

English Rhythm: An Articulatory Account

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According to the CD Model [1], “rhythm” of an utterance, including phrase boundary information, can be determined algorithmically from a pertinent articulatory description. Syllable strength is determined by the magnitude of jaw opening, depicted as syllable pulses, whose height varies with the amount of jaw displacement, after removing the component due to inherent value of vocalic jaw opening. The timing estimate for onset and coda can be obtained from the pertinent crucial articulator's crossing of a fixed threshold value of an appropriate flesh point height, in the case of an obstruent consonant. Triangles with constant angles are drawn with their apices at the top of each syllable pulse, with the resulting gaps between consecutive syllables representing phonetic phrase boundaries. Crucial articulator is defined as an obstruent's moving articulator that corresponds to phonological place. The algorithms are described in detail in [2,3,4].

This paper reports on jaw displacement and corresponding formant frequencies of monosyllabic American English words produced on low vowels, specifically, on the changes in these measurements for the four words in the middle phrase of the utterance as the location of contrastive emphasis changes within the phrase. The findings are (1) alternation of strong-weak syllables (in terms of amount of jaw displacement & differences in F2 minus F1) independent of emphasis location and (2) articulatorily-derived quantities of phrase boundaries. Implications of these findings to an understanding of English metrical structure are discussed.

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