

Title: An experimental investigation of Abercrombian feet in American English

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The metrical structure of English has been approached theoretically in terms of feet, i.e. structural units consisting of sequences of strong and weak syllables. Several different types of feet have been proposed, including the within-word foot (e.g. Liberman & Prince 1977, Halle and Vergnaud 1987) and the Abercrombian cross-word-boundary foot (Abercrombie 1965, 1973). Liberman and Prince's within-word foot divides a lexical word into units that consist of a lexically-stressed syllable followed by up to 2 weak syllables, as in [*down-* [*town*, [*Massa-* [*chusetts*, or [*elephan-* [*tiasis*. Abercrombie's proposal, based on the view that English is a stress-timed language (Steele 1775, Pike 1959 etc.), defines the foot as a unit that normally extends from one stress to just before the next one. The cross-word-boundary foot can thus incorporate fragments of separate words, as in his example [*Know then thy-* [*-self*, *pre-* [*-sume not* [*God to* [*scan...* Abercrombie's foot is defined not in terms of lexical stresses (which he calls accents), but in terms of utterance-specific stresses, which can either be overt or "silent"; overt stresses are often accompanied by increased activity of the respiratory muscles (Ladefoged 1980). We assume, based on examples like the one above, that Abercrombie's overt stresses often correspond to phrasally-stressed pitch accented syllables, and that an Abercrombian stress need not co-occur with every primary lexical stress.

Because the Abercrombian foot can combine fragments of adjacent lexical words, it cannot occur in strictly layered prosodic hierarchies that include the (prosodic) Word. Thus, to maintain a single strictly-layered Prosodic Hierarchy, one must abandon either the Word or the Abercrombian foot. Phonetic evidence suggests that the (prosodic) Word should be included in prosodic hierarchies that determine durational properties of speech (Turk & White 1999, Turk & Shattuck-Hufnagel 2000), because it is relevant for determining shorter durations in words with more vs. fewer syllables (polysyllabic shortening). In this study, we ask whether there is also evidence for the Abercrombian foot, using two kinds of phonetic measures: polysyllabic shortening, and boundary-related phenomena such as pausing and glottalisation at vowel onset. Materials included the following, where proposed Abercrombian foot boundaries are indicated with vertical slashes.

Verb+ing: e.g. |*baking* |*apples*

Verb+direct-object-pronoun: e.g. |*bake us* |*apples*

Verb+article: e.g. |*bake an* |*apple*

Verb+content-word: e.g. |*bake* |*apples*, |*bake e-*|*lixirs*, |*bake avo-*|*cados*

In contrast to other constituents, Abercrombian feet predict a) polysyllabic shortening of e.g. *bake* in |*bake e-* |*lixirs* and |*bake avo-* |*cados* compared to in |*bake* |*apples*, and b) an absence of boundary-related cues (e.g. pausing or glottalization) at the vowel onsets of *elixirs* and *avocados*.

Ten such sets of verb+vowel-onset-word tokens were produced as the 4th line of a limerick by 10 AmerEnglish speakers, and the digitized speech signals were analysed by hand for duration of the vowel in the verb and presence/absence of pause and glottalization, using Praat software. Preliminary evidence for 3 speakers suggests that 2 of them demonstrate no reliable shortening consistent with the Abercrombian foot (e.g. *-ake* shorter in |*bake avo-*|*cados* and |*bake e-* |*lixirs* than in |*bake* |*apples*). The shorter durations in *bake avocados* for the 3rd speaker, while consistent with Abercrombian feet, may also be consistent with polysyllabic shortening in a multi-content-word constituent, such as a verb phrase. Similarly, boundary cues examined for 2 speakers indicated a tight link between verb+ing, verb+us and verb+an (70-100% of tokens had no boundary cues), with verb+content-word sequences such as *bake avocados* and *bake elixirs* less tightly bound (0-30% no boundary cues). These results support the view that speakers have options for where to make the duration adjustments required to maintain the regular rhythm of the limerick, and that in some cases the option they choose is consistent with Abercrombian foot structure (although possibly also consistent with other structures). Ongoing work analyses the remaining speakers' data, more subtle syntactically-driven differences between *bake us* and *bake an*, and simultaneously recorded non-limerick sentence forms; results will be discussed in terms of how both word-constrained and non-word-constrained metrical units can function in a model of speech production.

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