

An ultrasound study of Armenian dorsal consonants: place, voicing & dialectal differences

Talia Tahtadjian, University of Ottawa

Armenian has two main dialects: Eastern Armenian (EA) and Western Armenian (WA). Historically, both their phonemic inventories include velar stops /k, g/, and uvular fricatives /χ/ and /ʁ/ (Vaux, 1998). Recent studies have shown inconsistencies in the transcription of these dorsal fricatives. Baronian (2017) and Kelly & Keshishian (2021) describe the series as a velar pair (/x/ and /ɣ/), while Vaux (1998) has described them as the uvular pair. These authors' transcriptions did not refer to any phonetic information; as such the descriptions have been impressionistic. As of yet, there is little to no consensus in the phonetic literature on how dorsal fricatives behave in both Armenian dialects, although an acoustic study conducted by Ariyae et al. (2021) found that /ʁ/ is produced more posteriorly to /χ/, and that these fricatives are also produced more posteriorly when compared to the same fricatives in Emirati Arabic and Iraqi Kurdish. The aim of the present study is thus to investigate (1) the relative place of articulation of the Armenian dorsal fricatives and (2) whether the voicing differences in this pair, if any, are consistent cross-dialectally, using articulatory methods.

Ultrasound tongue imaging (UTI) was used to investigate place of articulation in Armenian dorsal fricatives produced by 9 native speakers of Armenian (3EA and 6WA speakers). Target words with /k, g, χ, ʁ/ in initial position were followed by vowels /a/, /i/, and /u/, while in medial position followed only by /a/. Tongue contours for each participant were traced using the Articulate Assistant Advanced software (Articulate Instruments Ltd, 2012), and extracted at the last frame before the stop release and fricative end. Tongue contours for each target were compared per vowel and participant using SSANOVA (Davidson, 2006) and a polar coordinate system (Mielke, 2015).

Articulatory and acoustic data analysis is complete, though in this abstract, I report on results of targets followed by vowel /a/. Findings for WA include that speakers tend to make *less* place distinctions between stops /k, g/ and fricatives /χ, ʁ/. In WA, there were also *less* distinctions in the voicing pair /χ, ʁ/ (Figure 1), unlike Ariyae's (2021) findings. The findings for EA suggest that speakers tend to make *more* place distinctions between stops /k, g/ and fricatives /χ, ʁ/, with the uvulars being more posterior, which supports previous work that Armenian dorsal fricatives are uvular (Vaux, 1998). In EA, speakers made *more* distinctions in the voicing pair /χ, ʁ/, with the voiced being more posterior (Figure 2).

The inconsistencies from existing findings could be due to dialect or interspeaker variation. Results from WA speakers' less distinct voicing and place categories could be attributed to a diaspora effect, while EA speakers' more distinct voicing and place categories could perhaps be attributed to the dialect's more complex laryngeal contrast system. As the first articulatory study conducted in Armenian, this will lay the groundwork for the in-depth phonetic investigation of Armenian. Moreover, as Armenian dialects are spoken in different parts of the world and most speakers speak a language other than Armenian, comparisons between EA and WA will be a foundation for further research on the effect of language contact on each Armenian dialect.

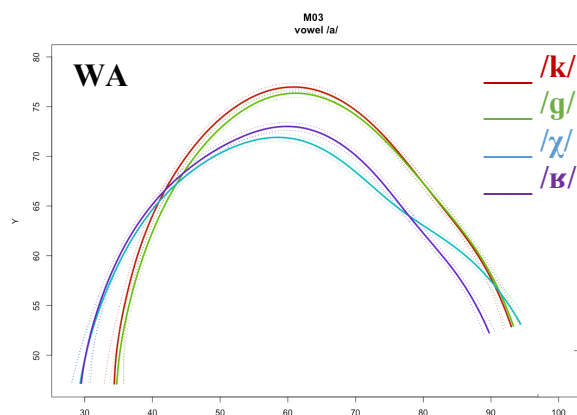


Figure 1. Tongue contours for a representative WA speaker's dorsal stops and fricatives, with tongue front at plot right

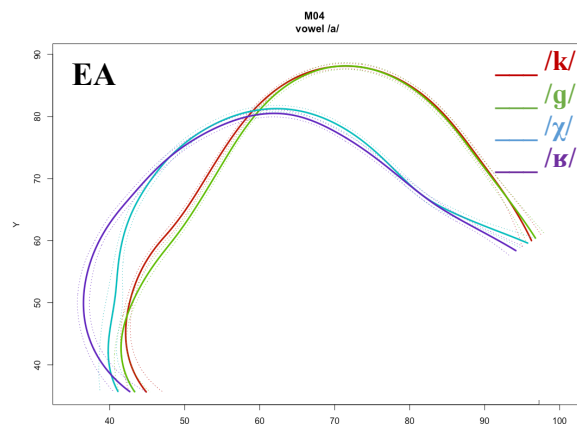


Figure 2. Tongue contours for a representative EA speaker's dorsal stops and fricatives, with tongue front at plot right

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