

Phonetic Differences Between Pre-nuclear and Nuclear Accents in Persian

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It has been known that in Languages like English, when there are multiple accents in an utterance, the final accent is perceived more prominently than the non-final ones. Bolinger (1986:58) argues the intuition that the final accent is the most prominent one is nothing but an illusion. Ladd (1996: 267) also maintains that there is no clear phonetic justification for treating the last accent in a sentence as the most prominent one. These perspectives regard the final accents to be perceived more prominently, only because they are not followed by any audible prominence in the utterance. On the other hand, Silverman and Pierrehumbert (1990) report that in English, non-final peaks often occur after the syllable with which they are intuitively associated.

This study investigates the phonetic differences between non-final (pre-nuclear) and final (nuclear) accents in Persian, by conducting production and perception experiments. Production experiments measure and compare the acoustic parameters such as f_0 , duration, overall intensity, spectral balance and vowel quality in nuclear accented and pre-nuclear accented words, by analyzing non-words uttered by native speakers. In perception experiments, manipulated stimuli are used to examine how much manipulation of which acoustic parameters can render a nuclear accented word to be perceived as a pre-nuclear accented one by native listeners.

The production experiments revealed that the f_0 peak on the syllables which are associated with a nuclear accent tends to occur at the middle of the syllable, while the f_0 peak on the syllables associated with a pre-nuclear accent tends to occur at the right edge of the syllable. This difference between the shapes of the pitch curves can be regarded as a consequence of f_0 peak delays in pre-nuclear accents. Production experiments also showed that syllables associated with a nuclear accent are significantly longer than the syllables associated with a pre-nuclear one.

The results of the Perception experiments revealed that Persian listeners can distinguish the two types of accent, without having access to the portion of the utterance that occurs after the accented word. This proves that there are phonetic differences between the two types of accents that can help the listeners distinguish them from each other. It also became clear that raising the f_0 at the right edge of a nuclear accented word will make the listeners perceive it as a pre-nuclear accent. Manipulating duration alone had no effect of the perception, however when accompanied by manipulations of pitch, decreasing the duration of a syllable associated with a nuclear accent, can render the word to be perceived as a pre-nuclear accented word more efficiently.

References:

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- Ladd, Robert (1996). *Intonational phonology*. Cambridge University Press.
- Silverman, Kim and Pierrehumbert, Janet (1990). The Timing of Prenuclear High Accents in English. *Papers in laboratory Phonology I*, 72–106.