

Acoustic cues for voicing and pharyngeal assimilation in Rural Jordanian Arabic

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This study investigates the durational and the spectral cues of voicing and pharyngeal assimilation across morpheme boundaries in Rural Jordanian Arabic (RJA). Assimilation across word boundaries has been investigated extensively in the literature, but investigating assimilation across morpheme boundaries is nearly completely limited to the examination of the definite article (Heselwood and Watson 2013; Alshammiry 2013; Benyoucef and Mahadin 2013; Al-Deaibes 2015). The aim of this study is to investigate the full extent of assimilation across morpheme boundaries in terms of voicing and pharyngealization (an important feature that spreads to neighboring sounds in Arabic) using the terminal consonants of three prefixes /mit-/, /in-/, and /il-/ and the initial consonant of the suffix /h-/. The importance of the current study is twofold. First, RJA is an understudied variety of Arabic, which appears to display different properties from other Arabic varieties, including Urban Jordanian Arabic. Second, this is the first study to acoustically analyze Arabic assimilation in a comprehensive manner, investigating several different morphemes and not just the definite article.

This research is based on word list data comprising 113 words uttered by six native speakers of RJA, recorded and acoustically analyzed in Praat (version 5.4.04) for a total of 678 words. Duration and F1 of three vowels (/a/, /u/, /i/) preceding the potentially voicing-assimilated consonants were measured, and duration and F1, F2, and F3 of the vowels preceding the potentially pharyngeal-assimilated consonants were also measured. Each vowel was also coded for a number of independent variables including word position, place and manner of articulation, pharyngealization, and speaker gender. For voicing assimilation, low periodicity, which shows voicing assimilation, is visualized through spectrograms. Similarly, total pharyngeal assimilation is also visualized through spectrogram to show how some sounds get fully assimilated to a previous or following consonant.

The results of this study reveal the following findings which are the focus of this talk. First, vowels preceding the potentially voicing-assimilated consonants are longer than those preceding voiceless consonants by 14 ms and are affected by place and manner of articulation, and the word position, while gender plays no role in lengthening the vowels. F1 of the vowels preceding the potentially voicing-assimilated consonants are found to be lower than those before voiceless consonants. The vowels are also affected by pharyngealization and position whereas place and manner of articulation as well as gender play no role. The vowel /u/ is the most vulnerable to vowel lengthening and F1 lowering among the the three vowels under investigation. Second, vowels preceding pharyngeal-assimilated consonants tend to have higher F1 and F3 while F2 tends to have a lower frequency as opposed to vowels preceding plain consonants which tend to have opposite results. Vowel duration before pharyngeal consonants is not affected and shows similar length to that before plain consonants. Phonologically, the directionality of assimilation is best accounted for through the sonority hierarchy, Dominance model, and OCP.

References

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