary of group- and population-level effects for 1928 (left) and 2021 models (right)

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