A Derived-Environment Effect in Kazakh: The Voicing Restriction of Velars and Uvulars

Many Turkic languages have consonant inventories that include velars and uvulars (henceforth dorsals). The specific dorsals vary within this language family but many exhibit voicing and place of articulation restrictions. Little descriptive work is available on these restrictions in Turkic languages and so my research aims to bridge the gap in the literature by looking at dorsals in Kazakh. I specifically examine the dorsals at the morpheme boundary.

Several characteristics are already known about Kazakh dorsals. First, the consonant inventory is asymmetrical. The number of velars and uvulars is imbalanced. Second, dorsals are restricted in native words depending on the neighbouring vowel (Muhamedowa, 2016). Velars appear in front vowels environments and uvulars appear in back vowel environments. Loanwords (and words containing [x]) are exceptions and can remain nonharmonic. Third, dorsals are restricted in their voicing depending on their position in the word (Kara, 2002). At the morpheme boundary, voiceless dorsals appear in the word-final position and voiced dorsal consonants appear in stem-final position intervocalically with a following vowel-initial suffix. Fourth, there is a fifth dorsal consonant [x] which occurs in loanwords. This sound varies freely with [q] ([xɑt]~[qɑt]) (Bekturova & Bekturov, 1996).

The existing descriptions contain limited amounts of data, which does not allow generalisations to be drawn about the voicing distribution. Several questions remain unanswered: Are velars and uvulars contrastive intervocalically? What happens to [x]: does it alternate with [q], [ɡ] or [ʁ]? Does the vowel, which affects which dorsal may occur, fall before or after the consonant (or either)? How do we account for the voicing distribution of dorsals theoretically?

To answer the questions, I conducted three elicitation-based experiments with six native Kazakh speakers using real and nonce words. The first elicitation examined real words by targeting dorsals in different positions of the word. This involved reading word lists and deriving nouns and verbs. The second elicitation tested whether the place restriction found in real words can be extended to nonce words. This involved reading a list of 160 CVCV and 160 CVCCVC nonce words out loud, each token three times. The first and second elicitations were based on orthographic stimuli. The thirst elicitation tested whether the voicing restriction found in real words can be extended to nonce words. 20 cvccvC nonce words were compiled from the original CVCCVC nonce words. This involved deriving the nonce words as if they were nouns and verbs. The third elicitation used auditory stimuli and tested how dorsals were perceived.

The results reveal that the voicing restriction is productive (and the place restriction is not). For real words, participants produced word-final dorsals as voiceless and stem-final dorsals as voiced intervocalically. Intervocalic voicing was extended to the stem-final [x], which voiced to [ʁ]. For nonce words, four of the six participants devoiced all voiced targets in the word-final position and two preserve the word-final voiced targets when reading from written stimuli, while all participants produced the word-final voiced targets as devoiced from auditory stimuli. The voiceless targets in stem-final position invariably voiced intervocalically. In addition, the dorsal fricatives reveal unexpected results. Participants did not neutralise word-final [ʁ] to [q], as expected, but instead, devoiced to [χ] when reading from written stimuli and to [x] from auditory stimuli. Stem-final [x] voiced to [ʁ] intervocalically, matching real word production.

The results provide the basis for two main discussions. For word-final devoicing, the participants that were not devoicing may have treated nonce words as loanwords, even though they were asked to treat them as real words. In many languages, loanwords may allow less restrictive phonotactic requirements than for native words. This phenomenon can be modelled using a co-phonology approach (Inkelas & Zoll, 2007) or indexed constraints (Ito & Mester,

2001; Pater, 2007). Also, neutralisation may have been incomplete. This could stem from the influence orthography has on careful speech. If spelling suggests a difference, one might make a distinction during careful speech. This was demonstrated by the two participants not devoicing word-finally and all participants producing all dorsals regardless of the vowel in nonce words.

For intervocalic voicing, voicing occurs at the local domain of the suffix but not in the identical environment found word-internally. Thus, the morphological boundary constitutes a specific environment for a phonological phenomenon, which can be characterised as a derived-environment effect (Burzio, 2011). The indexed constraint theory of lexical exceptions allows for proposing a morpheme-specific markedness constraint. These constraints are limited to a specific set of suffixes that applies to entire outputs in which the indexed constraints occur.

The voicing phenomena can be captured within OT (Prince & Smolensky, 1993/2004) using standard featural assumptions whereby all segments are fully specified for voicing, place, and manner. An indexed-markedness constraint accounts for the phonological process that applies when the conditioned environment contains any portion of an affix and a Local Conjunction constraint (Crowhurst, 2011) accounts for [q] and [x] voicing to [ʁ]. I propose FINDEV and the indexed-markedness constraint *VTV$_{SUFFIX}$, which doesn't allow morpheme specific voiceless consonants to appear intervocalically, outrank IDENT(voi) to ensure a voicing change is favoured over being faithful to the voicing feature. To account for /ʁ/ devoicing to [x] and /x/ voicing to [ʁ], I employ two lower ranked faithfulness constraints whereby maintaining manner (IDENT(cont)) is ranked higher than maintaining place (IDENT(hi)). Finally, to account for /q/ also voicing to [ʁ], whereby maintaining place is favoured over maintaining manner, I propose the locally-conjoined constraint IDENT(hi)&*VC$_{[+hi]}$V$_{SUFFIX}$ to ensure place is maintained and a morpheme specific intervocalic velar is not permitted. This constraint must be ranked above IDENT(cont) because the two simultaneous components of the constraint are favoured over faithfulness to manner and must be ranked below *VTV$_{SUFFIX}$ because intervocalic voicing at the morpheme boundary continues to be favoured. It is okay to change place as long as it does not result in a velar intervocalically. In conclusion, the voicing restriction contributed the most to the description of Kazakh since it was productive across real and nonce words.

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