

Delocalised cues for stress and the importance of the foot

While analysing instrumentally the acoustic correlates of primary and non-primary stress in English, using a collection of units – words, compounds and fixed phrases displaying complex prosodic patterns, extracted from a large corpus of recorded samples of British and American English (Gąsiorowski et al. [forthcoming]) – we came across a conundrum. Although listeners agreed about the impressionistic identification of non-primary stresses and their relative strength in multiply stressed words (one particular environment we focused on was Iambic Reversal), we found that the acoustic cues generally believed to correlate with prosodic strength (in particular, pitch level, duration and intensity) did not reliably discriminate between syllables carrying different degrees of non-primary stress. Vowel quality allows one to distinguish stressed syllables from entirely unstressed ones. The nuclear tone of an intonational unit marks out the primary stress of the word in focus position (“accented” in terms of the model advocated by Plag et al. 2011). In other (“unaccented”) positions, however, degrees of prominence do not seem to differ systematically in terms of fundamental frequency (f_0), vowel duration or intensity. We shall present original evidence suggesting that they can nevertheless be distinguished in terms of more dynamic f_0 changes and a greater peak–valley interval in the pitch track, provided that f_0 is traced across a domain larger than the stressed syllable (corresponding to the stress foot as defined in metrical phonology). For example, if the stressed syllable is pronounced with a low rising tone, the rise may reach its peak on the following unstressed syllable, and f_0 may then fall rapidly before the foot-final boundary – a behaviour traditionally believed to occur in stressed syllables.

We conclude that intonation (frequency modulation rather than mere pitch prominence) is the single most important cue for different levels of stress in English. Intonational movement is not confined to the stressed syllable but forms a contour that spans the entire foot. Stress perception depends on its being processed as a whole. This delocalised realisation of stress must be considered “syntagmatic” rather than “paradigmatic”. Despite the obvious differences, such a use of prosodic cues is reminiscent of what has been observed for example in Welsh, where the main pitch movement in words with penultimate stress is realised on the unstressed final syllable rather than the stressed one (Williams 1985). Also other prosodic phenomena, such as the pitch-accent contrast (acute vs. grave) in Central Swedish, clearly require a domain larger than a syllable for their realisation (Riad 2012). Our findings emphasise the importance of the foot as a prosodic entity. It is not only a unit of rhythmic organisation (at least in typical stress-timed languages) but also the domain of suprasegmental features crucial for the recognition of stress levels.

Key words: stress, prosody, frequency modulation, metrical foot

References

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