

A Sociophonetic Study of Pharyngealisation in Syrian Arabic: gender and regional differences between Damascene and Aleppian dialects

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During the last few decades, research has been directed towards investigating extra-linguistic factors that might have a significant role in the production and/or the perception of the pharyngealised segments. Among those factors are *gender* (Al Masri & Jongman, 2003; Kahn, 1975; Khattab, Al-Tamimi, & Heselwood, 2006) and *region* (Bellem, 2007; Heselwood, 1996). The results of the present study show that, in Syrian Arabic (SA), Aleppians tend to pharyngealize more than Damascenes. Regarding gender effect, Syrian Arabic and Jordanian Arabic follow different patterns for stops. Unexpectedly, gender didn't have any significant effect on the plain/pharyngealised fricative differences in SA, with males showing tendency for pharyngealisation more than females.

The present study aims at further investigating gender effect on the production and perception of pharyngealised coronals in SA. It also investigates a common belief among native speakers of SA about the production and perception of Aleppian dialect, i.e. that is a northern urban dialect of Syrian Arabic, is well known among native speakers for the extensive use of the pharyngeal area and the enlargement of the oral cavity, which are the articulatory settings of pharyngealisation. This personal intuition, as a native speaker of Syrian Arabic, leads to a hypothesis 'that Aleppians show a greater evidence of pharyngealisation'. To test this hypothesis the production and perception of pharyngealised segments of Aleppians are compared to those of Damascenes; i.e. that is a southern urban dialect of Syrian Arabic.

Two separate studies were conducted to examine the effects of gender and region, a perceptual study based on a simple categorical task and an acoustic study. The speech of eight native speakers of Syrian Arabic, two males and two females from each city, was recorded in the forensic recording studio in the Department of Language and Linguistic Science at the University of York. 18 minimal pairs repeated twice including stops and fricatives [t t^s d d^s s s^s z z^s] in initial prevocalic position were read by speakers in the phrase [ʃu:/ ʔiʃ bis^sir ʔiza s^sarax ____ bs^sot ʔa:li/ ʔe|iʔ]¹ 'What happens if he shouted ____ loudly?'. Together 288 words were extracted and put into auditory and acoustic analyses.

The acoustic study was the main interest of this work. However, a simple perceptual study based on two listeners was conducted to gain a preliminary idea of how pharyngealised segments are perceived on a categorical basis in SA, and whether their perception is affected by the gender or the origin of the speaker. The first listener was a native male speaker of SA, and the second listener was a native female speaker of Saudi Arabic. All target words were extracted, randomized and introduced to listeners in two lists for each speaker. The first list consists of words that have plain stops [t d] and their pharyngealised counterparts [t^s d^s], and the second list consists of words that have plain fricatives [s z] and their pharyngealised counterparts [s^s z^s]. The listeners were asked to rate the target consonant in each word into 'plain, half pharyngealised, or pharyngealised'. The results of this study show that gender and region didn't have any significant effect on the perception of plain/ pharyngealised distinction. However, consonant type'; i.e. that is plain vs. pharyngealised, had a significant effect on the perception of [d d^s] and [s s^s] only (p= 0.0001). In these cases, the pharyngealised segments were perceived more accurately than their plain cognates, which were mostly misperceived as pharyngealised or half-pharyngealised.

¹ The carrier phrase is chosen to reflect regional differences between Aleppian and Damascene dialects which can be seen in the first and last words: Aleppian: [ʔiʃ bis^sir ʔiza s^sarax ____ bs^sot ʔe|iʔ]

Damascene: [ʃu: bis^sir ʔiza s^sarax ____ bs^sot ʔa:liʔ]

All the acoustic analyses of this study were conducted using praat. The analysis procedures were automated using praat scripting language, thus, two separate scripts were written to extract the acoustic measurements of stops and fricatives. The acoustic analysis included extracting measurements for the target consonants and the following vowels. As for stops, negative VOT values were taken from the first voicing pulse during the hold phase to the burst of the voiced stop, and positive VOT values were taken from the burst of the voiceless stop to the first vocalic voicing pulse. Noise duration of fricatives, on the other hand, was extracted using a waveform and a wide-band spectrogram from the start of high energy concentrations to the first vocalic voicing pulse. In order to compare Center of Gravity (COG) of plain and pharyngealised fricatives, FFT spectrum was generated from a 40-ms full hamming window placed at the middle of the friction noise. Regarding the vowels following target consonants, formant tracks were generated using Burg algorithm to extract the first three formants of the onset of the vowel. To capture the onset of the vowel and not just a single point, formant values were averaged across three points chosen from the first vocalic pulse with 5-ms distance.

The results of this study show that F2 lowering after pharyngealised segments was the most consistent acoustic exponent that reflects gender and regional differences. As regard gender, no significant difference in F2 lowering was found after fricatives. Males showed tendency to pharyngealise more than females not only in F2 lowering but also in the normalized F1-F2 approximation after pharyngealised fricatives. Gender effect on stops, on the other hand, showed different results from what has been found for fricatives and in the literature. Females lowered F2 after pharyngealised stops significantly more than males did, and the normalized F1-F2 values showed more approximation for females. Furthermore, females showed greater, though not significant, difference between VOT values of [t tʰ]. Although no significant regional differences were found between Damascene and Aleppian speakers, Aleppians tended to lower F2 after pharyngealised segments more than Damascenes, and for most vowels F1-F2 approximation was more for Aleppians.

The implications of the perceptual study suggest that extra-linguistic factors do not have any effect on the perception of plain/ pharyngealised segments, and only the phonological factor i.e. presence or absence of pharyngealisation, seems to have the significant effect. However, the data base is small and based on two listeners only, thus, further research is required to confirm these findings. The difference in gender effect on stops and fricatives suggest that SA is different from other dialects, and perhaps a larger data base might allow gender effect on fricatives reach significance with the same direction of stops. Regional differences were in the same expected direction, which also needs further investigation. Since Aleppians show tendency for Pharyngealisation more than Damascenes, it is worth investigating gutturals and pharyngeals articulation differences between the two dialects. Pharyngealisation as a phonological feature can be added to consonants and vowels, this fact suggests, in the light of this study, that the phonological system of Aleppian dialect, unlike Damascene dialect, contains a pharyngealised allophone of most, if not all, its segments.

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