

Unstressed vowel reduction in Modern Standard Turkish

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The little earlier research on the acoustic properties of stressed and unstressed syllables in Modern Standard Turkish has found only f_0 and intensity/amplitude to be robust correlates for word stress (Konrot 1981, Levi 2005), and it has also been noted that neither vowel duration (Konrot 1981, Levi 2005), nor "formant structure" (Konrot 1981) serve as cues for stress location.

This paper reports a speech production experiment that examines Turkish vowel duration and F1 and F2 formant frequencies in stressed and unstressed position in nonsense words produced in carrier sentences. (Real words were also used to verify that production did not differ significantly between real and nonsense words.) A total of 2856 vowel tokens produced by 14 participants were analysed. The results showed a clear linear correlation between vowel duration and F1 frequency within stressed and unstressed allophones, suggesting consistent gradient undershoot. Contrary to earlier findings, however, stressed vowels had significantly longer durations, and non-close stressed vowels showed significantly higher F1 frequencies, which at the very least raises doubts about claims that rule these parameters out as effective perceptual cues for word stress (Konrot 1981, Levi 2005). The results of this study are also at variance with another earlier assertion, namely that Turkish initial-syllable vowels are longer than other unstressed vowels, on account of a certain phonological strength they are thought of having as triggers of vowel harmony (Barnes 2006). Our findings are that duration in initial syllables is shorter than (for close vowels), or equal to (for non-close vowels), that of other unstressed vowels.

The study also looked at the effect of consonantal context on vowel properties and showed that vowels were longer next to voiced consonants, that front vowels had lower F2 frequencies in the environment of dorsal consonants, and that back rounded vowels had higher F2 frequencies when flanked by coronals. No consistent effects of consonantal context on F1 frequency were found.

We conclude that Modern Standard Turkish displays duration-driven F1 frequency undershoot, in both stressed and unstressed position. This independently combines with significant durational differences between vowels in stressed and unstressed syllables. As a result, non-close vowels also have significantly higher F1 frequencies in stressed syllables than when unstressed.

References

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