An ultrasound study of dorsal stops in Tatar and Qumuq

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Background: This paper presents the results of a pilot ultrasound study comparing velar and uvular stops in Tatar and Qumuq (also referred to by its Russian name, Kumyk). They are both indigenous Turkic languages of Russia, and are categorised in different subbranches of northwestern Turkic. Tatar is spoken by about 5M speakers, and Qumuq by under 430K speakers (Eberhard, Simons, & Fennig 2019), the vitality of the latter classified as "vulnerable" (Moseley 2010).

As in many Turkic languages, dorsals alternate between velar and uvular in Tatar and Qumuq, depending on the dorsality of adjacent vowels. Exceptions are found in borrowed words, mainly from Arabic and Russian. This study documents velar and uvular stops in the so-called "native" lexicon (words known to not be recently borrowed) in the two languages, with obstruents and adjacent vowels corresponding in dorsality.

Methods: A data set of comparable words in comparable carrier sentences was created for each language, and the third and fourth authors, native speakers of Tatar and Qumuq, respectively, were recorded reading these sentences 3 times per recording. The recordings were conducted in the Laboratory for Linguistic Anthropology at Tomsk State University in Tomsk, Russia in late September / early October, 2019. Audio and ultrasound data were recorded using the Micro ultrasound system available from Articulate Instruments and the accompanying Articulate Assistant Advanced software (AAA: Wrench 2017).

Stimuli were monosyllabic words beginning and ending with [k] and [q], with a range of adjacent vowels. Tokens examined include 15 [k] and 12 [q] for Tatar, and 12 [k] and 10 [q] for Qumuq. Dorsal obstruents in the 2nd repetition (of 3) of each stimulus were annotated based on release burst of the obstruent in question and either release burst of a preceding obstruent or vocalisation of a preceding vowel. Ultrasound frames within those intervals were traced. Annotation and tracing were conducted by all the authors using AAA, with training and supervision from the first author; the data was later exported from AAA, and traces were cleaned up and processed using UltraTrace (Murphy et al. 2020).

Analysis was conducted using modified versions of scripts originally developed by Washington (2016) and Washington & Washington (2018). Tongue traces from the frame most closely centered to each annotated interval were considered, and their average and standard deviation were plotted to impressionistically understand the articulation of the phones in question.

Results: Results are shown in Figure 1. The velar and uvular articulation, respectively, of [k] and [q] in both languages is confirmed. Moreover, a tongue root contrast is also part of the distinction, particularly in Tatar. Specifically, [q] appears to involve a retracted tongue root or pharyngealised articulation. This parallels the vowel anteriority distinction described by Washington (2016) for Kazakh and Kyrgyz, but not that of standard Turkish, which has historically shifted the velar/uvular distinction to a palatal/velar distinction.

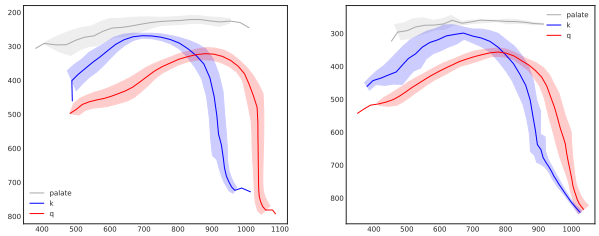

Figure 1: Average tongue traces of Tatar (left) and Qumuq (right) [k] (blue) and [q] (red), and palate (grey), with standard deviation bands. The front of the tongue is to the left.

Future work: In the future, we plan to examine more speakers of both Tatar and Qumuq, as well as other Turkic languages. We plan to investigate whether the pharyngeal coarticulation of the dorsal stops aligns with the role of tongue root in the vowel system of a given language. We are also interested in the status of the two uvular stops in Shor reported to contrast only in level of pharyngealisation (Урегешев 2002, pp. 211–263).

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