Malayalam Vowel Duration as a Correlate of Word Stress

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In Malayalam, a Dravidian language spoken in the Indian state of Kerala, there is a contrast in vowel length, as illustrated by minimal pairs such as [kaɭi] ‘game’ and [kaːɭi] ‘goddess of death’ (Velayudhan & Howie, 1974). According to K.P. Mohanan (1986), main word stress falls on the second syllable if it has a long vowel and the first syllable has a short vowel, and otherwise stress falls on the first syllable. The stress pattern as described by Mohanan has been incorporated into metrical theories of stress (Hayes, 1995; Kager, 1995; Tranel, 1991), but Nayar (2010) contests the existence of word-level stress in the language. The conflicting descriptions of Mohanan (1986) and Nayar (2010) were both based on impressionistic transcription data, so the present study was designed to resolve the issue by providing objective experimental evidence from multiple speakers. Preliminary investigations suggested that vowel duration varied more in the relevant syllables than f0 or intensity, so vowel duration, an important acoustic cue for stress (Fourakis, 1991; Fry, 1955; Lindblom, 1963), was the measure for the experiments. The stress pattern as described by Mohanan suggests that vowel duration would be longer for both long and short vowels in the first syllable than for comparable vowels in the second syllable, and that long vowels in a second syllable would be longer if the first syllable had a short vowel than if it had a long vowel.

Experiment 1 was performed to determine how vowel duration varied according to vowel length, syllable position and following consonant length. Sixteen real three-syllable words of Malayalam that varied vowel length in the first and second syllables and following consonant length (singleton or geminate), were placed into a carrier phrase. Three native Malayalam speakers were recorded speaking these phrases. The vowels in both the first and second syllable in each token were then measured for duration. It was found that long vowels were significantly longer than short vowels, vowels before geminates were significantly shorter than those before singletons, and vowels in the first syllable were significantly longer than those in second syllable. Lengthening of the first syllable is consistent with Mohanan’s stress pattern.

Experiment 2 focused on duration of long and short vowels in the first two syllables, with more subjects and more words per condition than in the first experiment. Six native speakers of Malayalam were asked to read twenty real three-syllable words of Malayalam consisting of CVCVCV, CV:CVCV, CVCV:CV, or CV:CV:CV. The vowels in both first and second syllable were measured for duration. It was found that long vowels were significantly longer than short vowels, and vowels in the first syllable were significantly longer than those in second syllable. Long vowels in the second syllable were not significantly longer after an initial syllable with a short vowel than after one with a long vowel. This runs contrary to what one would expect based on the Mohanan stress description, since a long vowel following a short-vowel initial syllable would receive primary stress, while a long vowel following a long vowel would receive secondary stress.

The vowel duration facts do not support Mohanan’s description of word stress in Malayalam for these 6 speakers of the language. The extra duration for vowels in the first syllable is consistent with quantity-insensitive word-level stress (contrary to Nayar (2010)) on the first syllable. The results also provide evidence of the effect of following consonant length on vowel duration in Malayalam (Broselow, Chen, & Huffman, 1997).


