Peak Alignment in Jordanian Formal and Colloquial Arabic

Raya Kalaldeh, kalalder@tcd.ie

This paper investigates peak alignment across two registers of Arabic as used in Jordan: Formal (JFA) and Colloquial Arabic (JCA). The study is based on the speech of two Jordanian females SK and DA (aged 39 and 28), raised and educated in the capital city of Jordan, Amman. The typical tonal pattern in Jordanian Arabic is H*+L H*+L L-L%. It has been reported that the tonal pattern used in Formal Arabic, *fusha*, reflects that of the Colloquial 'spoken', *amiyya*, Arabic dialect of the speaker [1]. One of the factors reported to have influence on peak alignment is the prosodic context, particularly the proximity to other pitch accents and prosodic boundaries [2,3]. In this study, peak alignment is investigated by manipulating the number of 'unstressed' syllables after the nuclear pitch accent and before the 'utterance-initial' pre-nuclear pitch accent. Speakers appear to use similar intonation patterns in both registers. Moreover, there is a broadly similar phonetic realization in both registers. This is reflected in a fairly stable peak alignment, within the pitch-accented syllable, regardless of the number of unstressed syllables following the nuclear accent or preceding the initial pre-nuclear accent. One speaker, though, had delayed peaks realized within the following unstressed syllable, particularly in pre-nuclear accents in JFA.

Three sentences were controlled for the number of unstressed syllables following the nuclear accent, varying from zero (N0) to two (N2); e.g. FJA, **N1**: /ˈmaɾɾat mɪn ˈhuna: ˈ**nam**l̲ə/; CJA, /ˈmaɾɾat mɪn ˈho:na ˈ**nam**l̲ə/ (*passed from here an ant*). Four sentences were controlled for the number of unstressed syllables before the pre-nuclear accent, varying from zero (0PN) to three (3PN); e.g. FJA, **0PN:** /ˈ**nam**latun ˈmaɾɾat mɪn ˈhuna:/; CJA /ˈ**nam**lə ˈmaɾɾat mɪn ˈho:n/ (a*n ant passed from here*). The pitch-accented syllable in all sentences is the CVC syllable /nam/ (except for /mann/ in N0 condition and /mam/ in N2 condition). Each speaker read three randomised repetitions per sentence from a computer screen. The data was analyzed using PRAAT software. Averaged durations of the unstressed syllables and of the accented syllables were calculated. Two measurements were taken as shown in figure (6): **durH** (the distance from the beginning of the accented syllable to the peak position) in milliseconds and **H%** (the proportion of durH relative to the duration of the accented syllable) represented as a percent.

The analysis suggests that similar to previous alignment studies [3,4], the peaks in nuclear accents are earlier than in pre-nuclear ones. In nuclear accents the peak usually falls at the C|VC boundary (beginning of the vowel /**n**|**am**/) in both JFA and JCA; figures (1) and (2) respectively. Arrows indicate the peak location. Sometimes, speaker DA would have the peak later in the pitch-accented syllable (usually within the vowel) particularly in JFA. In pre-nuclear accents, the peak usually falls at the CV|C boundary of the pitch-accented syllable (after the vowel /**na**|**m**/) in both JFA and JCA as shown in figures (3) and (5), respectively. An exception is speaker DA who has delayed peaks in JFA, where the peak falls in the following unstressed syllable; figure (4). This suggests that although speakers have the same tonal pattern in both JFA and JCA, some may 'put on' an artificial feature when using the formal register which can be detected in the fine timing of the peak alignment.

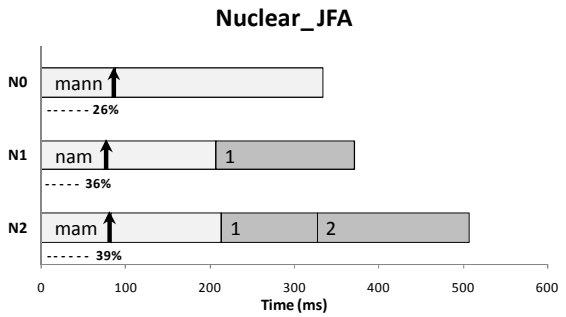

Figure 1*: Peak position and H% shown in N conditions for JFA by both speakers.*

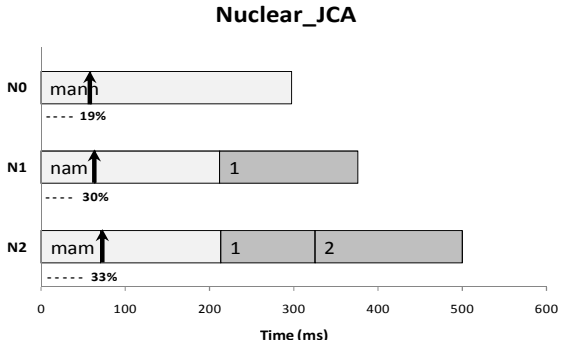

Figure 2: *Peak position and H% shown in N conditions for JCA by both speakers.*

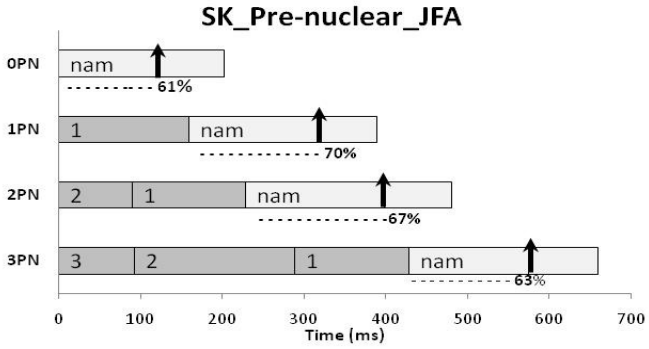

Figure 3: *Peak position and H% shown in PN conditions for JFA by speaker SK.*

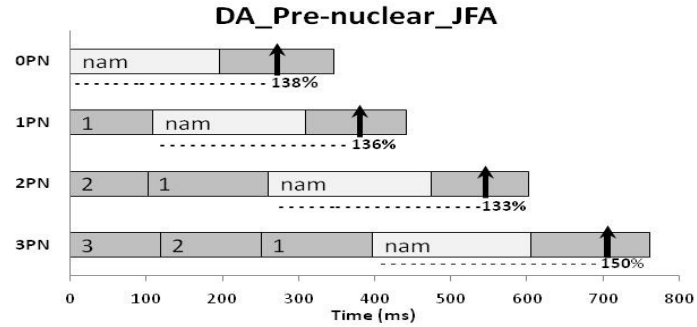

Figure 4: *Peak position and H% shown in PN conditions for JFA by speaker DA.*

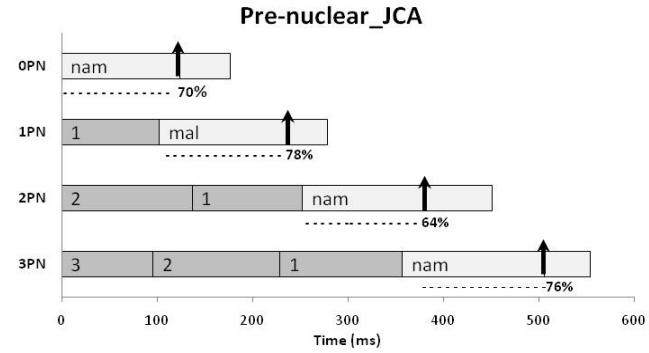

Figure 5: *Peak position and H% shown in PN conditions for JCA by both speakers.*

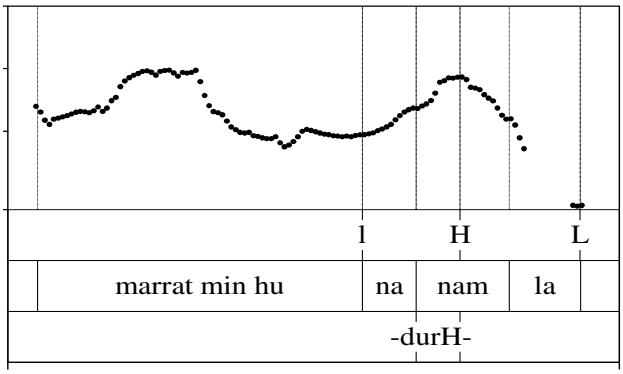

Figure 6: *An illustration of the durH measurement in the sentence* /ˈmaɾɾat mɪn ˈhuna: ˈnamla/ *shown in N1 condition of JFA. 'l' is minimum F0 before the peak 'H', and 'L' is the minimum F0 after 'H'.*

References:

[1] Hellmuth, S. & D. El Zarka, "Variation in phonetic realization or in phonological categories? Intonational pitch accents in Egyptian Colloquial Arabic and Egyptian Formal Arabic", Proceedings of 16th ICPhS, Germany, 2007.

[2] Dalton, M. and Ní Chasaide, A., "Tonal Alignment in Irish Dialects," *Language and Speech,* 48, 2005, pp. 441-464.

[3] Ladd, R., *Intonational Phonology*, 2nd ed, Cambridge: Cambridge University Press. 2008, pp. 169-181.

[4] Schepman, A., Lickley, R., and Ladd, D.R., "Effects of vowel length and "right context" on the alignment of Dutch nuclear accents," *Journal of Phonetics*, 35, 2006, pp. 1-28.

[5] Ladd, D.R., Schepman, L., White, L., Quarmby, L.M., and Stackhouse, R., "Structural and dialectal effects on pitch peak alignment in two varieties of British English," *Journal of Phonetics*, 2009, doi:10.1016/j.wocn.2008.11.001.