Polish rhythmic stress revisited: phonetic evidence of an iterative system
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The lower-level stress pattern in Polish has been considered a classic example of a bidirectional system with internal lapses, e.g. prenumera 'subscription' – przenierówania 'subscribed' nom.sg. – przenierowego 'subscribed' gen.sg. It was classified as such both in traditional descriptions and theoretically-oriented analyses (Dłuska 1932, 1974; Halle & Vergnaud 1984; Rubach & Booij 1985; Franks 1985; Hammond 1989; Kraska-Szlenk 2003). However, the iterative nature of Polish stress was questioned in Newlin-Łukowicz’s (2012) acoustic study, in which only one level of prominence (main stress on the penult) was detected. The main argument was the apparent absence of clear acoustic markers of tertiary stress in six-syllable words. This conclusion has far reaching typological and theoretical implications. It puts into question the existence of bidirectional systems as such and the adequacy of phonological tools designed to account for such systems.

There are important reasons why the validity of the above-mentioned results can be doubted. First, although linguistic stress is a relative category, the statistics were based on absolute measures of acoustic parameters (f0, intensity, and duration, with f0 and intensity values expressed on a logarithmic scale, in semi-tones and decibels, respectively). Second, focusing on vowel parameters might have hindered detection of a pattern which, according to an early empirical study of Dłuska (1932), hinges mostly on onset consonant duration. Third, the Polish rhythmic pattern is described as optional, which, if combined with the problems mentioned above, makes its detection even less probable.

This paper reports on a study of paired five- and six-syllable words (e.g. pomidorowy ‘tomato’ Adj. nom. sg. – pomidorowego ‘tomato’ Adj. gen. sg.). The results indicate that the words differ significantly with respect to relative consonant duration (expressed as the PVI measure; e.g. Low et al. 2000; Ballard et al. 2010, 2012; Arciuli et al. 2014) in the onset of the third syllable, depending on whether the syllable bears the tertiary degree of prominence (as in six-syllable words) or remains unstressed (as in five-syllable words). A paired t-test conducted on 332 pairs of tokens (34 pairs of words read by 10 speakers; 8 pairs of tokens rejected) confirms that the consonant is significantly longer with respect to the preceding vowel in six-syllable words; t(331)=14.67, p<0.00001. The reported difference in PVI averages of the two groups is 18.89. This relative lengthening is often, but not always, a combined effect of lengthening of the consonant and shortening of the preceding vowel. Importantly, no such effect is detected in the onset of the second syllable which remains constantly unstressed. Thus, I conclude that Polish has iterative stress, with the third degree of prominence manifested acoustically by a decreased PVI measure in the heterosyllabic -V.C- sequence. Therefore, bidirectional systems exist and are not illusory. The implication for phonological theory is clear: the analysis in terms of the undominated *FtFt constraint, proposed in Newlin-Łukowicz’s study, loses empirical support. Needless to say, a more complete acoustic description of the lower degrees of stress in Polish and other bidirectional systems is still in order.
References