

Where do labial-velars go?

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1. Introduction

- Labial-velars: **kp̄**, **gb̄**, **ɲm̄** and modifications (abbreviated KP here, no tie-bars)
- Two historical topics: *origins* of KP and *changes* of KP. Here I focus on the latter.
- Since KP's are only known in non-Indo-European languages, their development is not discussed in most historical linguistics books, except Dimmendaal 2011.
- Several researchers have discussed them in relation to individual language families (e.g. Edoid in Elugbe 1986, Guang in Snider 1990, Northern Mande in Long 1971, Mande in Dwyer 1989, Lower Cross in Connell 1995), but larger cross-linguistic tendencies have gone largely unnoted, with the exception of some of Connell's work (e.g. Connell 1994).
- Two common and clear tendencies when labial-velars change historically.
 - “decay” into simple labials /p, b, m/
 - merger of /kp/ and /gb/ into /gb/
 - there are other less common cases

2. Labial-velars tend to have labial reflexes (*KP > P)

2.1 Data

- Snider (1990:50) notes the “clear innovation” of *kp > p in Coastal Guang.
- Connell (1991, 1994) notes that Proto-Lower-Cross (PLC) *kp has evolved most commonly into [p]. (/kp/ is the only labial-velar in these languages.)
 - Only Ebughu, Enwang, and Okobo below don't have [kp]; in each of these it has been replaced by [p] (Connell 1991:161).

(1) Connell 1991:200 (abbreviated list) Lower Cross Languages

Gloss	bag	bone	leopard	die
Anaang	è-kpàt	á-kpó	é-kpè	kpá
Ebughu	è-pè	ó-pó	é-pîè	pé
Efai	è-kpè	ó-kpó	é-kpĩ	kpá
Efik	è-kpàt	ó-kpó	é-kpè	kpá
Enwang	è-pè	ó-pó	é-pè	pá
Ibibio	è kpàt	á-kpó	é-kpê	kpá
Iko	è-kpà	ú-kúp	é-kpè	kpá
Obolo	à-kpà	ú-kúp	é-gbè	k ^w ù / g ^w ù
Okobo	è-pà	ó-pó	é-pĩ	pá
Usakade	è-bà	ú-síp	ó-bê	bá
PLC	*e-kpàt	*ó-kpó	*é-kpè / i-	*kpá

- The Kwa languages of Cote d’Ivoire and Ghana also illustrate the tendency to lose the velar portion, as Abron did below:

(2) Kwa correspondences (Mensah 1983)

Abron	Agni (Anyi)	Baoulé	Nzema	
pám	kpá	kpá	kpá	coudre ‘stitch’
àpàràá	kpààlé	kpàlē	--	pangolin
pòrò	kpòlò	kplò	kpòlò	pourrir ‘rot’
pùsù	kpùsù	---	kpùsù	secouer ‘shake’

- Williamson (2004) shows Proto-Igboïd had *kp, *gb, and these developed into implosives in most Igboïd languages, and correspond to plain labials in Bantu. “It thus appears likely that an earlier common proto-language had *gb, retained in PI but simplified to *b in Bantu and Akan.”

(3)

Table 2 Bantu b = PPAB *b = PI *gb

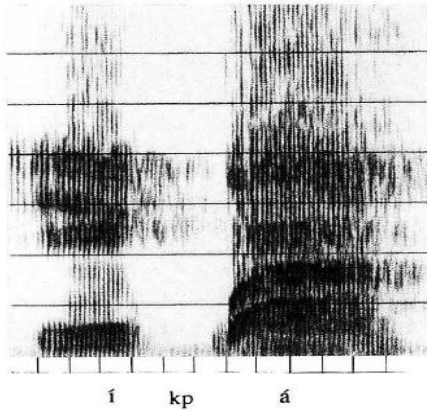
CB	Akan	PPAB	PI	Èkpèyè	Owèrè	Onìcha
64. *-búd- <i>break, smash, hit, kill</i>	- buru	*-bɔɔɔ	*-gbú <i>cut, hit, kill</i>	-gbú	-bú	-bú
*-báb- <i>sting</i>			*-gbá	-gbá	-bá	-bá
*-bàngá <i>jaw</i>			*-gbà	à-gbà	à-g ^{wh} à à-b ^h à	à-bà
*-bàng- <i>open up</i>			*-gbáá <i>open</i>	--	-bá	-bá

- Ohiri-Aniche (2004) reconstructs *kp, *gb, *’kp, *’gb for “Pre-Lower Cross Igboïd Yoruboid-Edoid.” His *kp and *gb as well as the lenis *kp’ and *gb’ have labial-velar reflexes and labial ones in the daughter families, but no velars (2004:412), with the single exception of a few g^{wh} cases in Igboïd.
- See also Olson’s ACAL paper an hour ago about Luto. (Olson 2021)
- Some languages do appear to have K or other sounds as a reflex of KP (e.g. Boyeldieu 2006); these are distinctly in the minority. In some cases, this reflex could be due to sociolinguistic pressures. Sometimes the direction of a putative *KP > K change is open to alternate interpretations: which is actually the proto-segment?

2.2 Motivation for change – why a labial reflex, not velar?

- /k̄p/ is usually written as [kp] and not [pk]. This is no accident; the labial component slightly trails the velar one, producing a distinctively labial release
- Labial release is supported by spectrograms from Dedua (PNG) and Efik (Ladefoged & Maddieson 1996) as well as Ibibio below:

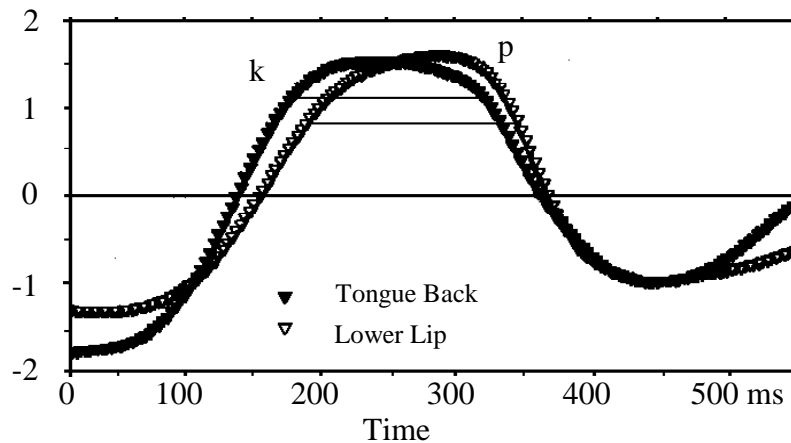
(4) Ibibio – Connell 1994:454



Note the “velar pinch” of F2 & F3 going into the [kp], and steep F1 & F2 transition out of the [kp].

- This is also supported by electromagnetic articulography from Ewe (Maddieson 1993).

(5)



Coordination of lower lip and tongue back movements in the Ewe word **akpa**. Y-axis is vertical displacement; horizontal lines indicate the likely duration of actual contact of the articulator.

- The *release* of a consonant is more salient than the onset; so a KP is more likely to be *perceived* as P than K (noted as far back as Westerman & Ward 1933). What is perceived is pronounced, and so *KP > P.

3. Labial-velars /kp/ and /gb/ often merge to the voiced /gb/

3.1 Data

- In the clear majority of cases, when *kp, *gb merge into one reflex, the result is synchronic /gb/, not /kp/ (Cahill 2008). Somewhat surprising, since typologically, a language is more likely to have a voiceless series of stops than a voiced series.
- Cahill 2008 lists 29 languages which have /gb/ but not /kp/. A sample:

1. Jiru (Jukunoid)	p/b, t/d, k/g, -/gb	Shiziru 1971
2. Kar (Senufo)	p/b, t/d, k/g, -/gb	Wichser 1994
3. Manya (W. Mande)	p/b, t/d, k/g, -/gb	Manessy 1964
4. Western Sisaala (S. Gur)	p/b, t/d, k/g, -/gb	Moran 2006
5. Tepo (W. Kru)	p/b, t/d, k/g, -/gb	Thalmann 1980
6. Mofu-Gudur (Chadic)	p/b, t/d, k/g, -/gb	SALA

- A language with only / \widehat{kp} / always has other gaps in the segmental inventory, suggesting strongly that the reason for the lack of / \widehat{gb} / is because it never developed, or that there was a simultaneous historical devoicing of all stops having a velar component (Cahill 2008).

3.2 Motivation for change – why voicing?

Several phonetic details of the pronunciation of a typical /kp/ are also those which typically are characteristic of voiced rather than voiceless stops.

Reason 1. A /kp/ is either unaspirated or has a distinctively shorter VOT than other voiceless stops in a language.

- Smith (1967) reports aspiration on all voiceless stops in Nupe except labial-velars, which he specifically states are unaspirated.
- In Konkomba (Steele & Weed 1966), Vagala (Crouch & Smiles 1966), Tampulma (Bergman, Gray & Gray 1969), Kusaal (Spratt & Spratt 1968), Nafaara (Jordan 1980), Dilo (Jones 1987) and Sisaala-Pasaale (Toupin 1995), /kp/ alone among voiceless stops is not aspirated.
- Phwin has a *phonemic* contrast between aspirated and unaspirated voiceless stops (p, t, c, k), with the *exception* of the labial-velar stop (K. Warfel, pc).
- Gangam (Dye) has aspiration on all voiceless stops except for labial-velars (Reimer 2020).
- Looma /kp/ is specifically noted as unaspirated, while other stops are labeled aspirated (Sadler 2006:12-14).
- Westerman & Ward (1933:58) in talking about African labial-velars, state flat-out that “There is no aspiration in kp.”

Reason 2. There is often at least a partially ingressive air mechanism, which typologically is much more common with voiced stops

- Ladefoged (1968) notes three mechanisms for producing labial-velars, two of which involve ingression (31 of 33 languages)
- Labial-velars in the Tyebaara dialect of Senufo are pronounced “with noticeable suction in the oral cavity, and with a pop upon release.” (Mills 1984).
- Dan (Santa) is described as having “bilabial implosion” for /gb/ and “strong bilabial implosion for /kp/ (Bearth & Zemp 1967).
- Engenni /kp/ and /gb/ are specifically listed as “ingressive,” in contrast to the other “egressive” stops (Thomas 1978).
- Wilhoit (1999) labels /kp/ and /gb/ as “implosive” in Loma.
- Labial-velars are not implosive in all languages, however. Besides Ladefoged’s notes above, Painter (1970) specifically notes that Gonja has a simple pulmonic airstream. Kɔnni also has a simple pulmonic airstream for labial-velars (Cahill 2007).
- Ega evidently has both; it is reported as having a contrast between implosive and non-implosive voiced labial-velars, symbolized as /g[̃]b/ and /gb/ (Connell, Ahoua and Gibbon 2002).

Reason 3. There is often partial voicing even of the “voiceless” /kp/.

- similar to the lack of aspiration (both relate to VOT), but some differences:
 - the languages here have an actual *negative* value of VOT.
 - some languages contrast voiceless aspirated stops, unaspirated stops, and voiced stops; there is a *categorical difference* between an essentially zero VOT and a negative VOT.
 - partial voicing can also occur at the *left* edge of the stop, a continuation of voicing from a preceding vowel into the stop (“voicing tail”) – which simple stops generally lack (Connell 1994 and references therein, Shryock et al 1996/1997)
- Connell (1994) reports on specific voice onset times for phonemically voiceless stops in Ibibio, with average VOTs of +6 ms for /p/, +21 ms for /k/, but –26 ms for /k[̃]/.
- Olson (2005:141) measured VOTs for Mono as +10.2 ms for /p/, +27.6 ms for /k/, but –10.0 ms for /k[̃]/.
- Rolle (2013) measured VOT for Urhobo voiceless stops. /p/ was slightly aspirated (13-36 ms), /t/ (60-100 ms), /k/ (45-66 ms), but /kp/ actually had negative VOT (-18 to -109 ms).
- Shryock et al (1996/1997) note that /kp/ in Defaka has the onset of voicing *prior* to its release, similar to that of /b/ in English.

- So these phonetic tendencies – lack of aspiration, ingression, and negative VOT – are characteristics which would make *kp tend toward voicing.

4. Both labial and voiced reflexes

These two tendencies are both concretely illustrated in the development of Supyire (Gur, Senufo subgroup).

- Supyire has no labialvelar stops, unlike most Senufo languages (Carlson 1994).
- The labialvelar stops in northern Senufo languages first merged *kp and *gb into /gb/ (e.g. Sucite in Garber 1987), then Supyire changed this /gb/ to /b/.

(6) Cebaara	Shenara	Sucite	Supyire	gloss
kpā?ā	gba?a	gbāxā	bāgā	‘house’
gbā?ālāgà	gba?alaga	-----	bàhàgà	‘bedbug’

- Correspondingly, the Supyire /b/ is disproportionately common, the results of combining the frequencies of words with *b, *gb, and *kp.
- Mande languages offer another example. Below, we see the correspondence $\widehat{kp} \sim \widehat{gb}$ in the left five columns and the correspondence $\widehat{gb} \sim b$ in the right two columns.

(7) Northern Mande (Long 1971)

language	‘skin’	‘hit’	‘white’	‘hot’	‘cry’	‘big’	‘all’
Vai	kpolo	kpasi	kpei	kpandile	kpala	---	gbi
Ligbi	kpolo-	---	kpiε	---	gbare	gbonkase	gbo
Maninka	gbolo	gbasi	gbe	---	---	bon	bee
Konyanka	gbolo	gbasi	gbe	gban	---	---	be
Marka	gboo	gbasi	gba-ni	gban	---	bo	ba
Kurankɔ	bole	gbesi	gbe	---	gba-	---	---
Kɔnɔ	boo	gbasi	gbe	gban	gbai	---	gbe
Wassunlunka	golo	gbese	gbe	---	---	bo	be

- Vai and Ligbi alone above have \widehat{kp} , and most of the other languages have corresponding \widehat{gb} . (Kurankɔ, Kɔnɔ, and Wassunlunka also have other correspondences with ‘skin’.) The last two columns show correspondence between \widehat{gb} in Vai and Ligbi and b in the other languages, illustrating another common case, of retaining the labial articulation (*KP > P).

5. Other

- The patterns here not universal. Dimmendaal (2019:150) notes that labial-velars, present in Katla, have become labialized velar stops in the closely related Tima

(*gb > *g(w) > k(w)). /g/ is very rare (<http://tima-dictionary.mine.nu>) even though /b, d/ are common.

(8)	Katla	Tima	
	gb-əlana	kè-láánù	‘elder’
	gb-àjàŋ	k-àràŋ	‘leopard’
	g-û	k-úù	‘dog’
	g-únû	k-ónò	‘ear’

6. Summary

- These patterns (*KP > P and *kp > gb) are not the only reflexes of *KP, but they are by far the most common, and are more amenable to systematic explanations.
- Both patterns connect to phonetic explanations, especially to perceptual ones.
 - *KP > P because the labial gesture lags and is more perceptible than the velar
 - *kp > gb because even a “voiceless” /kp/ often has characteristics commonly found in voiced stops.
- It’s helpful when investigators note the phonetic details that I’ve alluded to above. But many do not. There’s usually a chart of phonemes, which is valuable, but it would be even more valuable if phonetic details like aspiration and implosion were noted, even measured. For example, if the airstream mechanism were more commonly noted, its effect on historical development could be clarified, even quantified.
- Dwyer (1989) reconstructs *kp, *gb and possibly a *lenis* *kp’ for proto-Mande. There’s more to investigate!

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