

Issue:

Heritage Arabic speakers, those raised in a non-Arabic speaking country, may show different linguistic behavior than native speakers raised in an Arabic speaking country. This study investigates whether heritage speakers who emigrated from Egypt to the U.S. prior to the age of 18, and are bilingual in English, show the same degree of pharyngealization than non-heritage speakers with respect to Arabic coronal fricatives (Modern Standard Arabic (MSA) /ð^s/ ~ Egyptian Arabic (EA) /z^s/ with /ð/ ~ /z/ and /z/ ~ /z/ as controls). Previous research (Chang et al 2008, Guion 2003) on the phonetic and phonological production of heritage speakers demonstrates that production differs for heritage and non-heritage speakers. Chang et al (2008) showed that heritage Mandarin speakers produced less of a difference between two similar fricatives than non-heritage speakers. Guion (2003) showed that age of L2 bilingual acquisition had an effect on the vowel space of Quichua-Spanish bilinguals, such that earlier exposure to a language enabled more native-like vowel production, but the languages also had an effect on the vowel space of one another. Extending this to pharyngealization, these studies suggest a hypothesis whereby heritage EA speakers may show a lesser degree of pharyngealization in distinguishing emphatic consonants from their plain counterparts.

Methods:

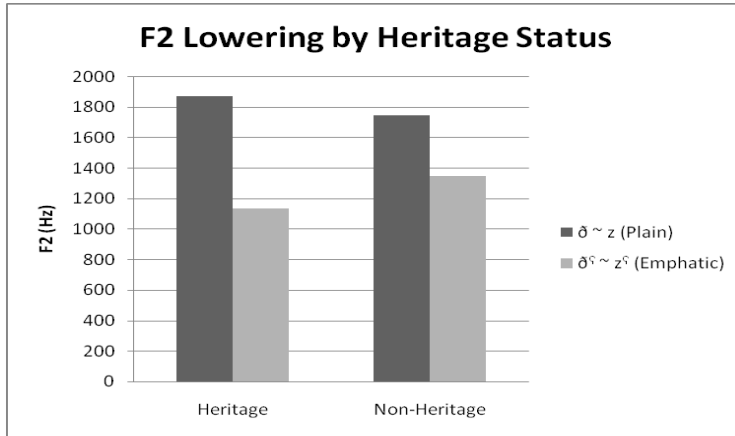
The present study reports on an experiment consisting of a word list reading task completed in isolation in a sound-attenuated chamber. The word list consisted of 26 words of interest interspersed between fillers, each read once. Eight of these words began with the plain fricative MSA /ð/ ~ EA /z/, 9 with the plain fricative MSA /z/ ~ EA /z/, and 9 with the emphatic fricative MSA /ð^s/ ~ EA /z^s/. Twelve participants were recorded, and 8 of the 10 viable recordings have been analyzed (4 female, 4 male); two of the original 12 were removed due to the Arabic reading level of the participants. The null hypothesis is that there will be no difference in the quality of the vowel following an emphatic consonant between the heritage and non-heritage speakers. The alternative hypothesis is that heritage EA speakers will show less pharyngealization in vowels following emphatic fricatives when compared to non-heritage EA speakers.

Results

Arabic emphatic consonants affect the quality of the surrounding vowels, mainly characterized by a significant drop in F2 (Zawaydeh, 1997). The vowels immediately following the plain consonants MSA /ð/ ~ EA /z/ and MSA /z/ ~ EA /z/ were compared with the vowels immediately following the emphatic consonants MSA /ð^s/ ~ EA /z^s/. The data was collapsed across all participants and each continuous F2 data point was assigned categorical values for the heritage status and gender of the speaker. A between subjects ANOVA was run where each vowel F2 value was treated as a subject, and there was a significant effect for the interaction of pharyngealization (plain vs. emphatic) and heritage status ($p = 0.036$, $N = 133$). This result offers significant evidence with which the null hypothesis can be rejected, but not in the direction of the alternative hypothesis. Overall, comparing MSA /ð/ and EA /z/ productions with MSA /ð^s/ ~ EA /z^s/ productions, heritage speakers lower F2 by an average of 735Hz after an emphatic consonant, in comparison to the non-heritage speakers that only lower by 403Hz.

1. Table 1: F2 Lowering by Heritage Status

F2 (Hz)	$\delta \sim z$ (Plain)	$\delta^s \sim z^s$ (Emphatic)
Heritage	1873	1138
Non-Heritage	1750	1347



2. Figure 1: F2 Lowering by Heritage Status

Conclusion

This study offers new contributions to the study of pharyngealization from the perspective of heritage language study. The results indicate that EA heritage speakers differentiate plain and emphatic consonants with greater pharyngealization on the following vowel than their non-heritage counterparts. This difference could be a result of earlier contact with English and the development of a distinct vowel space within heritage speakers, while for non-heritage speakers there is less of an effect of English as a second language on their Arabic, as suggested by Guion (2003). Furthermore, a complementary perceptual explanation suggests that heritage speakers' interaction with English, a language that has no plain-emphatic contrast, increases pharyngealization to self-assure the speaker that they are distinguishing these consonants in their own speech.

Further investigative opportunities exist regarding the choice of place of articulation of the plain and pharyngealized fricatives. This choice could have its own effect on F2, where F2 lowering would be more extreme between the dentals MSA / δ / and / δ^s / than the alveolars EA / z / and / z^s /.

Selected References

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