

Effects of Acoustic Parameters on Perception of Lexical Pitch Accents

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Previous research has revealed that some of the most robust acoustic parameters used to contrast pitch accent categories are F0 alignment, F0 height, shape, and tonal onglide (D'Imperio 2011, Grice et al. 2017). While most studies have addressed the effects of F0 acoustic parameters on the perception of *post-lexical* pitch accents, there have been no studies dealing with the effects of these acoustic parameters on the perception of *lexical* pitch accents. This study aimed to fill this gap by investigating whether F0 alignment and F0 height, two strong acoustic parameters (Grice et al. 2017), affect the perception of lexical pitch accents, i.e. whether these two could be robust acoustic correlates of lexical pitch accents.

The present study explored whether speakers of English, Mandarin, and Persian could contrast Serbian lexical pitch accents by relying on F0 alignment and F0 height. These four languages were selected as they had distinct word-prosodic systems, inter alia (Hyman 2006, 2009). To that end, participants carried out an AX discrimination task in PsychoPy (Pierce et al. 2019) on spoken sentences recorded by two Serbian speakers. Each sentence contained a target lexical item that was uttered in either an H*+L or L*+H Serbian pitch accent (Godjevac 2005). By manipulating pitch in Praat (Boersma & Weenink 2017), four versions of the target lexical items were created following the procedure in Grice et al. (2017). In order to generate contrasts between lexical pitch accents, the created versions included different levels of modification of F0 alignment and F0 height. Out of these four versions, the first was the original (unmanipulated) recording, the second included the F0 alignment modification, the third was composed of the F0 height increase, and the fourth one included the manipulation of F0 alignment and height in tandem. Pairwise combinations of these versions yielded ten (10) conditions in total.

The data were analyzed by using the Generalized Estimating Equation (GEE) models (Liang & Zeger 1986) in RStudio (RStudioTeam 2015), and the results revealed that the acoustic parameters, F0 alignment and F0 height, significantly influenced the perception of Serbian lexical pitch accent categories. These two acoustic parameters were reliable predictors of accuracy scores ($\chi^2(9) = 123, p < .001$), and reaction times ($\chi^2(9) = 148, p < .001$), which was in line with Grice et al.'s (2017) experiment results. The findings also showed that English and Mandarin speakers did not significantly differ ($B = 0.874, SE = 0.261, z = -0.45, p = 0.65$). However, these two groups of speakers performed significantly better on the task than Persian speakers ($B = 1.767, SE = 0.306, z = 3.29, p = 0.01$; $B = 0.424, SE = 0.125, z = 2.910, p = 0.004$, respectively). This finding was attributed to the fact that the given F0 acoustic parameters were strong correlates of pitch accents in English (Grice et al. 2017) and tones in Mandarin (Gandour 1983). Since duration was considered a robust acoustic cue of stress and pitch accents in Persian (Sadeghi 2011), it was hypothesized that Persian listeners focused on duration rather than the given parameters – F0 alignment and F0 height, which, in turn, resulted in their inability to reliably discriminate between Serbian lexical pitch accents.

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