



as focus. Vowel duration and F0 values were measured for stressed (a) penultimate and (b) antepenultimate syllables, (c) stressed vs. unstressed penultimate syllables and (d) stressed vs. unstressed antepenultimate syllables to investigate the correlates of stress in SA.

Measurements of vowels of stressed syllables of (2) I, which is the default word order, showed that vowel duration in (a) penult position (which is the default position for stress placement in SA) is greater than that of (b) antepenult syllables ( $F(1, 41) = 40.255, p < 0.05$ ). The syllable position effects are plotted in Fig. 1. Another significant durational difference is between stressed and unstressed syllables (in penultimate and antepenultimate): Vowels in stress positions a & b in Table (2) are longer than those in unstressed (a) ( $F(1, 41) = 84.831, p < 0.05$ ) and (b) ( $F(1, 41) = 56.914, p < 0.05$ ) syllables. The stress and position effects are plotted in Fig. 2. Analyses of the fundamental frequency patterns are different from the durational patterns. F0 values do not show a significant difference between (stressed) a & b positions in Table (2). This result makes SA different from Jordanian Arabic (De Jong & Zawaydeh 1999), where both duration and fundamental frequency are the correlates of stress [2].

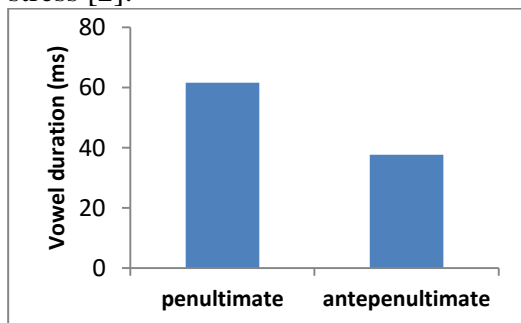


Figure 1. Mean vowel durations of stressed penultimate and antepenultimate positions

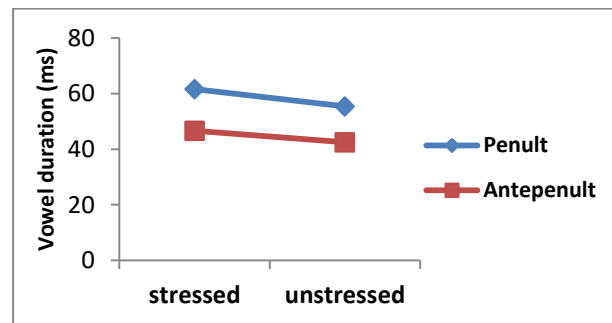


Figure 2. Mean vowel durations by position and stress

The analysis of F0 patterns of stressed syllables (a, b & c in Table (2)) of focused constituents A, B and C show a significant difference in all stressed positions when focused, as in 2 (I), where ( $F(2, 188) = 4.002, p < 0.05$ ), 2 (II) ( $F(2, 188) = 16.730, p < 0.05$ ) and 2 (III) ( $F(2, 188) = 11.853, p < 0.05$ ), respectively. Measurements of vowel durations of focused constituents show a different result from F0 patterns where only the focused A & B are different. However, the statistical test shows that all constituents are significantly different; A ( $F(2, 188) = 6.247, p < 0.05$ ), B ( $F(2, 188) = 8.338, p < 0.05$ ) & C ( $F(2, 188) = 6.309, p < 0.05$ ), regardless of their default word order. The acoustic correlates of focus investigated in this study are thus F0 values and vowel duration of the stressed syllables. These acoustic cues are used in a number of languages to mark accentual prominence at the word-level [9], and may be divided into: melodic cues (F0), temporal cues (duration and length) and dynamic (loudness) [9]. Our analysis shows that focus not only increase the duration of a vowel, but also tends to increase the fundamental frequency of that vowel. These results show that both melodic and temporal cues are used to mark focus in SA. The focused constituents in (2) I, II & III show that (A & B) have significantly longer duration in all stress positions (a, b & c). On the other hand, F0 of all the focused constituents (A, B & C) are more prominent in all stress positions.

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