

## The glorious world of labialvelars

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Knowing the phonetics helps explain the history and phonology, and knowing the history helps explain the phonology, but there is still one phonological phenomenon of labial-velar stops that is unexplained by any current phonological theory.

The labial-velar stops  $\widehat{gb}$  and  $\widehat{kp}$ , as well as the nasal  $\widehat{\eta m}$ , subsumed under the symbol KP, are found as phonemes in hundreds of languages in west and central Africa, several dozen in the Pacific, and a handful in South America.

Phonetically, the components of labial-velars are not perfectly overlapping; the labial component lags behind the velar one, giving a labial release. The duration of a labial-velar stop is only slightly longer than a simple stop. Interestingly, voiceless labial-velars often have characteristics in common with voiced stops: they are less aspirated, they are partially voiced, and they often have an ingressive air mechanism.

Perception of labial-velars is under-studied. Results of a recent perceptual experiment with Yoruba speakers are reported in which information from both the CV transition *and* the pre-voicing play a part in distinguishing word-initial  $\widehat{gb}$  from *b*.

Historically, labial-velars can develop from either labialized velars or labials, but a common sequence is KuV > KwV > KPV.  $\widehat{kp}$  often merges with  $\widehat{gb}$  giving  $\widehat{gb}$ , not surprising, given that  $\widehat{kp}$  often shares phonetic characteristics of  $\widehat{gb}$ . Labial-velars often merge with plain labials, again unsurprising given the phonetic characteristic of a labial release.

Phonological behavior of labial-velars that must be explained include, among others:

1. The common occurrence of /gb/ without /kp/
2. Vowel restrictions after KP – several languages do not allow KPu
3. Consonant co-occurrence restrictions – several languages do not allow KP to co-occur with a labial
4. Distinguishing phonemes /KP, K<sup>w</sup>/, since both are found in the same language
5. Distinguishing allophones [KP], [KP<sup>w</sup>], [KP<sup>y</sup>], [TP]
6. Unit-consonant behavior (reduplication, voicing and nasalization as unit)
7. Left-right asymmetry in partial nasal assimilation ([ $\eta$ KP], not [mKP]. [KPm] but not [KP $\eta$ ])
8. Neutralization of KP with P word-finally in Amele

Several of these can be explained by the historical development of KP (#1, 2) or the details of phonetics (#7). Specific representations in Feature Geometry may illumine other behaviors (#3, 4, 6, 8). However, the phonological distinction in Kɔnni nasal assimilation between  $\eta KP$  word-internally and  $\widehat{\eta m} KP$  across words remains unexplainable in any theory of phonology developed thus far.