Balancing social determinism vs. sound change

The case of Fang

Roslyn Burns
Yale University

This paper investigates the relationship between social and phonetic motivations for language change in Fang (Bantoid). While previous research has proposed that innovations in Fang arose due to social need and lack phonetic motivation (Mve et al. 2019; Good, Di Carlo & Tschonghongei 2020), I propose that there is a phonetic motivation and the social situation, at best, was a pathway for the innovation to gain wider adoption in the population. I provide comparative and language-internal evidence that the Fang innovations are driven by two interconnected processes, palatalization and spirantization, triggered by high vowels. These processes have been obscured synchronically in part due to the phonemic merger of *i > ə in some parts of the paradigm, thus making the alternations look phonetically unmotivated.

Keywords: sound change, regularity hypothesis, social motivation, palatalization, Bantoid, labial-velars

1. Introduction

When language changes, there is sometimes a question as to whether intentional social acts or unintentional abstract behaviors determine the observed outcome. This paper presents a case study of the relationship between these two factors in Fang [fak] (Niger Congo: Bantoid), an under-documented language of western Cameroon.[1] Previous research on Fang proposes that an innovation of *labial-velar simplification*, whereby the double constriction of a labial-velar simplifies

1. There is another language spoken in Gabon with the same name, Fang [fan] (Niger Congo: Bantu A.75), which is not the focus of this paper. The similarity in these names is believed to be coincidental (Good et al. 2011: 146).

https://doi.org/10.1075/jhl.22012.bur | Published online: 18 September 2023
Journal of Historical Linguistics ISSN 2210-2116 | E-ISSN 2210-2124

(e.g., [kp] > [p]), has arisen due to intentional social acts (Mve et al. 2019; Good, Di Carlo & Tschonghongei 2020). Synchronic alternations of this sort appear in Fang's possessive pronoun paradigm. For example, a class 18a (c.18a) possessive head, like [m ə̀ ŋ k w á l á ŋ] 'calabashes (c.18a)',[2] is associated with multiple possessive pronouns. While some of these possessive pronouns exhibit labial-velars as in [**ŋm** ú] '1SG's calabashes (c.18a)', [**ŋm** ɛ́] '2SG's calabashes (c. 18a)', and [**ŋm** ə́ s ə́] '1PL's calabashes (c.18a)', others have only simplex labials as in [**m** í] '3SG's calabashes (c.18a)' and [**m** ə̀ b ú n] '3PL's calabashes (c.18a)'. Labial-velar simplification also targets plosives and glides, but curiously these alternations are mostly restricted to possessive pronouns. Labial-velar simplification is not found in content morphemes such as [**kp** í s ə́] 'elbow (c.5)', [ʃ j ə́ m **kp** ə́] 'armpit (c.7)', [**ŋm** ə̀] 'farm (c.18a)', [**gb** í m] 'to hunt', and [– **kp** ə̀] 'perfective'. Good, Di Carlo and Tschonghongei (2020) propose that Fang labial-velar simplification is not due to regular sound change because:

a. Labial-velar simplification is morphologically restricted to grammatical morphemes.[3]
b. Labial-velar simplification lacks a clear conditioning environment. Even within the possessive pronoun paradigm, one finds [ŋm] ~ [m] alternations before [ə] as shown above.

Instead, Mve et al. (2019) and Good, Di Carlo and Tschonghongei (2020) propose that labial-velar simplification has its origins in the speech community's regional identity and politics. In the Lower Fungom, where Fang is spoken, people-groups are determined based on perceived linguistic distinctness. Thus, in order to have autonomy, a group must have a claim to a distinct language. Following this line of thought, they propose that the Fang intentionally disguised their language, specifically portions of the possessive pronoun paradigm, to make it difficult for outsiders to understand (Mve et al. 2019: 177).

While this proposal from Mve et al. (2019) and Good, Di Carlo and Tschonghongei (2020) is attention grabbing, its social underpinning doesn't align with well-known developments in the assignment of social meaning and linguistic change. First, while social pathways are necessary conduits along which innova-

2. All diacritics used above vowels in this paper represent tone.

3. Although Mve et al. (2019) and Good, Di Carlo and Tschonghongei (2020) claim that these alternations are restricted to grammatical paradigms, a close read of the research team's work shows one such alternation in a content morpheme: [**gb** ú ŋ] 'mountain (c.5)' and [t ə̀ – **b** ú ŋ – k ə̀] 'mountains (c.13)' (Mve et al. 2019:173). Consonant-initial class 5 nouns are unprefixed, and notably the form [**b** ú ŋ] 'mountain (c.5)', without a labial-velar, is provided by the research team in Good et al. (2011). This is an isolated instance of the alternation outside of a morphological paradigm.

tions spread (Weinreich, Labov & Herzog 1968: 176–188; Labov 1994a: 1–33), innovative forms often originate from motivations internal to language structure, as opposed to motivations internal to social situations (Ohala 1983, 1985). Second, the assignment of social meaning to any given linguistic form seldom begins with complex meanings such as those referencing secrecy or political identity. Often, the earliest social meaning associated with a linguistic form is a direct reference to the individuals who utter the form know as a *1st order indexical* (Silverstein 2003). More complex social meanings, such as group characteristics, become linked with linguistic forms via metonymy from the 1st order indexical referent (the resulting social meaning is called an *n+1 indexical*). This means that contrary to Mve et al.'s (2019) and Good, Di Carlo and Tschonghongei's (2020) proposal, it is more likely that a novel linguistic form arose prior to the form indexing the Fang's political position.

Departing from previous work, I propose that the observed labial-velar alternations were phonetically motivated and historically had a predictable distribution. While there were social reasons to adopt labial-velar simplification in the community, as outlined by Mve et al. (2019) and Good, Di Carlo and Tschonghongei (2020), I propose that ultimately labial-velar simplification arose from palatalization, a process which is closely linked to spirantization. Both palatalization (without labial-velar simplification) and spirantization are observable in Fang's possessive paradigm, but previous work has not connected the relationship of the two processes.

The rest of this paper is organized as follows. Section 2 presents both social and linguistic background to the Fang community (Section 2.1) and its diachronic placement within Bantoid (Section 2.2). Section 3 focuses on identifying a motivated conditioning environment by reanalyzing the diachrony of Fang's alternations. Section 3.1 situates the reader in the previous literature on the historical structure of Benue-Congo possessive pronouns. In this section, I propose an alternative scenario to the origins of the paradigmatic alternation: simplex labials may be conservative inherited reflexes (i.e., there is no labial-velar simplification), and labial-velars may have developed in restricted environments.

Section 3.2 presents a novel comparative analysis of the paradigmatic alternations in Fang and related languages spoken in Cameroon: Mundabli (Bantoid) and Basaá (Bantoid: Bantu A.43). Fang and Mundabli, which are compared in Mve et al. (2019), have similar possessive stems, but otherwise the triggers of allomorphy share little in common. Instead, Fang exhibits alternations and motivations which are more similar to those found in Basaá. I propose that unlike Basaá, Fang underwent phonemic neutralization of *i > ə in noun class prefixes, which in turn disguised some triggers of the labial-velar alternation. Section 3.3 links the restricted nature of Fang's innovation to the concept of "regular sound change", drawing from examples both within Bantoid and across other languages.

Section 4 presents the phonetic pathway motivating labial-velars simplification before /i/, or, in the event that the alternative hypothesis is true, the failure to develop labial-velars before /i/. Both palatalization and spirantization are known to have occurred in other Bantoid languages, but few scholars have looked at how these processes are realized when they target labial-velars (Hudu, Miller & Pulleyblank 2009; Bennett 2014; Danis 2014, 2017). Section 4.2 discusses the relationship between the processes of palatalization and spirantization across the Bantu family. Even though the innovations in Fang are independent of Bantu, the Bantu survey lends support to the view that presence of palatalization and spirantization in Fang paradigms are mutually supportive, albeit distinct, processes.

Finally, Section 5 closes with a recap of why language planning itself is not the precursor to language change in the Fang. Although it is important to be sensitive the social conditions in which innovations develop, we should still be meticulous in our attempt to unearth the systematic non-social aspects of innovation.

2. Background

This section presents background to the Fang speech-community and the known linguistic properties of the language (Section 2.1). Next, this section discusses family affiliation, including known problems with sub-grouping, and where labial-velars fit within comparative analysis.

2.1 The Fang language

Fang is spoken in the Lower Fungom in northwestern Cameroon in a region known as the Grassfields. The map in Figure 1 shows the geographical location of Fang with respect to other languages spoken in the region.

Several behaviors support the claim that the Fang seek social and political independence from others. First, the Fang's village is unique in its physical structure, being covered by notably more canopy than other villages. This contributes to a sense of separation from a physical perspective (Mve et al. 2019: 174–175). Additionally, their village is known to be a much more recent settlement than others in the region. It is believed that they migrated to the Lower Fungom as a cohesive unit instead of forming *in situ* by recruiting locals (Mve et al. 2019: 175). The Fang price others out from joining their group by charging high prices to marry into the group and charging outsiders high prices to raise their children among the group (Mve et al. 2019: 174–176).

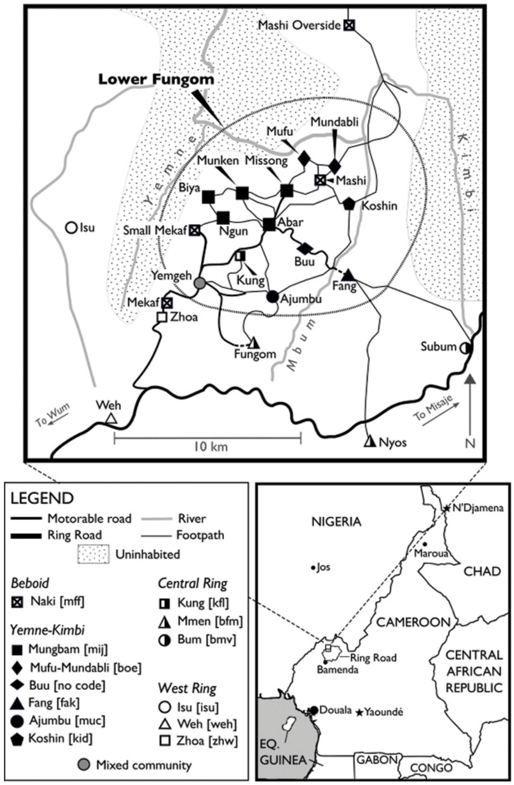

Figure 1. Distribution of Villages in the Lower Fungom (Di Carlo, Ojong Diba & Good 2021)

In the Lower Fungom, language plays a critical role in both politics and the sense of identity derived from the political structure. In this region, an individual's identity (including political affiliation) is centered around the concept of their village. A village's leadership and the language spoken by the leader form a large part of a village's identity (Di Carlo 2018: 145). Each village's leader is subject to the authority of village secret societies, yet the leader is the only one aware of the collective operations of all of the villages' secret societies (Di Carlo 2018: 156). Across most villages, the secret societies have similar structures except for the Fang's societies, which are structurally distinct (Mve et al. 2019: 174–175).

Because language is a symbol of the political leadership, locals understand language to be a tool by which residents validate the existence of themselves as a group and others as members of distinct groups (Di Carlo 2018: 154). For this reason, Good, Di Carlo and Tschonghongei (2020) proposed that the Fang seek to have identifiable linguistic differences between themselves and others: having a different language supports the idea that they are a separate group, and they are not beholden to the customs, traditions, and politics of others.

Like many languages of the Lower Fungom, Fang is under-documented and most public documentation is in written form without audio. Currently, there is a lexical database containing 429 total target items produced across two speakers (Tschonghongei 2022). Table 1 shows the segmental inventory of Fang according to Good et al. (2011).

Table 1. Fang Sound Inventory (Based on Good et al. 2011)[4]

	Labial		**Alveolar**		**(Alveolar-) Palatal**		**Velar**		**Labial-Velar**			**Front**	**Central**	**Back**
Plosive	(p)	b	t	d			k	g	kp	gb	Super-Close	i̝		u̝
Fricative	f	v	s	z		ʒ					Close	i		u
Affricate			ts		ʧ	ʤ		ŋ		ŋm	Close-Mid	e	ə	o
Nasal		m (ɱ)		n		ɲ					Open-Mid	ɛ		ɔ
Liquid				l							Open		a	
Glide						j				w				

The inventory in Table 1 represents a preliminary proposal of the Fang sound system. Other reports by the same research group suggest the occurrence of additional segments, such as [ʃ] and [ɨ], but they are not analyzed in terms of their phonemic status (Mve et al. 2019). The proposed system contrasts plain labial, plain velar, and labial-velar places of articulation.

The Fang vowel system distinguishes between close and super-close vowels. The super-close vowels sometimes trigger spirantization as in [g ú̝] ~ [gv ú̝] 'fire' (Good et al. 2011: 148). Across the Grassfields region of Cameroon, there are a variety of different super-close vowel effects, such as aspiration and spirantization which are only triggered by high vowels (Hyman 1972; Watters 2003).

In the morphological domain, Bantoid possessive pronouns are often comprised of two parts, a prefix marking the noun class of the head (the owned

4. I have collapsed the alveolar-palatal and palatal places of articulation. This is because the set has complementary membership; obstruents are alveolar-palatal, and sonorants are palatal. Phonologically, palatalization results in outputs across the palatal and alveolar-palatal region (see Section 3).

thing) and a stem marking the dependent (the owner) (Van de Velde 2019: 257). Mve et al. (2019) present the standard set of possessive pronouns as shown in Table 2 (Section 3.3 discusses additional possessive pronoun patterns). In Table 2, the rows are organized based on the noun class of the possessive head, where each noun class is represented by the standard Bantuist numbering system. As noun classes are not always semantically motivated, a sample member of each noun class is also provided. The columns are organized based on the person/number features of the possessive dependent.

Table 2. Preliminary Set of Fang Possessive Pronouns (Based on Mve et al. 2019: 168)

Head		**Dependent**					
Class	**Noun**	**1sg**	**2sg**	**3sg**	**1pl**	**2pl**	**3pl**
c.1	ŋ k ʊ́ ŋ 'chief'	v ù	ŋg ɛ̄	ŋg ì	ŋg ə̀ s ə̀	ŋg ə̀ n ə̀	b ú n
c.2	b ə̀ ŋ k ʊ́ ŋ 'chiefs'	kp ú	kp ɛ́	p í	kp ə́ s ə́	kp ə́ n ə́	b ə̀ b ú n
c.3	kp ú n 'tree'	v ù	ŋg ɛ̄	ŋg î	ŋg ə́ s ə́	ŋg ə̄ n ə̄	b ú n
c.4	k w u n 'trees'	v ú	ŋg ɛ̄	ŋg í	ŋg ə́ s ə́	ŋg ə́ n ə́	b ú n
c.5	f í n ə̄ 'bird'	v ū	w ɛ̄	v í	w ə́ s ə̄	w ə́ n ə̄	b ú n
c.13	t ə̀ f í n ə̀ 'birds'	t û	t ɛ̄	t ī	t ə́ s ə̄	t ə́ n ə̄	t ə̀ b ú n
c.7	k ə̀ m b à ŋ 'jaw'	kf ɨ̂	k ɛ̄	k î	k ə́ s ə́	k ə́ n ə́	k ə̀ b ú n
c.8	b ə̀ m b à ŋ 'jaws'	kp û	kp ɛ́	p î	kp ə́ s ə́	kp ə́ n ə́	b ə̀ b ú n
c.9	s ɔ̄ ŋ 'sheep'	v ú	ŋg ɛ́	ŋg í	ŋg ə̄ s ə̄	ŋg ə̄ n ə̄	b ú n
c.10	s ɔ̂ ŋ 'sheep'	v û	ŋg ɛ̂	ŋg ī	ŋg ə́ s ə̄	ŋg ə́ n ə̄	b ú n
c.18a	m ə̀ ŋ k w á l á ŋ 'calabashes'	ŋm ú	ŋm ɛ́	m í	ŋm ə́ s ə́	ŋm ə́ n ə́	m ə̀ b ú n

Good et al. (2011) do not provide a morphological analysis of Fang's possessive pronoun stems, but I propose that the stems are /ú/ '1SG POSS', /ɛ́/ '2SG POSS', /í/ '3SG POSS', /ə́ s ə́/ '1PL POSS', /ə́ n ə́/ '2PL POSS', and /ˋ b ú n/ '3PL POSS'. While the full analysis of the segmental makeup of the system will be discussed in detail in Section 3, this cursory analysis reveals a variety of segmental alternations in prefixes such as [v] ~ [ŋg] in classes 1, 3, 4, 9, and 10; [v] ~ [w] in class 5; [kp] ~ [p] in classes 2 and 8; [kf] ~ [k] in class 7; and [ŋm] ~ [m] in class 18a. Mve et al. (2019) and Good, Di Carlo & Tschonghongei (2020) note that this sort of variability is unusual in the region, thereby aiding the Fang's claim to cultural/political separation from others.

Finally, I shall note that Fang grammatical prefixes have a reduced vowel system, a property commonly observed in related languages. The extant data show that the ten vowel system in Table 1 reduces to /i, u, ɛ, ə/ in nominal grammatical paradigms (including grammatical prefixes and grammatical stems). In this respect, the vowel system can be defined along two dimensions, height and frontness, as shown in Table 3.[5]

Table 3. Fang Nominal Grammatical Paradigm Vowel Contrasts

	[+front]	**[−front]**
[+high]	/i/	/u/
[−high]	/ɛ/	/ə/

Even though the inventory in Table 3 lacks the super-close distinction among the high vowels, the system still has a clearly identifiable set which constitutes the highest member of the system shown in the first row. This will be relevant to the discussion of motivations underlying the paradigmatic alternations in Sections 3 and 4.

2.2 Regional diffusion vs. genetic affiliations

Fang is a member of the Bantoid sub-branch of the Benue-Congo clade in the Niger-Congo family. Bantu languages, like Basaá, are also Bantoid, but are often classified lower in the tree. The relationship between Bantu and the broader Bantoid family is important because Mve et al. (2019) likely failed to identify the motivation underlying Fang's paradigmatic alternations in part due to an attempt to compare apples to apples by only evaluating paradigms of higher-level Bantiod languages spoken in the same region (i.e., comparing Fang and Mundabli) to the exclusion of lower-level family relations or languages in other regions (e.g., Basaá). This is despite acknowledging that the Fang people are late arrivals to the Lower Fungom.

To give a sense of the potential pitfalls of this comparison, we should first understand that the term "Bantu" (also known as *Narrow Bantu*) is a designation created by Guthrie (1967–1971) on the basis of morphology and lexical traits. Guthrie classified Bantu languages both into a cohesive group, to the exclusion of other languages which appeared to be related, and into geographical subgroups of alphabetically labeled zones, so-called *Guthrie zones*, which are used to identify Bantu languages today. Figure 2 shows a composite map created by the author of the updated Guthrie zones based on Maho (2009).

5. A reviewer noted that there are many more features that could be used to describe these vowels, e.g., ATR. I have only included features which are necessary for understanding the morphophonological patterns observed in Fang's possessive paradigms.

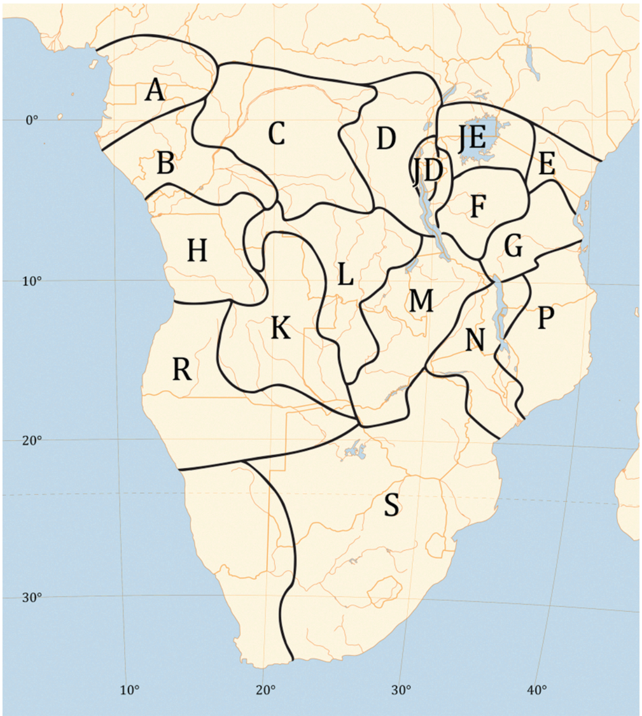

Figure 2. Guthrie Zones (Based on Guthrie 1967–1971; Maho 2009)

Today, we mostly understand the group labels to be areal in nature. They provide little insight into how individual languages relate to higher levels within Bantoid. Present-day SE Nigeria and Cameroon, which subsumes zone A, is widely believed to be the Bantu homeland, and Bantu languages within this region exhibit varying degrees of closeness to higher levels of the tree (Bastin & Piron 1999; Williamson & Blench 2000: 34; Nurse & Philippson 2003; Pakendorf, Bostoen & de Filippo 2011; de Filippo et al. 2012; Good 2018; Philippson & Grollemund 2019). To give an example of the murky boundaries between higher level Bantoid relationships and northwestern Bantu, Figure 3 shows two different trees. Figure 3a on the left is based on Dimmendaal (2011), whereas Figure 3b on the right is based on Bastin and Piron's (1999) lexicostatistical analysis.

Notice that in Figure 3a, (Narrow) Bantu is presented as if the entire set of languages shown in Figure 2 form a cohesive sub-branch within Bantoid. The distinction between the northwestern languages (i.e., those in zones A and B) and all other Bantu languages is a lower-level distinction.[6] In Figure 3b, however,

6. Watters (2018) notes that the branches and internal grouping of East Benue-Congo languages (including Bantoid) are not fully settled (2018: 6). Nurse and Philippson (2003) suggest

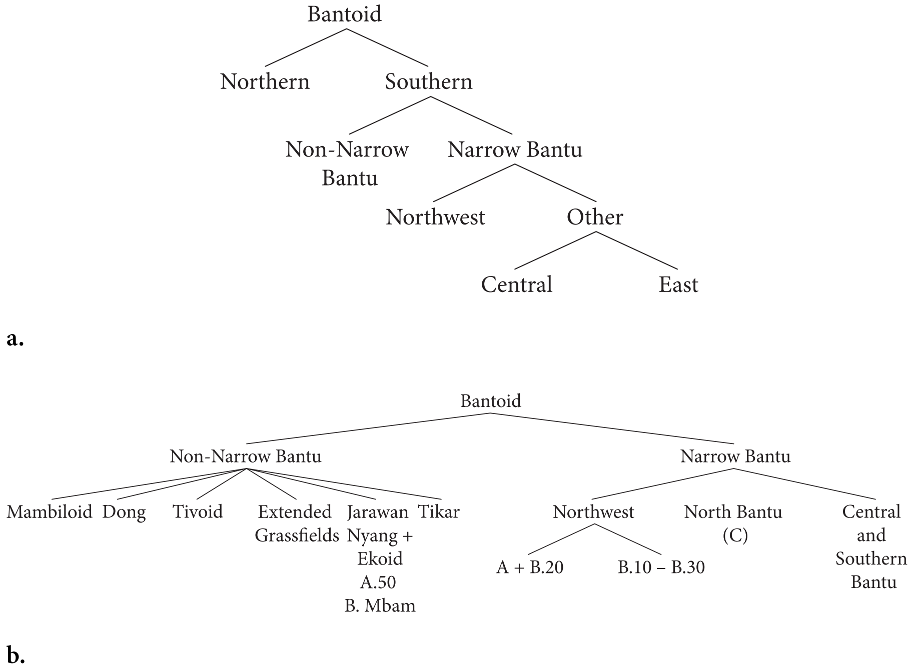

Figure 3. Lower Bantoid Classification: 3a. Dimmendaal (2011), 3b. Bastin and Piron (1999)

some zone A languages show a closer affiliation to non-Bantu Bantoid languages than they do to other central and southeastern Bantu languages.[7] Some scholars view the relationship between northwestern Bantu and higher levels of the tree as one in which individual sets of Bantoid languages sloughed off during migration until eventually larger more cohesive sub-groups developed (Philippson & Grollemund 2019).

Certain assumptions of the family tree model make it difficult to disentangle the Bantoid tree structure in the northwest. Perhaps most importantly, the model assumes that one can factor out the effects of areal diffusion in order to identify neatly defined sub-branches. As a region, the northwest is known for the areal diffusion of sound system properties, such as the development of maximum stem

that languages of zone A are Bantu, but they are split between different sub-groupings within Bantu (2003:178–197).

7. The split classification of zone A found in Bastin and Piron (1999) is similar to the results found in other lexico-statistical analyses of the zone A languages, even if other studies attempt to explain areal features as opposed to genetic affiliation (Philippson & Grollemund 2019:341).

size constraints (Hyman 2008: 341). The strategies used to bring stems down to size resulted in various types of stem-affix fusion and loss of phonological material which obfuscates the core object needed to perform comparative phonological classification.[8]

The best established reconstructed sound system within Bantoid is Proto Bantu (PB). Table 4 shows the PB sound system according to Hyman (2019).[9]

Table 4. Proto-Bantu Segment Inventory[10]

	Labial		**Alveolar**		**Palatal**		**Velar**			**Front**	**Central**	**Back**
Plosive	*p	*b	*t	*d	*tʃ	*dʒ	*k	*g	Super-close	*i		*u
Nasal		*m		*n		*ɲ			Close	*ɪ		*ʊ
									Mid	*e		*o
									Open		*a	

The two highest vowels of PB, known as the first degree vowels, are super-close and have properties consistent with fricative vowels, whereas the lower variant of close vowels, known as the second degree vowels, do not (Dimmendaal 2011: 25; Merrill 2013; Hyman 2019: 140–142; Maddieson & Sands 2019: 89). The first degree vowels often trigger a process known as Bantu Spirantization, that is the development of fricatives, on pre-vocalic consonants, as in **p í* mb ò 'stick' > Shona (S.10) [**tsv í** mb ó], but second degree vowels do not, as in ***p ɪ́** 'burn' > Shona – [**p ɪ́**] – instead of – [**tsv ɪ́**] –. Similar to the description of Fang (Bantoid) provided above, PB stems exhibit the full vowel system while prefixes exhibited a reduced inventory of *i, *ɪ, *ʊ, and *a (Hyman 2019: 132).

Notably absent from the reconstructions in Table 4 are labial-velars. Today, many Bantoid languages have labial-velars of the sort stop + glide (e.g. [kw]) that transparently developed from co-articulation with the following vowel as in *k U > [kw] (Hyman 2011: 15–16; Watters 2003: 236). Double closure labial-velars (e.g.,

8. Other Bantu regions (the east and the south) instead innovated minimum stem size constraints and thus maintain a lot of phonological material in the stem (Hyman 2008: 341), thereby aiding in the comparison of related forms.

9. For other representations of the Proto-Bantu inventory, see Bastin et al. (2002) and Bostoen (2019). Hyman (2019) also includes discussion of variation in the different proposed inventories.

10. Bastin et al. (2002), Good et al. (2011), Hyman (2003a, 2019), and Bostoen (2019) use the Africanist notation of <c>, <j>, <y>,<ny>, and <zh> for what I represent as IPA [tʃ], [dʒ], [j], [ɲ], and [ʒ]. Despite the uncertainty in the actual places of articulation, I use this representation to make the text more readable to non-Africanists.

[kp], [gb]) are often transparently derived from *kw, *gw, and *bw, sometimes exhibiting synchronic alternation as in as in Noni (Bantoid: Beboid) [**kw** ē n] ~ [**kp** ē n] 'firewood' (Hyman 2011: 15), c.f. PB ***k ʊ́** n ì 'firewood'. Related languages sometimes exhibit regular correspondences between double closure labial-velars and other labialized segments. Example (1) shows labial-velar correspondences in select A.20 languages and a comparative data point outside of the group (source: Bakweri, Monikang 1989; Atindogbe 2013; other A.20, Ebobissé 2014; Ekulu C.60, Grégoire 2003; Babiole C.101, Leitch 2003; Gyeli A.80, Grimm 2021; PB, Bastin et al. 2002).

(1)	Bakweri	Other A.20	Compare
a.	[**kp** é l í] 'death'	Duala [**kw** é d í] 'death'	PB ***k ú** - í d ì 'death'
	[m ò **kp** è ò] 'scabies'	Isubu [m è **k ò** l ò] 'scratch'	PB ***k ò** d ʊ d 'scrape'
	[**kp** ɛ̂] 'fall'	Mulimba [ì **k** ɔ́ɔ̀] 'fall'	Babiole **kw** é 'fall'
b.	[**gb** á m ù] 'goodness'	Duala [**bw** à m] 'goodness'	Eleku **b ò** – l á m 'goodness'
	[ŋ **gb** â] 'dog'	Duala [m **b** ɔ́] 'dog'	PB *N – **b ʊ́** à 'dog'
	[**gb** â] 'break'	Duala [**b ú** à] 'break'	Gyeli **bv ú** ɔ̀ 'break'
	[**gb** àà β á] 'snake'	Mulimba [**ɓw** à ɓ á] 'long'	Gyeli **bw** à 'to become big'
c.	[ŋ **gb** ɛ̀ nd ɛ̀] 'moon'	Isubu [ŋ **g** ɔ̀ nd ɛ̀] 'month'	PB *N – **g ò** nd è 'moon'

In (1), the most common consonant correspondences are those involving Bakweri [kp] and voiceless labialized velars, (1a), and those involving [gb] and voiced labialized labials, (1b). Although there are correspondences between Bakweri [gb] and voiced labialized velars, (1c), these are not as common.

Labial-velar stops with two closures are a well-known regional feature in West Africa and the Sudanic Belt including, but not limited to, parts of Cameroon (Connell 1994; Hyman 2011: 16; Maddieson & Sands 2019: 91; Idiatov & van de Velde 2021). Although labial-velars of this sort are found in several Bantu regions, this type of labial-velar did not originate within Bantoid languages and was borrowed as part of an areal prosodic emphasis strategy (Bostoen & Donzo 2013; Idiatov & Van de Velde 2021). Nevertheless, disentangling the relationship between labial-velars and borrowing can be difficult because, as shown in (1), the borrowed segment type has undergone extension from the borrowed context and now exhibits correspondences in inherited vocabulary. Despite the prevailing view that the sounds were borrowed, there are endogenous motivations for their further extension. According to Ponelis (1974), across Bantu, reflexes of labialized velars exhibit scalar gestural narrowing often resulting in spirantization as in [gw]

> [gv] (1947: 28–29, 38–48). In a restricted geographical area, which includes parts of Cameroon, the gestural narrowing scale is [gw] > [gb] > [ɓ].

3. Reconstructing Fang's Morphological Paradigms

This section establishes that the alternations observed in Table 2 are motivated by regular change. I first provide information about the known historical Benue-Congo possessive pronouns (Section 3.1). Based on preexisting reconstructions, I propose another potential trajectory of the innovation: simplex labials might be conservative (i.e., labial-velar simplification never happened). For space considerations, I follow Good, Di Carlo and Tschonghongei's (2020) trajectory and discuss the alternative in more detail in Section 4.

Section 3.2 presents a novel comparative analysis of another Bantoid language which has previously been compared to Fang, Mundabli (Mve et al. 2019), and a related Bantu language from a different region of Cameroon, Basaá. While lexically, Fang looks like Mundabli, phonologically, Fang behaves more like Basaá. Based on the comparative data in the Basaá paradigms, I propose that Fang underwent phonemic merger of *i > ə in noun class prefixes which obscured the source of labial-velar simplification. Crucially, this reconstruction provides a motivated conditioning environment for labial-velar simplification, absent of which the alternations appear phonetically unmotivated. Section 3.3 summarizes the findings of this section and provides a brief discussion of why these alternations can be understood as "regular sound change" even though they are in a restricted paradigm.

3.1 Prior reconstruction of the components of possessive pronouns

As stated in Section 2.1, possessive pronouns across Bantoid languages often consist of a prefix marking head properties (possessum) and a stem marking dependent properties (possessor). Morphologically, the noun class system, to which the prefix belongs, is one of the defining linguistic features of the Benue-Congo clade (Guthrie 1970; De Wolf 1971; Maho 1999: 246–261; Dimmendaal 2011; Hyman 2018b). Table 5 shows the proposed reconstructed noun class systems for Proto-Benue-Congo (De Wolf 1971; Good 2018) and PB (Meeussen 1967; Bostoen 2019). The agreement marker to the left is the nominal prefix and the agreement marker to the right is the concord prefix (or in the case of PB, the pronominal prefix). Note that alternating numerical pairing is only presented for space considerations.

Table 5. Reconstructed Noun Class and Concord Prefixes

	Proto-Benue-Congo		Proto-Bantu (Narrow)			Proto-Benue-Congo		Proto-Bantu (Narrow)	
1	*ù – / *ò -	*g w u – / *à -	*m ʊ̀ -	*g ʊ̀ -	2	*b à -	*b a -	*b à -	*b á -
3	*ú -	*u – / *g u -	*m ʊ̀ -	*g ʊ́ -	4	See class 10		*m ì -	*g í -
5	*l i -	*z í – (?)	*ì -	*d í -	6	*(m)$_{6a}$à -	*g a – / *a -	*m à -	*g á -
7	*k i – / *k e -	*k i -	*k ì -	*k í -	8	*b ì – /*b è -	*b i -	*b ì -	*b í -
9	*ì – / *è -	*z í -	*N\` -	*j ì -	10	*í -	*í – / *z í -	*N\` -	*j í -
11	*l u -	*l u -	*d ʊ̀ -	*d ʊ́ -	12	*k à -	*k a -	*k à -	*k á -
13	*t i -	*t i -	*t ʊ̀ -	*t ʊ́ -	14	*b ù -	*b u -	*b ʊ̀ -	*b ʊ́ -
15	*k u -	*k u -	*k ʊ̀ -	*k ʊ́ -	16	N/A		*p à -	*p á -
17	N/A		*k ʊ̀ -	*k ʊ́ -	18	N/A		*m ʊ̀ -	*m ʊ́ -
19	*b i -	*p i -	*p ì -	*p í -					

A known feature of the PB noun class system is the so-called 'nasal classes' constituting classes 1, 3, 4, 6, 9, and 10 (Good 2018; Hyman 2018b). The history of the nasal classes in the higher branches of Benue-Congo is murky. Watters' (2003) Proto-Grassfields Bantu (not Narrow Bantu) reconstructions have nasals in noun class prefixes 1, 3, 9, and 10, but no nasal in the corresponding concord prefixes (2003: 240). Still at these higher levels, there is debate as to whether nasality should be reconstructed in these classes or whether it represent a later innovation (see Hyman 2018b for a summary of three different positions). For example, class 1 has been reconstructed as *u, *N (u), and *ũ.

The data in Table 5 reveal a major complication for identifying the source of the labial-velar alternation in Fang. The Fang classes with simplification in Table 2, (e.g., class 8, class 18a), historically had plain voiced labials shown in Table 5. This leads to a potential confound; if labials result from labial-velar simplification, why not propose that labial-velars developed in certain environments and that simplex labial reflexes are conservative? That is, why not propose Benue-Congo *b > Fang [gb], [kp] except under certain conditions where the simplex labial is retained. Good, Di Carlo and Tschonghongei (2020) are of the view that the labial-velar alternations originated from a labial-velar source thus adopting the trajectory Benue-Congo *b > Pre-Fang *gb, *kp > Fang [b], [p] under certain conditions. As discussed in Section 2.2, double closure labial-velars can exhibit regular correspondences in inherited vocabulary; therefore, I do not dismiss Good, Di Carlo and Tschonghongei's (2020) trajectory out of hand. For the sake of continuity and space, I adopt Good, Di Carlo and Tschonghongei's(2020) position that the simplex labial is innovative.

Full possessive pronoun reconstructions are shown in Table 6 for Proto-Grassfields Bantu (Hyman 2018a: 203) and PB (Kamba Muzenga 2003).

Table 6. Possessive Stem Reconstructions in Proto Grassfields Bantu and Proto-Bantu

	Proto-Grassfields Bantu				**Proto-Bantu (Narrow)**		
	Class 1		**Class 2**				
	Singular	**Plural**	**Singular**	**Plural**		**Singular**	**Plural**
1st	*g ù – à m ə̀	*g ù – í t ə́	*b ə́ – à m ə̀	*b ə́ – í t ə́	1st	*-a – ng u / *-a – ng a	*- i – t u / *-i – ʊ
2nd	*g ù – ò	*g ù – í n ə́	*b ə́ – ò	*b ə́ – í n ə́	2nd	*- a – k u – o	*- i – n u / *- i – n ʊ
3rd	*g ù – í	*g ù – á b ə́	*b ə́ – í	*b ə́ – á b ə́	3rd	*- i – nd i – e / *-a – k a – e	*- a – b a – o

The forms in Proto-Grassfields Bantu look similar to the observed reflexes in Fang (see Table 2). Note that the reconstructed pronouns have a fairly uniform structure: CV-V(CV). While reflexes of Fang's pronominal stems frequently correspond to the V-initial roots proposed by Hyman (2018a), notably, the 3rd person plural stem /` b ú n/ '3PL POSS' is C-initial. The C-initial stem likely derives from reanalysis of the class 2 prefix marker into the stem itself. While I do not seek to account for the diachrony of individual pronominal stems, knowing that stems derive from different sources and have defined shapes, either C- or V-initial, is important to understanding the prosodic behavior of prefixes.

3.2 Comparative analysis of Fang

Today, possessive stems have a variety of prosodic shapes across different languages. Some languages exhibit exclusively C-initial stems (e.g., Nen A.44, Mous 2003; Pagibete C.401, Reeder 2019), others exhibit exclusively V-initial stems (e.g., Bakweri A.20, Atindogbe 2013; Kwakum A.91, Mous 2019), and still others have a mix.[11] Table 7 shows the prosodic structures of possessive stems in Mundabli, Fang, and Basaá.[12]

Table 7. Comparative Prosodic Structure of Stems

Mundabli				Fang				Basaá (Hyman 2003a: 266)			
V-Initial		C-Initial		V-Initial		C-Initial		V-Initial		C-Initial	
/ɨ̋ ŋ/	'1SG POSS'	/b ɔ̌/	'3PL POSS'	/ú/	'1SG POSS'	/`b ú n/	'3PL POSS'	/ɛ̂ m/	'1SG POSS'	/n â n/	'2PL POSS'
/ã̋/	'2SG POSS'			/ɛ́/	'2SG POSS'			/ɔ́ ŋ/	'2SG POSS'		
/ɪ̋/	'3SG POSS'			/í/	'3SG POSS'			/éé/	'3SG POSS'		
/ɪ̋/ (< *ɪ̋ s)	'1PL POSS'			/ə́ s ə́/	'1PL POSS'			/ɛ́ s/	'1PL POSS'		
/ɛ̋ n/	'2PL POSS'			/ə́ n ə́/	'2PL POSS'			/á p/	'3PL POSS'		

The prosody of the class prefix depends on the prosodic structure of the stem, which is a common type of development in Bantu class marking systems (Guthrie 1967–1971 Vol. 1: 36–40, 1970: 81–82). Table 8 shows this prosodic relationship in Mundabli, Fang, and Basaá.

Table 8. Representation of Possessive Pronoun Structure

	$_{\text{prefix}}$[C$^{(G)}$] -	$_{\text{stem}}$[V	$_{\text{prefix}}$[C V] -	$_{\text{stem}}$[C
	HEAD	DEPENDENT	HEAD	DEPENDENT
Mundabli	m -	ã̋	∅ -	b ɔ̌
	c.18a	2SG POSS	c.18a	3PL POSS
Fang	ŋm -	ɛ́	m ə̀ -	b ú n
	c.18a	2SG POSS	c.18a	3PL POSS
Basaá	hj -	ɔ́ ŋ	h í -	n â n
	c.19	2SG POSS	c.19	2PL POSS

11. A reviewer suggested that this difference is an artificial artifact of descriptive analysis, and that underlyingly, these languages are structurally similar.

12. Full possessive pronoun paradigms are provided in the Appendix.

C and $C^{(G)}$ occur before V-initial stems whereas C V and ∅ occur before C-initial stems. Some noun class markers might always exhibit a vocalic-element, but whether that element is a glide or independent vowel depends on the identity of the stem's initial segment.

Prosodically, Fang has two underlying synchronic shapes to prefixes, /C/ and /C V/. Before C-initial stems, /C/ prefixes delete as in /v/ – 'c.1' + /`b ú n/ '3PL POSS' > [b ú n] '3PL.'s chief (c.1)' whereas /C V/ prefixes surface faithfully as in /f ə / – 'c.19' + /`b ú n/ '3PL POSS' > [f ə̀ – b ú n] '3PL's calabash (c.19)'. Before V-initial stems, /C/ prefixes retain their underlying shape as in /v / – 'c.1' + /ú/ '1SG POSS' > [v – ú] '1SG's chief (c.1)', but /C V/ prefixes delete the vowel to avoid hiatus as in /f ə / – 'c.19' + /ú/ '1SG POSS' > [f – ú] ' 1SG's calabash (c.19)'. Table 9 summarizes the synchronic prefixes in Fang.

Table 9. Fang Prefix Forms

Possessive Head		Dependent Marking	
Class	**Examples**	**Prefix for V-Initial Stem**	**Prefix C-initial Stem**
c.1	ŋ k ӧ́ ŋ 'chief'	v –, ŋg -	∅
c.2	b ə̀ ŋ k ӧ́ ŋ 'chiefs'	kp –, p -	b ə -
c.3	kp ú n 'tree'	v –, ŋg -	∅
c.4	k w u n 'trees'	v –, ŋg -	∅
c.5	f í n ə̄ 'bird'	w –, v -	∅
c.13	t ə̀ f í n ə̀ 'birds'	t -	t ə -
c.7	k ə̀ m b à ŋ 'jaw'	k –, kf -	k ə -
c.8	b ə̀ m b à ŋ 'jaws'	kp –, p -	b ə -
c.9	s ɔ̄ ŋ 'sheep'	v –, ŋg -	∅
c.10	s ɔ̂ ŋ 'sheep'	v –, ŋg -	∅
c.19	f ə̀ ŋ k w á l á ŋ 'calabash'	f -	f ə -
c. 18a	m ə̀ ŋ k w á l á ŋ 'calabashes'	ŋm –, m -	m ə -

Segmentally, Fang exhibits [v] ~ [ŋg] allomorphy in classes 1, 3, 4, 9, and 10 (the nasal classes), even though concord prefixes in these classes are not reconstructed to have nasals (see Section 3.1).[13] Classes 1/3 and classes 9/10, which are associated with different prefix patterns in Table 5, exhibit paradigmatic leveling favoring the class 1/3 pattern. Although [v] ~ [ŋg] alternations appear suppletive,

13. I treat the surface [g] in [ŋg] as an excrescent segment which occurs during the nasal release into the following oral vowel.

the distribution of these allomorphs is phonologically conditioned: [v] always appears before high vowels, and [ŋg] appears in all other vowel contexts. Considering that a proposed reconstruction for the Benue-Congo class 1 prefix is *ʊ / ʊ̃ (see Section 3.1), we can propose that historically the prefix alternation derives from a *w ~ *w̃ alternation. We can posit this because w̃ > ŋ is a natural sound change attested in various language families outside of Bantoid (Ohala & Lorentz 1977: 584–587). This innovation occurs because the dorsal constriction in [w̃] creates an anti-formant structure which resembles the anti-formant structure of [ŋ], a segment which is simpler to articulate. This innovation is more often attested in the environment before lower vowels which resembles the distribution in Fang where [ŋ] is doesn't occur before high vowels in grammatical morphemes.

The connection between vowel height and paradigmatic alternations receives support from other static distributions; notably both [ŋg] and [k] never appear before [u] in the paradigm. A survey of Tschonghongei (2022) reveals that across the 429 Fang target words, there are no instances of [ŋ(g) u], and there are only 12 instances of both [k u] and [g u] between both speakers. This is curious because as mentioned in Section 2.1, the velar in [g ṳ́] 'fire' alternates with [gv ṳ́], but one speaker surveyed in Tschonghongei (2022) realizes this item as [gbv ə́]. This suggests the existence of a co-occurrence restriction against back vowels with back velars. This restriction is more evident in grammatical paradigms than in lexical morphemes. In the possessive paradigm, /k/ – 'c.7' + /ú/ '1SG POSS' is realized as [kf ɨ̂] '1SG's jaw (c.7)' with a loss of dorsality on the vowel and a leftward spread of labiality.

We shall now turn to Mundabli, the subject of previous comparison to Fang. As shown above, Fang and Mundabli have similar possessive stems, but despite this similarity, I will show that the two languages have different phonological motivations underlying the observed prefix alternations. The prefixes in Mundabli are shown in Table 10.

Prosodically, all Mundabli prefixes are synchronically underlyingly /C/ and delete before C-initial stems (hence why there are no C V prefixes before 3PL stems). Segmentally, Mundabli's C-prefix allomorphy derives predominantly from anticipatory nasalization in the 1SG stem, as in /b/ – 'c.2' + /ɪ̋ ŋ/ '1SG POSS' > [m ɪ̋ ŋ] '1SG's chiefs (c.2)', not vowel height like in Fang. The [w] ~ [ŋg] alternations in classes 1 and 3 likely derive from anticipatory nasalization historically creating a *w ~ *w̃ alternation and then, via natural sound change, *w̃ > ŋ. Natural sound change, however, cannot account for why classes 9 and 10 also exhibit [j] ~ [ŋg] alternations. This is because the phonetic underpinnings of [w] > [ŋg] would instead result in an unattested [j] ~ [ɲ] alternation.

The account of why Mundabli classes 1 and 9 both alternate with [ŋg] likely involves analogy within the nasal classes. Unlike Fang's nasal class analogy, which

Table 10. Mundabli Prefix Forms[14]

	Possessive Head	Dependent Marking
Class	**Example**	**V-Initial Stem Prefix**
c.1	ŋ k ŏ ŋ 'chief'	w –, ŋg -
c.2	b ə̀ ŋ k ŏ ŋ 'chiefs'	b –, m -
c.3	gb ō 'house'	w –, ŋg -
c.7,7a	n ɨ̀ m 'belt'	k –, ŋk -
c.8,8a	n ɨ̄ m 'belts'	b –, m -
c.9	ɲ àː m 'animal'	j –, ŋg -
c.10	ɲ āː m 'animals'	j –, ŋg -
c.19	f ì dʒ ǐ 'small dog'	f –, mf -
c.18,18a	m ù dʒ ǐ 'small dogs'	m -

leveled all nasal class alternations to the class 1/3 type, Mundabli's analogy only extends the nasal allomorph. The glide, which is a reflex of the vowel prefix in Table 5, is not affected by analogy. Although the Mundabli glide ~ [ŋg] class prefix alternation is formally suppletive in classes 9 and 10, it is phonologically conditioned suppletion. The nasal allomorph surfaces when required by the possessive stem's nasality as in /ŋ`/ – 'c.9' + /ɨ̋ ŋ/ '1SG POSS' > [ŋg ɨ̄] 1SG's animal (c.9)'; otherwise, the glide allomorph surfaces as in /j`/ – 'c.9' + /a̋/ '2SG POSS' > [j ā] '2SG's animal (c.9)'.

Contrary to the claim made in Good et al. (2011: 129), the third type of prefix allomorphy in Mundabli is phonologically predictable, being derived from dissimilatory nasality restrictions. When a form has two underlying sources of /ŋ/ in the same word as in /ŋ`/ – 'c.1' + /ɨ̋ ŋ/ '1SG POSS', the surface form lacks the final nasal as in [ŋg ī] '1SG's chief (c.1)', not [ŋg ī ŋ]. When the surface nasal is derived from nasality spread as in /k/ – 'c.7' + /ɨ̋ ŋ/ '1SG POSS', we observe two nasals as in [ŋ k ɨ̋ ŋ] '1SG's belt (c.7)'. The behavior observed in these forms is strikingly similar to the Kwanyama Law, a dissimilatory variant of Meinhof's Law discussed

14. The 3SG stem vowel changes shape depending on the surrounding consonants. This does not happen in other stems with high vowels. It is [u] following [w] and either [ɔ] or [i] following [b]. This suggests, that [b] may historically correspond to two different segments, one of which is specified for either round and/or low properties in class 2 [b ɔ̌] and another which is not specified for these properties in class 8 [b í].
Mundabli's free form pronouns are a mix of different shapes depending on their position with respect to the verb (Good et al. 2011: 127).

by Hyman (2019: 144). In the Kwanyama Law, a nasal + plosive cluster loses its nasalization if preceded by another nasal+plosive cluster. This leads to forms in Kwanyama (R.21) like [o **ŋg** o **b** e] 'cattle' < *N ≠ **g** o **mb** e and [o **ŋg** a **d** u] 'crocodile' < ***N** ≠ **g** a **nd** u (Hyman 2019: 144).[15] The retention of the velar nasal in class 7 is likely due to the failure of the nasal + voiceless plosive to meet the nasalization threshold necessary for dissimilation to take effect as nasalization cannot physically be carried for the same duration as it could be with a voiced consonant.[16]

To summarize, while Fang and Mundabli are lexically similar, the Fang segmental prefix allomorphy investigated up to this point has been shown to be sensitive to vowel height, whereas Mundabli prefix allomorphy is sensitive to stem nasality. In this respect, Mundabli is not the best comparative data point if our goal is to understand the phonological motivation underlying Fang's allomorphy. Comparative data from Basaá can help us make sense of Fang's labial-velars alternations of the sort [kp] ~ [p] < *kp, [ŋm] ~ [m] < *ŋm , and [w] ~ [v] < *w. Table 11 shows the synchronic possessive prefix system in Basaá based on Hyman (2003a). Note that Basaá, has either C or C^G prefixes before V-initial stems and C V or ∅ prefixes before C-initial stems.[17]

In Basaá, prosodic allomorphy can be accompanied by segmental changes as seen in classes 5 and 13. In these classes, /C V/ prefixes change before V-initial stems as in /d i/ – 'c.13' + /ɛ m/ '1SG' > [ʧ ɛ̂ m] '1SG's bird (c.13)'. The alternations in these two classes historically derive from glide formation and coronal palatalization. First, *C V prefixes prosodically reduced to C^G before V-initial stems, and then coronal palatalization applied as in class 5 *d ɪ + V > *dj + V > ʤ + V and class 13 *t i + V > *tj + V > ʧ + V. The corresponding CV reflexes before C-initial stems lack coronal palatalization (class 5 *d ɪ > l i, class 13 *t i > d i) because prosodic glide formation, which triggered palatalization, did not occur.

Similar to Fang, Basaá has C V prefixes with labial constrictions that alternate with labial-velar C prefixes (cf. Basaá classes 8 and 4). In the nominal prefix paradigm, the class 8 noun prefix *b i has two reflexes before V-initial stems, depending on the roundness of the stem vowel as in b i ≠ ɛ́ɛ́ 'tree (c.8)' vs. gw ≠ oó (< *bw

15. The classic version of Meinhof's law is assimilatory wherein NCVNC → NNVNC. This law reduces the number of NC contours in a word similar to the dissimilatory version described above. The Mundabli version of the dissimilatory innovation exhibits the extreme outcome of dissimilation: deletion (see Burns 2022 for scalar outcomes of dissimilation). Although, the Mundabli target segments are ŋgVŋ as opposed to two nasal+plosive clusters, there are variants of Meinhof's Law involving simplex nasals as the trigger as discussed in Hyman (2019: 138).

16. For more information about variable degrees of nasalization resulting in different phonological behaviors, see Stanton (2018).

17. Basaá /C/ prefixes delete before C-initial stems as in /w/ – 'c.1' + /n a n/ '2PL POSS' > [n a n] '2PL's child (c.1)'.

Table 11. Synchronic Distribution of Basaá Possessive Prefixes (Based on Hyman 2003a)

Possessive Head		Dependent Marking	
Class	**Example**	**Prefix for V-Initial Stem**	**Prefix C-initial Stem**
c.1	n l ó m 'man'	w -	∅
c.2	ɓ à l ó m 'man'	ɓ -	∅
c.3	ŋ ɛ́ m 'flower'	w -	∅
c.4	m i ŋ ɛ́ m 'flowers'	ŋw -	m i -
c.5	l i ɓ u m 'belly'	ʤ -	l i -
c.6	m a ɓ u m 'bellies'	m -	m a -
c.7	t ɔ́ ŋ 'horn'	j -	∅
c.8	b i t ɔ́ ŋ 'horns'	gw -	b i -
c.9	s ó ŋ 'moon'	j -	∅
c.10	s ó ŋ 'moons'	j -	∅
c.19	h i n u n í 'bird'	hj -	h i -
c.13	d i n u n í 'birds'	ʧ -	d i -

≠ oó) 'yam (c.8)' (Hyman 2003a: 263). We can posit that the class 8 possessive prefix before a V-initial stem similarly exhibited different reflexes in these two contexts: *bj and *bw > [gw]. Unlike the noun class prefixes, the possessive prefixes underwent leveling in favor of [gw]. In class 4, the labial-velar derives from *m i – ŋ (see Hyman 2003a: 262). In the possessive paradigm, prefixes cannot exceed one mora. Before C-initial stems, the ŋ is deleted but before V-initial stems the vowel is deleted. Absent of the high-front vowel, the C prefix *m ŋ fused into a labialized velar [ŋw].

An important difference between Fang and Basaá C-initial stem prefixes is that while Fang always exhibits the vowel [ə] in the prefix, Basaá exhibits different vowels in this part of the paradigm. The data in Basaá are more consistent with the reconstructed vowel qualities of Proto-Benue-Congo and PB (see Table 5), suggesting that Basaá is more conservative than Fang, which leveled all CV prefix vowels to /ə/. This is supported by other C V prefixes in the concord system. In C V prefixes before lexical noun stems, Basaá has /i, a/ (Hyman 2003a: 262), Mundabli has /i, u, ə/ (Good et al. 2011: 130), yet Fang only ever exhibits /ə/ (Good et al. 2011: 150).

Given the similarities between Fang and Basaá, I reconstruct *i as Fang's C V possessive prefix vowel. When the Basaá C V prefix vowel retains a high-front reflex of *i, the preceding consonant is simplex. If a Basaá prefix lost a high-front vowel, either due to deletion or rounding assimilation, a complex labial-velar segment can develop. In the Fang alternations, simplex labials are found in C V prefixes, but the C prefixes are always complex unless the following stem-vowel is [i]. This evidence supports reconstructing *i as the vowel following the simplex labials in the Fang CV class prefix, similar to what is found in Basaá.

Following Good, Di Carlo and Tschonghongei's (2020) trajectory, we must posit that Fang's class prefixes exhibit two innovations. One innovation is the paradigmatic leveling of all variation in the prefix vowels to *C V – > C ə -. Before leveling occurred, labial-velars in *C i – prefixes (classes 2, 8, 18a) all underwent simplification to plain labials. Because vowel leveling only targeted prefixes in Fang, the vowels in V-initial stems still retain their transparent relationship to the simplification process thus giving us insight into what drives the allomorphy.

Fang bears even more phonological similarity to Basaá when we look beyond the productive class prefix paradigm. In a non-productive subset of the possessive paradigm, Fang has reflexes of coronal palatalization shown in Table 12. Forms which exhibit similar alternations to those in Table 9 are excluded for space considerations.

Table 12. Non-Productive Fang Possessive Prefixes (Based on Mve et al. 2019: 171)

Possessive Head		Dependent Marking	
Class	Example	Prefix for V-Initial Stem	Prefix C-initial Stem
c.1	s ō n 'friend'	n –, ɲ –, ŋg – < *N -	∅
c.1	kp ə́ 'wife'	s – or ʃ – < *s -	∅
c.9	d à l é 'robe'	j – or ʒ – < *j -	∅

In this paradigm, coronals alternate with palatals as seen in class 9 and both versions of class 1. Unlike the class 1 alternations discussed in Table 9, there is no manner alternation with the reflex of *w̃ -. Instead, the nasal reflex exhibits three places of articulation depending on the height and frontness features of the following stem vowel (ɲ/_[+high], ŋg/_[+back+low], n/ elsewhere). Additionally, Fang exhibits spirantization of *j > [ʒ] before [i] and [u], which is not observed in either Mundabli or Basaá.

Fang's static phonotactic distribution of prefix reflexes is highly dependent on the adjacent vowel. Table 13 shows the distribution of coronal and labial-velar reflexes across the 4-vowel system of grammatical paradigms (see Table 3). Because vowel contrasts underwent leveling in some parts of the Fang paradigm, I distinguish between [ə] < *i and [ə] from other historical sources.

Table 13 shows that innovations mostly took place before *i and *u. As established in Section 2.1, the vowels [i] and [u] are the highest members of the reduced

Table 13. Phonotactic Distribution of Fang Possessive Paradigm Reflexes

Place	Manner	Segment	i, ə < *i	u	ɛ	ə
Coronal	Obstruents	*n	ɲ	ɲ	✓	ŋ
		*s	ʃ	ʃ	✓	✓
	Glides	*j	ʒ	ʒ	✓	✓
Labial-Velar		*w	v	v	✓	✓
	Stops	*kp	p	✓	✓	✓
		*gb	b	N/A	N/A	N/A
		*ŋm	m	✓	✓	✓

vowel inventory found in grammatical paradigms (see Table 3). Before the high vowels, coronals palatalized, or in the case of glides, spirantized. Spirantization is not restricted to coronals, as it also targets the labial-velar glide before high vowels. Labial-velar stops simplify, but only before *i. Similar to the spirantized labial-velar glide, the labial-velar stops only retain labial properties of the constriction. As mentioned above, there are also innovative restrictions disfavoring the co-occurrence of /u/ and simplex back velars. Table 14 summarizes my proposed reconstructions of the Fang prefixes and the contextual phonological processes which changed them over time. This table assumes that prosodic C ~ C V allomorphy is inherited.

As can be seen in Table 14's reconstructions, high vowels are the environment of simplification whether they are in the neighboring stem or the prefix itself.

3.3 Discussion

I have shown that contrary to Good, Di Carlo and Tschonghongei's (2020) proposal, there are phonological motivations to the patterns observed in Fang, and these motivations have correlates in related languages. While Fang's possessive paradigm stems and glide ~ [ŋg] alternations are similar to those found in its geographical Bantoid neighbor Mundabli, the phonologically motivated processes in Fang are distinct and more similar to those observed in Basaá (coronal palatalization and simplification of complex gestures). Fang underwent a unique innovation not found in the other two languages: merger of vowels in noun class prefixes to /ə/. This later innovation has obscured the conditioning environment of earlier labial-velar simplification in prefixes.

This brings us to another argument used by Good, Di Carlo and Tschonghongei (2020) to propose a non-structural motivation to labial-velar simplification: it is restricted to nominal grammatical paradigms; therefore, its imple-

Table 14. Reconstructed Fang Prefixes According to Good, Di Carlo and Tschonghongei's (2020) Trajectory

Possessive Head	**Dependent Marking**	
Class	**Prefix for V-Initial Stem**	**Prefix C-initial Stem**
c.1	*w – > v – / _[+high] *w̃ – > ŋg – / elsewhere	*w- > ∅ / _ C
c.2	*kp – > p – / _ i *kp – > kp – / elsewhere	*gb i – > *b i – > b ə -
c.3	*w – > v – / _[+high] *w̃ – > ŋg – / elsewhere	*w – > ∅ / _ C
c.4	*w – > v – / _[+high] *w̃ – > ŋg – / elsewhere	*w – > ∅ / _ C
c.5	*w – > v – / _ [+high] *w – > w – /elsewhere	*w – > ∅ / _ C
c.13	*t – > t -	*t i – > t ə -
c.7	*k – > kf – / _u *k – > k – /elsewhere	*k i – > k ə -
c.8	*kp – > p – / _ i *kp – > kp – / elsewhere	*gb i – > *b i – > b ə -
c.9	*w – > *v – / _[+high] *w̃ – > ŋg – / elsewhere	*w – > ∅ / _ C
c.10	*w – > *v – / _[+high] *w̃ – > ŋg – / elsewhere	*w – > ∅ / _ C
c.19	*f – > f -	*f i – > f ə -
c. 18a	*ŋm – > m – / _ i *ŋm – > ŋm – / elsewhere	*ŋm i – > m i – > m ə -

mentation is not exceptionless. According to this view, the innovation is not regular in a Neogrammarian sense (Hock 2009: 34).

The label "irregular" can be applied to otherwise natural and regular innovations for a variety of reasons. One such reason involves the failure to notice a conditioning environment as in the case of Grimm's Law which was subsequently regularized by the discovery of Verner's Law. Within Bantoid, there are a variety of historical processes which have asymmetries in their application. Hyman (2008) proposes that an asymmetry found in northwestern Bantu, and related languages spoken in Cameroon, is the development of prefix-stem fusion even though cross-linguistically this process should not be preferred (2008: 342). As I have argued above, Fang is one such case where we failed to notice the conditioning environment of an otherwise regular innovation.

Another source of irregularity is *lexical diffusion*, which directly challenges the regularity hypothesis. In this process a pattern originating in one part of the lexicon spreads to other parts of the lexicon until it eventually appears to be exceptionless (Wang 1969). The idea that exceptionless sound change begins in more restricted domains has gained support among historical linguists and has even been proposed for the development of Bantu Spirantization reflexes in east Africa (see Labroussi 1999).[18] In this innovation, high vowels trigger plosives to spirantize stem internally, and the process eventually spreads to other domains. There is an observable hierarchy wherein spirantized reflexes are most likely to be found in roots, where the process originated, but among suffixes there is also a hierarchy. Causative suffixes are most likely to exhibit these reflexes followed by agentive suffixes, followed by perfective suffixes (Labroussi 1999; Hyman & Merrill 2015). As discussed above, Fang also seems to exhibit properties which may be consistent with lexical diffusion as the pronominal paradigm exhibits more co-occurrence restrictions on place features than lexical morphemes (see Sections 2.1 and 3.2).

Restricted innovations can regularized, leading to the appearance of a "regular" sound change. Outside of dialect/language contact, this can arise due to production and processing.[19] Bybee (2002, 2015) proposes that all sound change begins as a restricted process, especially in frequent lexical items, and only later regularizes. She attributes the frequency effects in part to the amount of articulatory practice that speakers have with individual lexical items. With any speech gesture, speakers may fail to achieve the target gesture known as *undershoot*. The more we repeat any given lexical form, the more undershoot we produce, which in turn can enter into one's experience-based lexical memory. This leads to a pattern where high frequency items often show a greater degree of undershoot and gestural overlap, and low frequency items tend to be more conservative (Bybee 2015: 481–482). In the case of Fang, failing to make a full double closure

18. Hyman and Merrill (2015) argue that irregularities in Bantu Spirantization reflexes in Lumogi (Bantu JE.16) arose from paradigmatic leveling and borrowing as opposed to lexical diffusion. Similarly, Bostoen (2008) provides an account of Bantu Spirantization as the reanalysis of a predictable phonological alternation to signal specific morphological relations.

19. Labov provides a case of regularization from dialect contact with the development of the Northern Cities Shift which originated from the New York City low-front vowel tensing pattern. Speakers of different New York City patterns underwent gradual regularization when they settled together in large numbers (Labov 2007: 334–335, 373). They ultimately leveled the complexity of the original input patterns to a wholly regular innovation which became the first vowel movement of a vowel chain shift known as the Northern Cities Shift (Labov 1994b: 195).

in [kp] can be a form of gestural undershoot, and in the environment of [i] co-articulation with the vowel's high tongue-body may exacerbate the undershoot. Additionally, grammatical morphemes, such as pronouns, tend to be frequently used.

Finally, some have argued that restricted sound change is driven by semantic contextual recoverability. Blevins (2005) proposes that the loss of repeated segments in a reduplicant string is driven by the listener's ability to recover semantic information from the base in the event that the signal is compromised (e.g., due to ambient noise). Given that prosodic structures across a given reduplication process are ostensibly the same, the listener is more tolerant of changes in the predictable reduplicant morpheme than they are to changes in the base. Bases tend to be less predictable because they often exhibit more structural and contextual variability. This consideration may help explain why in Fang, the proposed labial-velar simplification tends to be found in grammatical prefixes rather than content morphemes.

4. Phonetic pathways favoring labial-velar simplification

The previous section identified evidence in favor of the view that labial-velar simplification is structurally motivated in Fang. In this section, I discuss the phonetic pathways that favor simplex labials as natural reflexes of labial-velar simplification. Independent of vowel environment, labial-velars are known to be subject to simplification processes. Kpogo, Mueller Gathercole and Nsiah Tetteh's (2021) survey of labial-velar plosive acquisition among Ga (Niger-Congo: Atlantic) children shows that the most common error is simplification with strong a bias towards preserving the labial constriction. This finding mimics a bias in adult perception wherein C V transitions are favored over V C transitions, leading to V C_1 C_2V reduction favoring the retention of the second consonant, especially when the two consonants are stops (Côté 2000: 139–142). While the observed tendency towards labial-velar simplification is a non-contextual property in Ga, in Fang, we must be able to account for why *i seems to be the most aggressive trigger of simplification and what connection *u has to both labial velar simplification in *w and more broadly coronal palatalization.

Section 4.1 discusses the phonetic underpinnings favoring the development of labial simplification as a form of palatalization, a cross-linguistically common processes which occurs before /i/. To return to an earlier point, it is possible that Good, Di Carlo and Tschonghongei's (2020) proposed trajectory of labial-velar simplification is wrong (Section 3.1); i.e., labial-velars may have just failed to develop before /i/. The phonetic motivations explained in Section 4.1 are robust enough to explain the same conditioning environment as a blocking environment if the alternative trajectory *p > [kp] is correct.

In Section 4.2, I discuss a process related to palatalization, known as spirantization. Palatalization is a known feature in some Narrow Bantu regions and is often connected to Bantu Spirantization (Hyman 2003b), but many Bantu regions lack double closure labial-velars (see Section 2.1 for discussion of the geographical distribution of labial-velars). While the innovations involving spirantization in Fang are independent of the innovations previously investigated in Narrow Bantu, I note that Bantu Spirantization is physically motivated by similar articulatory gestures to those that bring about palatalization. Previous surveys of Bantu Spirantization reveal that the shared motivation for spirantization and palatalization frequently result in both processes applying at once. This supports the idea that glide spirantization in Fang pronominal paradigms may be related to the development of both coronal palatalization and labial-velar simplification.

4.1 Palatalization

Palatalization is a process whereby the tongue is raised to an i-like position during the primary gesture of another consonant (Ladefoged & Maddieson 1996: 363). The most common triggers of the process are [i] and [j]; all other triggers have dependency relationships with these vocoids. According to Bateman (2007) two implicational relationship of triggers exist which are outlined in (2):

(2) a. Trigger Height Dependency: Lower front vowels cannot trigger palatalization unless higher front vowels also trigger palatalization. The inverse does not hold.
  b. Trigger Backness Dependency: Higher back vowels cannot trigger palatalization unless higher front vowels also trigger palatalization. The inverse does not hold.

These implicational relationships are obeyed in both Fang coronal palatalization and labial-velar simplification: *u does not trigger palatalization of *n > ɲ and *s > ʃ independent of *i. In the simplification of *w > v, the same is true. When labial-velar stops are simplified, the innovation appears to be more restricted because only the most aggressive trigger of palatalization, the high front vowel, triggers the process; the high back vowel does not participate. As a reminder, finding a simplex labial in the C ə – prefixes is not an exception to the generalizations in (2). Rather, as established in the previous section, the simplex labial is the result of a palatalization process triggered by *i prior to the phonemic merger of *i > ə in Fang grammatical prefixes.

Palatalization tends to target certain segments more readily than others. Segments which are articulated with the tongue, that is dorsals and coronals, tend to undergo the process more so than labials. From this, Bateman (2007) draws another implicational relationship which is outlined in (3):

(3) a. Target Place Dependency: Labials do not undergo palatalization unless either dorsals or coronals also undergo the process. The inverse does not hold.

Dorsals in particular are highly susceptible to the phonetic process of palatalization. *Automatic palatalization* is a process in which dorsal segments undergo some degree of palatalization in so far as they are in the context of [i] (Hyman 1975: 171). While this suggests that the labial-velars would be highly subject to palatalization, because of the dorsal constriction, Bateman (2007) does not analyze the relationship of complex vs. simplex targets.

Nupe (Benue-Congo: Nupoid) is the only language in Bateman's (2007) survey identified as having labial-velar stop palatalization. In Nupe, all simplex place constrictions, labial, coronal, and dorsal, also undergo palatalization (Bateman 2007: 438–439). Dagbani (Niger-Congo: Atlantic) also exhibits labial-velar palatalization (Hudu, Miller & Pulleyblank 2009; Bennett 2014; Danis 2017), and similar to Nupe, other simplex places such as velar, coronal, and labial also palatalize (Danis 2017: 149; Hudu 2018: 216). Danis (2014) proposes a relationship wherein doubly articulated stops cannot undergo a phonological process unless that same process applies to simplex stops. This implies that if palatalization targets a labial-velar, it should also target segments with simplex constrictions as observed in Nupe, Dagbani, and ostensibly Fang.

Finally, while triggers and targets are important issues, possibly the most important question involving the palatalization hypothesis is "How does palatalization result in a simplification outcome?" Palatalized labial-velars in Nupe result in [kʲpʲ] (Bateman 2007), whereas in Dagbani, they result in either [tp], [cp], or [cpʃ] (Hudu, Miller & Pulleyblank 2009; Bennett 2014; Danis 2017).[20] Although these languages fail to simplify labial-velars, there are perceptual and production-based reasons as to why simplification may result in plain labials (or why plain labials may fail to develop into labial-velars), specifically in the palatalizing context.

20. For an approach to labial-velar simplification involving place markedness, see Danis (2014). Danis (2014) hypothesizes that labials are the least marked constriction of labial-velars suggesting that simplification should result in a plain labial. Hudu (2018) provides an alternative view to place markedness.

A *consonant locus* is an acoustic artifact that reflects information about the interaction between tongue body movement in consonant production and C V co-articulatory resistance (Sussman, McCaffrey & Matthews 1991; Iskarous, Fowler & Whalen 2010). The less the body of the tongue is involved in the articulation of a consonant or the more resistance there is to C V overlap in production, the lower the consonant locus will be. The fact that either tongue body movement or co-articulatory resistance result in a similar acoustic artifact suggests that these behaviors are acoustically convergent. When distinct articulatory properties lead to convergent acoustic cues, listeners are more likely to erroneously attribute the wrong articulation to the production of the cue. While locus itself is not an object of perception, rather the formant transitions that we use to calculate locus are directly observable by listeners, locus is a convenient tool for understanding which segment types are likely to exhibit acoustic convergence and in turn, which segment types are likely to be confusable to listeners.

Simplex constrictions exhibit a hierarchy wherein labials have the lowest loci, followed by dorsals, and finally coronals/palatals (Iskarous, Fowler & Whalen 2010). Connell's (1994) survey of Ibibio (Benue-Congo: Cross-River) found that when combined, the labial and velar constrictions together resulted in the production of a consonant locus that was much lower than that of normal labials (1994: 469).

Hudu, Miller and Pulleyblank's (2009) ultrasound investigation of Dagbani suggests that tongue retraction occurs for labial-velars in non-front vowel contexts, but tongue advancement (i.e., co-articulation) occurs before /i/. An acoustic consequence is that labial-velars before /i/ will average higher loci than labial-velars in other contexts. If a listener receives an acoustic signal of a labial-velar before a high front vowel, and they are tasked with categorizing the signal, they might mistake the consonant type for a different category with convergent acoustic properties that also result in higher loci. This could include plain labials, but could also potentially include something higher in the locus hierarchy like coronals.

Each constriction of a labial-velar is independently confusable with coronals in palatalizing contexts. Guion (1998) found that in contexts favoring palatalization, mentioned in (2), English listeners were more prone to misinterpret dorsals as coronals (i.e., /k/ as /tʃ/) than they were to correctly identify the dorsal. They seldom mistook coronals for dorsals in the same context. This tendency can be extended beyond English speakers as we find examples of palatalization in Bantu where dorsal consonants palatalize before high front vowels, yet historical coronals are not confused for dorsals in this context (cf. Shona S.10 PB ***k** í g è 'eyebrow' > [**ts** í j è], PB *****t** í k ʊ̀ 'night' > [**s** í k ú], not [**k** í k ú], PB *****g** ì 'a fly' > (n h ú n)[**z** ì], PB *****d** í m 'extinguish' > – [**dz** í m] – not [**g** í m]).[21]

In palatalizing contexts, labials are confusable with coronals as observed in Southern Bantu (Doke 1954; Ohala 1985; Bateman 2010). Xhosa (Bantu S.41) exhibits dissimilatory palatalization wherein labials palatalize before a high back vowel and the glide [w] as in PB *d ú **m** + w a 'bite' > *l u **mʲ** w a > Xhosa [l u **ɲ** w a] (Doke 1954; Kotzé & Zerbian 2008; Bateman 2010; Bennett & Braver 2015). Ohala (1985) attributes the change of palatalized labials > coronals to perceptual confusion of the formant transitions (as opposed to other acoustic characteristics). Because the formant transitions of palatalized labials bear more similarities to coronals than to plain labials, the listener erroneously assumes that the palatalized labial is actually coronal. Figure 4 shows the author's pronunciation of the sequences [ɑbɑ], [ɑbʲɑ], and [ɑdʒɑ] in Praat (Boersma & Weenink 2019).

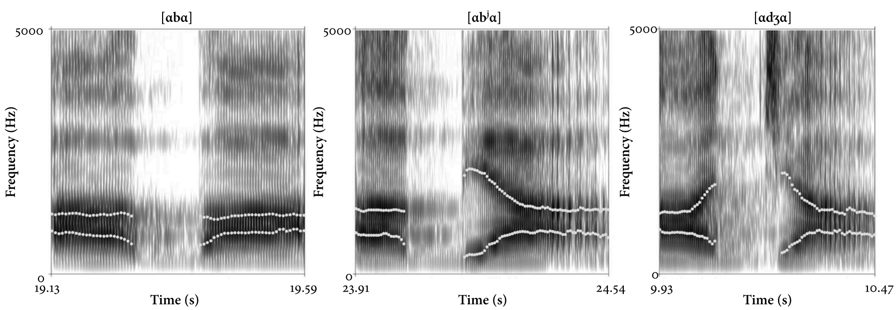

Figure 4. Formant Transitions for Plain Labials (left), Palatalized Labials (center), and Coronals (right)

Notice that the palatalized labial formant transitions are more similar to the coronal transitions than they are to the plain labial transitions. This is due to the coronal gesture that the tongue makes during the secondary articulation. While Bateman (2010) rejects the perceptual basis of this innovation in favor of a production-based explanation (glide hardening), both Ohala (1985) and Bateman (2010) concur that there is a phonetic basis for labials becoming coronal in palatalizing contexts. One of the proposed reflexes of labial-velar palatalization in Dagbani is [cpʃ] (Bennett 2014: 116–117; Danis 2017), which reflects the palatal labial > coronal innovation. Additionally, the palatalized labial > coronal inno-

21. Recasens (2020) claims to have found counter-examples where palatals become velars in Romance. In these cases, a palatal segment like [c] is an allophone of both coronals and dorsals, and the assumption that the coronal subset is underlyingly dorsal is due to hypercorrection on behalf of listeners (Recasens 2020: 51–52).

vation has cross-linguistic support and is found in a variety of non-Bantoid languages as in Old French (cf. Latin *rubeus* 'red' > French [ʁuʒ], but Spanish [ru**bj**o] 'blonde'), Moldovan Romanian (cf. Standard Romanian [psal**m**] 'psalm', [tsə**p**] 'splinter' > Moldovan Romanian [psla**nʲ**], [tsə**kʲ**], Bateman 2010), and Common Slavic (cf. *vo**nj**a 'smell' > Russian *вонь* [vo**nʲ**] with the expected palatalized segment, but *ze**mj**a 'land' > *земля* [ze**mlʲ**a] with an excrescent palatalized coronal, Shevelov 1965: 208, 220) to name a few.

Given that both labials and velars can independently be confused with coronals, possibly one way to avoid confusability is to remove the constriction which has the highest likelihood of being interpreted as coronal: the dorsal (see Example (3) above). At first blush, the explanation positing avoidance of perceptual confusion seems to be at odds with the explanation that palatalization occurred and thus raised the consonant locus; however, both may have happened. Language users may have applied palatalization, but in response to their high confusability with coronals, they may have eroded the velar component in order to retain as many labial-velar cues as possible. A similar logic can be applied to the retention of plain labials according to the alternative hypothesis. In this hypothesis, where *p > [kp] except before *i, the exception can be explained because coarticulation with [i] would interfere with production and perception of labial and labial-velar cues, thus language users would avoid developing labial-velars in this environment to avoid confusability.

4.2 Spirantization

While there are robust studies on the cross-linguistic realization of palatalization (Bhat 1978; Bateman 2007, 2010), there are notably fewer studies on spirantization. For this reason, we will look at spirantization from a language family internal perspective to ask (a) how does the spirantization in Fang compare to spirantization in related Bantu languages, and (b) should we interpret palatalization and spirantization in Fang to be related processes (i.e., should it matter for the argument of labial simplification that *j > ʒ/ _V[+high])?

Similar to palatalization, spirantization involves reducing the surface area of the oral cavity available for air to flow freely. When this occurs, pressure rises faster, meaning that laminar airflow (characteristic of low pressure and glides) is more likely to become turbulent (characteristic of fricatives) in a short amount of time. In this respect, a glide like [j] is more likely to become turbulent potentially resulting in [j̝] or [ʒ]. Evidence from Narrow Bantu suggests that the highest vowels in the inventory tend to trigger spirantization (Schadeberg 1994; Labroussi 1999; Bostoen 2008; Merrill 2013; Hyman & Merrill 2015). This is especially true if the two highest vowels in PB, the fricative vowels, merged with the second highest set of vowels in the system (Schadeberg 1994).

Unlike palatalization, spirantization exhibits no clear dependency relationship where one member of the highest vowel category could trigger spirantization but the other could not. While no one has fully worked out the correspondences in Fang, for reasons discussed in Section 2.1, we do know that Fang has superclose vowels in the full vowel system and that these vowels have a fricative quality that can spread to neighboring consonants. Unlike labial-velar simplification, spirantization is found in content morphemes (see the discussion about 'fire' in Sections 2.1 and 3.3).

Across different Narrow Bantu languages, innovative spirantization is frequently observed. Merrill's (2013) survey of the development of spirantization in southern Bantu languages (zones H, K, L, M, and R) found that the innovation mostly targets occlusive reflexes of PB oral plosives and, to a lesser extent, targets glides. For this reason, it is curious that in the Fang pronominal paradigms, glides readily spirantize before high vowels, as in /j/ – 'c. 9' + /í/ '3SG POSS' > [ʒ ì] '3SG's robe (c. 9)', but other manners of articulation, such as plosives tend not to undergo this process as in /k/ – 'c. 7' + /í/ '3SG POSS' > [k î] '3SG's jaw (c. 7)' and not [ʃ î]. The one exception to this generalization is *k – 'c.7' + *u '1SG POSS', which has the reflex [kf ɨ̂] instead of [k û], but as mentioned in Section 3.2, this is likely just leftward spread of labialization owing itself to a more general restriction in Fang disfavoring the co-occurrence of high back vowels and back velars. Notably, in many reflexes of Bantu Spirantization, the process does not result in historical vowels losing backness or labial specifications, as we observe in Fang. This suggests that while the spirantization innovations in Fang have a similar conditioning environment to the spirantization innovations in Bantu, they are likely independent of each other.

In Bantu Spirantization, changes in consonant manner are often accompanied by changes in place. Place changes are consistent with place properties of the vocalic trigger. Labialization often co-occurs with spirantization triggered by *u, and palatalization often co-occurs with spirantization triggered by *i. For example, in Ganda (Bantu E.15), PB *p, *t, *k palatalized to [s] before *i but labialized to [f] before *u (Schadeberg 1994: 75). In Luba (Bantu L.31a), Safwa (Bantu M.25), Inamwanga (Bantu M.22), and Ndali (Bantu M.301), a similar set of reflexes are found for the voiceless plosives, with the exception that *p only spirantizes before *i; it does not palatalize (Schadeberg 1994: 75; Labroussi 1999: 345, 347, 353). The fact that *p does not palatalize, but *t and *k do, is consistent with Bateman's (2007) implicational hierarchy outlined above in Section 4.1, wherein labials are the least likely segment to undergo palatalization. While most of the feature spreading reported in Bantu Spirantization involves vowel frontness vs.

labiality, sometimes the innovation just involves narrowing the vocal tract (consistent with high vowels) but no palatalization. In Herero (R.30, Merrill 2013), *b, *d, and *g always exhibit anterior coronal reflexes before *i (always [ðe]) and *u (always [ðu]), as do *p, *t, *k (> [θe], {[θu]/[tu]}).

These data suggest that while palatalization and spirantization are independent processes, they often support each other and co-occur in the Bantu family. The co-occurrence of these two processes happens because the articulatory condition of one provides the necessary articulatory condition for the other. Although Fang is not Bantu, given the physical motivation for the co-occurrence of these processes, it is reasonable to interpret spirantization as supporting palatalization (or vice versa) in the Fang paradigms. This suggests that while spirantization and palatalization may have developed in separate stages in Fang, the presence of one could have promoted the development of the other.

4.3 Summary

This section explored the connection between labial-velar simplification and palatalization, on the one hand, and palatalization and spirantization on the other. While it is the case that labial-velars can simplify to labials without a vocalic context, palatalizing contexts may destroy some of the unique acoustic transition properties of labial-velars resulting in a higher likelihood to confuse labial-velar transitions with coronal transitions. While some languages, like Ibibio and Dagbani, tolerate this potential confound, likely by relying on other acoustic cues, other languages, like Fang, may resolve it by removing the dorsal constriction, as dorsals are most likely to result in coronal transition cues. The destruction of the unique acoustic cues is relevant to the alternative hypothesis, wherein the labial reflex is conservative. In effect, labial-velars would fail to develop from *b and *m before *i because the acoustic cues used to identify place would deteriorate in this co-articulatory context.

The presence of spirantization in the Fang paradigm is most likely motivated and supported by palatalization (and vice versa). While we should not interpret spirantization in related Bantu languages to be a shared innovation, the distribution of Bantu Spirantization reflexes across different environments supports the view that spirantization and other types of feature spreading (like palatalization) can co-occur.

5. Closing

This paper evaluated the claim by Mve et al. (2019) and Good, Di Carlo and Tschonghongei (2020) that labial-velar alternations in Fang pronominal paradigms derive from a conscious choice made by the speech-community, rather than regular phonetic properties. At the outset, I voiced skepticism about this claim, because novel linguistic forms often travel along social pathways but are not generated due to social need.

Using evidence from Fang and related languages (Mundabli and Basaá), I argued that alternations in Fang's possessive paradigm are structurally motivated. Segmentally, possessive stems and prefixes in Mundabli and Fang bear some similarities (e.g., *w ~ *w̃), but the phonological motivation for allomorphy is distinct in the two languages. Glide nasal allomorphy is derived from root nasality spread in Mundabli, but according to vowel place properties Fang. Alternations triggered by vowel place properties in Fang bear some similarities to alternations triggered by vowel place in Basaá, most notably, labial-velar alternations. The similarity between Fang and Basaá helped to provide justification for reconstructing *i in Fang's C V possessive prefixes, thereby uncovering the regular conditioning of labial-velar simplification not detected in previous work.

After proposing the relevant reconstructions, I provided evidence that the conditioning environment of labial-velar simplification follows normal typological properties of palatalization. Labial-velar palatalization likely results in simplification of the complex segment, because the formant transitions in this context are highly confusable with coronal transitions. The speaker responds by removing the dorsal constriction in an unconscious attempt to assist the listener in identifying the correct constriction place. This motivation is also relevant to the alternative hypothesis where the simplex labial is conservative and failed to become a labial-velar in palatalizing contexts. I have additionally provided evidence that the spirantization observed in the paradigmatic alternations is likely related to the process of palatalization, but appears to be independent of Narrow Bantu Spirantization.

In sum, the evidence provided in this paper supports the view the paradigmatic alternations in Fang arose from compatibility issues with labial-velars and tongue-raising/tongue-fronting gestures as opposed to social utilitarianism. The social value of the alternation was likely *post hoc*. Whether one works on Benue-Congo languages or not, this investigation should serve as a cautionary tale. While it may be tempting to focus on social aspects and consequences of language use, which are very real and important aspects of language, the linguistic forms which are assigned social meaning often precede the assignment of social value to those forms.

Acknowledgements

I would like to thank Jeff Good and the KPAAM-CAM team for their generosity in granting me access to their lexical databases and maps for this paper. I would also like to thank the Yale Historical Linguistics Working Group, Darya Kavitskaya, William Bennett, and William Lundberg for their words of encouragement. Above all, I am grateful to Zorro who saw me through the toughest times so that I could do the easy parts alone.

References

Atindogbe, Gratien. 2013. A Grammatical Sketch of Mokpè (Bakweri), Bantu A20. *African Study Monographs, Supplementary Issue* 45:1–163.

Bastin, Yvonne & Pascale Piron. 1999. Classifications lexicostatistiques: bontou, bantou et bantoïde: de l'intérêt des "groupes flottants". *Bantu Historical Linguistics: Theoretical and Empirical Perspectives* ed. by Jean-Marie Hombert & Larry Hyman, 149–163. Stanford: CSLI Publications.

Bastin, Yvonne, André Coupez, Evariste Mumba & Thilo Schadeberg (eds.). 2002. *Bantu Lexical Reconstructions 3*. Tervuren: Royal Museum for Central Africa, online database. Online: https://www.africamuseum.be/en/research/discover/human_sciences/culture_society/blr

Bateman, Nicoleta. 2007. A Crosslinguistic Investigation of Palatalization. PhD Dissertation: University of California San Diego.

doi Bateman, Nicoleta. 2010. The Change from Labial to Palatal as Glide Hardening. *Linguistic Typology* 14:167–211.

doi Bennett, William. 2014. Some Differences Between Clicks and Labio-Velars. *South African Journal of African Languages* 34:2.115–126.

doi Bennett, William & Aaron Braver. 2015. The Productivity of 'Unnatural' Labial Palatalization in Xhosa. *Nordlyd* 42:33–44.

Bhat, Darbhe N. S. 1978. A General Study of Palatalization. *Universals of Human Language Vol. 2* ed. by Joseph Greenberg, 47–92. Stanford: Stanford University Press.

doi Blevins, Juliette. 2005. The Role of Phonological Predictability in Sound Change: Privileged Reduction in Oceanic Reduplicated Substrings. *Oceanic Linguistics* 44:2.517–526.

Boersma, Paul & David Weenink. 2019. *Praat: Doing Phonetics by Computer* v. 6.0.46. Online: praat.org

doi Bostoen, Koen. 2008. Bantu Spirantization: Morphologization, Lexicalization and Historical Classification. *Diachronica* 25:3.299–356.

doi Bostoen, Koen & Jean-Pierre Donzo. 2013. Bantu-Ubangi Language Contact and the Origin of Labial-Velar Stops in Lingombe (Bantu, C41, DRC). *Diachronica* 30:4.435–468.

doi Bostoen, Koen. 2019. Reconstructing Proto-Bantu. *The Bantu Languages* ed. by Mark Van de Velde, Koen Boston, Derek Nurse & Gérard Philippson, 308–334. 2nd ed. London: Routledge.

doi Burns, Roslyn. 2022. Persistent Innovations and Historical Conspiracies as Reanalysis and Extension. *Diachronica* 39:1.39–87.

Bybee, Joan. 2002. Word Frequency and Context of Use in the Lexical Diffusion of Phonetically Conditioned Sound Change. *Language Variation and Change* 14:261–290.

Bybee, Joan. 2015. Articulatory Processing and Frequency of Use in Sound Change. *The Oxford Handbook of Historical Phonology* ed. by Patrick Honeybone & Joseph Salmons, 467–484. Oxford: Oxford University Press.

Connell, Bruce. 1994. The Structure of Labial-Velar Stops. *Journal of Phonetics* 22:4.441–476.

Côté, Marie-Hélène. 2000. Consonant Cluster Phonotactics: A Perceptual Approach. PhD Dissertation: Massachusetts Institute of Technology.

Danis, Nick. 2014. Deriving Interactions of Complex Stops. *ROA-1220*.

Danis, Nick. 2017. Complex Place and Place Identity. PhD Dissertation: Rutgers University.

de Filippo, Cesare, Koen Bostoen, Mark Stoneking & Brigitte Pakendorf. 2012. Bringing Together Linguistic and Genetic Evidence to Test the Bantu Expansion. *Proceedings of the Royal Society B* 279.3256–3263.

De Wolf, Paul. 1971. The Noun Class System of Proto-Benue-Congo. PhD Dissertation: State University of Leiden. The Hauge: Mouton.

Di Carlo, Pierpaolo. 2018. Towards an Understanding of African Endogenous Multilingualism: Ethnography, Language Ideologies, and the Supernatural. *International Journal of the Sociology of Language* 254:139–163.

Di Carlo, Pierpaolo, Rachel A. Ojong Diba & Jeff Good. 2021. Towards a Coherent Methodology for the Documentation of Small-Scale Multilingualism: Dealing with Speech Data. *International Journal of Bilingualism* 25:4.860–877.

Dimmendaal, Gerrit. 2011. *Historical Linguistics and the Comparative Study of African Languages*. Amsterdam: John Benjamins.

Doke, C.M. 1954. *The Southern Bantu Languages*. Oxford: Oxford University Press.

Ebobissé, Carl. 2014. *Sawabantu: Eine vergleichende Untersuchung der Küstensprachen Kameruns (Bantu A.20 und A.30)*. Frankfut am Main: Peter Lang.

Good, Jeff, Jesse Lovegren, Jean Patrick Mve, Carine Nganguep Tchiemouo, Rebecca Voll & Pierpaolo Di Carlo. 2011. The Languages of the Lower Fungom Region of Cameroon: Grammatical Overview. *Africana Linguistica* 17:101–164.

Good, Jeff. 2018. East Benue-Congo Noun Classes, with a Focus on Morphological Behavior. *East Benue-Congo: Nouns, Pronouns, and Verbs* ed. by John R. Watters, 27–58. Berlin: Language Science Press.

Good, Jeff, Pierpaolo Di Carlo & Nelson Tschonghongei. 2020. The Causes and Consequences of Deliberate Language Change in the Cameroonian Grassfields. Presentation at the *Linguistics Society of America Annual Meeting*. New Orleans, LA, January 2–5.

Grégoire, Claire. 2003. The Bantu Languages of the Forest. *The Bantu Languages* ed. by Derek Nurse & Gérard Philippson, 349–370. 1st ed. London: Routledge.

Grimm, Nadine. 2021. *A Grammar of Gyeli*. Berlin: Language Science Press.

Guion, Susan. 1998. The Role of Perception in the Sound Change of Velar Palatalization. *Phonetica* 55:1–2.18–52.

Guthrie, Malcolm. 1967 – 1971. *Comparative Bantu: An Introduction to the Comparative Linguistics and Prehistory of the Bantu Languages*. Volumes 1–4. Westmead: Gregg Press.

Guthrie, Malcolm. 1970. Observations on Nominal Classes in Bantu Languages. *Collected Papers on Bantu Linguistics* ed. by Malcom Guthrie, 79 – 89. Westmead: Gregg International Publishers.

Hock, Heinrich H. 2009. *Principles of Historical Linguistics*. 2nd ed. Berlin: De Gruyter.

Hudu, Fusheini, Amanda Miller & Douglas Pulleyblank. 2009. Ultrasound Imaging and Theories of Tongue Root Phenomena in African Languages. *Proceedings of Conference on Language Documentation & Linguistic Theory* 2 ed. by Peter K. Austin, Oliver Bond, Monik Charette, David Nathan & Peter Sells, 153–163. London: SOAS.

doi Hudu, Fusheini. 2018. Asymmetries in the Phonological Behaviour of Dagbani Place Features: Implications for Markedness. *Legon Journal of the Humanities* 29:2.197–240.

Hyman, L. M. 1972. A Phonological Study of Fe'fe'-Bamileke. PhD Dissertation: University of California, Los Angeles.

Hyman, Larry. 1975. *Phonology: Theory and Analysis*. New York: Holt, Rinehart and Winston.

Hyman, Larry. 2003a. Basaá (A43). *The Bantu Languages* ed. by Derek Nurse & Gérard Philippson, 257–282. 1st ed. London: Routledge.

doi Hyman, Larry. 2003b. Sound Change, Misanalysis, and Analogy in the Bantu Causative. *Journal of African Languages and Linguistics* 24:1.55–90.

doi Hyman, Larry. 2008. Directional Asymmetries in the Morphology and Phonology of Words, with Special Reference to Bantu. *Linguistics* 46:2.309–350.

doi Hyman, Larry. 2011. The Macro-Sudan Belt and Niger-Congo Reconstruction. *Language Dynamics and Change* 1.3–49.

doi Hyman, Larry & John Merrill. 2015. Morphology, Irregularity, and Bantu Frication: The Case of Lulamogi. *UC Berkeley PhonLab Annual Report* 11:69–85.

Hyman, Larry. 2018a. Third Person Pronouns in Grassfields Bantu: East Benue-Congo. *East Benue-Congo: Nouns, Pronouns, and Verbs* ed. by John R. Watters, 199–221. Berlin: Language Science Press.

Hyman, Larry. 2018b. More Reflections on the Nasal Classes in Bantu. *East Benue-Congo: Nouns, Pronouns, and Verbs* ed. by John R. Watters, 223–236. Berlin: Language Science Press.

doi Hyman, Larry. 2019. Segmental Phonology. *The Bantu Languages* ed. by Mark Van de Velde, Koen Boston, Derek Nurse & Gérard Philippson, 128–149. 2nd ed. London: Routledge.

doi Idiatov, Dimitry & Mark Van de Velde. 2021. The Lexical Distribution of Labial-Velar Stops is a Window into the Linguistic Prehistory of Northern Sub-Saharan Africa. *Language* 97:1.72–107.

doi Iskarous, Khalil, Carol A. Fowler & D. H. Whalen. 2010. Locus Equations are an Acoustic Expression of Articulator Synergy. *The Journal of the Acoustical Society of America* 128:4.2021–2032.

Kamba Muzenga, J. G. 2003. *Substitutifs et possessifs en bantou*. Louvain: Peters

doi Kotzé, Albert & Sabine Zerbian. 2008. On the Trigger of Palatalization in the Sotho languages. *Journal of African Languages and Linguistics* 29:1.1–28.

doi Kpogo, Felix, Virginia C. Mueller Gathercole & Johnathan Nsiah Tetteh. 2021. Acquisition of Doubly Articulated Stops Among Ga-Speaking Children. *Journal of African Languages and Linguistics* 42:1.101–146.

Labov, William. 1994a. *Principles of Linguistic Change: Social Factors*. Malden: Wiley-Blackwell.

Labov, William. 1994b. *Principles of Linguistic Change: Language Internal Factors*. Malden: Wiley-Blackwell.

Labov, William. 2007. Transmission and Diffusion. *Language* 83:2.344–387.

Labroussi, Catherine. 1999. Vowel Systems and Spirantization in Southwest Tanzania. *Bantu Historical Linguistics: Theoretical and Empirical Perspectives* ed. by Jean-Marie Hombert & Larry Hyman, 335–377. Stanford: CSLI Publications.

Ladefoged, Peter & Ian Maddieson. 1996. *The Sounds of the World's Languages*. Oxford: Blackwell.

Leitch, Myles. 2003. BABOLE (C101). *The Bantu Languages* ed. by Derek Nurse & Gérard Philippson, 392–421. 1st ed. London: Routledge.

Maddieson, Ian & Bonny Sands. 2019. The Sounds of the Bantu Languages. *The Bantu Languages* ed. by Mark Van de Velde, Koen Boston, Derek Nurse & Gérard Philippson, 79–127. 2nd ed. London: Routledge.

Maho, Jouni Filip. 1999. A Comparative Study of Bantu Noun Classes. PhD Dissertation: Göteborg University.

Maho, Jouni Filip. 2009. *NUGL Online: The Online Version of the New Updated Guthrie List, a Referential Classification of the Bantu Languages*. Online: https://brill.com/fileasset/downloads_products/35125_Bantu-New-updated-Guthrie-List.pdf

Meeussen, A. E. 1967. Bantu Grammatical Reconstructions. *Africana Linguistica* 3.79–121.

Merrill, John. 2013. Evidence from Southwestern Bantu for the Reconstruction of *į and *ų. Master's Thesis: University of California, Berkeley.

Monikang, Evelyn. 1989. Phonology of Mokpwe. PhD Dissertation: University of Yaounde.

Mous, Maarten. 2003. Nen (A44). *The Bantu Languages* ed. by Derek Nurse & Gérard Philippson, 283–306. 1st ed. London: Routledge.

Mous, Maarten. 2019. Language Contact. *The Bantu Languages* ed. by Mark Van de Velde, Koen Boston, Derek Nurse & Gérard Philippson, 355–380. 2nd ed. London: Routledge.

Mve, Patrick, Nelson Tschonghongei, Pierpalo Di Carlo & Jeff Good. 2019. Cultural Distinctiveness and Linguistic Esoterogeny: The Case of the Fang Language of the Lower Fungom, Cameroon. *Engagement with Africa: Linguistic essays in honor of Ngessimo M. Mutaka* ed. by Pius W. Akumbu & Esther P. Chie, 163–178. Köln: Rüdiger Köppe Verlag.

Nurse, Derek & Gérard Philippson. 2003. Towards a Historical Classification of the Bantu Languages. *The Bantu Languages* ed. by Derek Nurse & Gérard Philippson, 164–181. 1st ed. London: Routledge.

Ohala, John J. 1983. The Origin of Sound Patterns in Vocal Tract Constraints. *The Production of Speech* ed. by Peter F. MacNeilage, 189–216. New York: Springer-Verlag.

Ohala, John J. 1985. Sound Change is Drawn from a Pool of Synchronic Variation. *Language Change Contributions to the Study of its Causes* ed. by Leiv E. Breivik & Ernst H. Jahr, 173–198. Berlin: De Gruyter Mouton.

Ohala, John J. & James Lorentz. 1977. The Story of [w]: An Exercise in the Phonetic Explanation for Sound Patterns. *Annual Meeting of the Berkeley Linguistics Society* 3.577–599.

doi Pakendorf, Brigitte, Koen Bostoen & Cesare de Filippo. 2011. Molecular Perspectives on the Bantu Expansion: A Synthesis. *Language Dynamics and Change* 1:50–88.

doi Philippson, Gérard & Rebecca Grollemund. 2019. Classifying Bantu Languages. *The Bantu Languages* ed. by Mark Van de Velde, Koen Boston, Derek Nurse & Gérard Philippson, 335–354. 2nd ed, London: Routledge.

Ponelis, Fritz. 1974. On the Dynamics of Velarization and Labialization: Some Bantu Evidence. *Studies in African Linguistics* 5:1.27–58.

doi Recasens, Daniel. 2020. *Phonetic Causes of Sound Change: The Palatalization and Assibilation of Obstruents*. Oxford: Oxford University Press.

doi Reeder, JeDene. 2019. Pagibete C401. *The Bantu Languages* ed. by Mark Van de Velde, Koen Boston, Derek Nurse & Gérard Philippson, 449–471. 2nd ed. London: Routledge.

doi Schadeberg, Thilo. 1994. Spirantization and the 7–5 Vowel Merger in Bantu. *Belgian Journal of Linguistics* 9:73–84.

Shevelov, George Y. 1965. *A Prehistory of Slavic: The Historical Phonology of Common Slavic*. New York: Columbia University Press.

doi Silverstein, Michael. 2003. Indexical Order and the Dialectics of Sociolinguistic Life. *Language & Communication* 23:3–4.193–229.

doi Stanton, Juliet. 2018. Environmental Shielding is Contrast Preservation. *Phonology* 35:1.39–78.

doi Sussman, Harvey M., Helen McCaffrey & Sandra Matthews. 1991. An Investigation of Locus Equations as a Source of Relational Invariance for Stop Place Categorization. *The Journal of the Acoustical Society of America* 90:3.1309–1325.

Tschonghongei, Nelson C. 2022. *Wordlists of Lower Fungom Languages Collected for the KPAAM-CAM Project*. Online: https://kpaam-cam.org/wordlists/accessdb.php

doi Van de Velde, Mark. 2019. Nominal Morphology and Syntax. *The Bantu Languages* ed. by Mark Van de Velde, Koen Boston, Derek Nurse & Gérard Philippson, 237–269. 2nd ed. London: Routledge.

doi Wang, William S.-Y. 1969. Competing Changes as a Cause of Residue. *Language* 45:1.9–25.

Watters, John R. 2003. Grassfields Bantu. *The Bantu Languages* ed. by Derek Nurse & Gérard Philippson, 225–256. 1st ed. London: Routledge.

Watters, John R. 2018. East Benue-Congo. *East Benue-Congo: Nouns, Pronouns, and Verbs* ed. by John R. Watters, 1–25. Berlin: Language Science Press.

Weinreich, Uriel, William, Labov & Marvin I. Herzog. 1968. Empirical Foundations for a Theory of Language Change. *Directions for Historical Linguistics: A Symposium* ed. by Winfred P. Lehman & Yakov Malkiel, 95–195. Austin: University of Texas Press.

Williamson, Kay & Roger Blench. 2000. Niger-Congo. *African Languages: An Introduction* ed. by Bernd Heine & Derek Nurse, 11–42. Cambridge: Cambridge University Press.

Appendix of Agreement Tables

Table 15. Mundabli Possessive Pronoun Paradigm (Mve et al. 2019: 168)

	Singular			Plural		
	1	**2**	**3**	**1**	**2**	**3**
Class 1	ŋg ɨ̄	w ā	w ū	w í̋	w ɛ̄ n	b ɔ̌
Class 2	m í̋ ŋ	b a̋	b ɔ̋	b í̋	b ɛ̋ n	b ɔ̌
Class 3	ŋg í̋	w a̋	w ű	w í̋	w ɛ̋ n	b ɔ̌
Class 7, 7a	ŋ k í̋ ŋ	k a̋	k í̋	k í̋	k ɛ̋ n	b ɔ̌
Class 8, 8a	m í̋ ŋ	b a̋	b í̋	b í̋	b ɛ̋ n	b ɔ̌
Class 9	ŋg ɨ̄	j ā	j ū	j í̋	j ɛ̄ n	b ɔ̌
Class 10	ŋg í̋	j a̋	j í̋	j í̋	j ɛ̋ n	b ɔ̌
Class 19	m f í̋ ŋ	f a̋	f í̋	f í̋	f ɛ̋ n	b ɔ̌
Class 18a, 6	m í̋ ŋ	m a̋	m ű	m í̋	m ɛ̋ n	b ɔ̌

Table 16. Fang Possessive Pronoun Paradigm (Mve et al. 2019: 168, 171)[22]

	Singular			Plural		
	1	**2**	**3**	**1**	**2**	**3**
Class 1	v ù	ŋg ɛ̄	ŋg ì	ŋg ə̀ s ə̀	ŋg ə̀ n ə̀	b ú n
Class 2	kp ú	kp ɛ́	p í	kp ə́ s ə́	kp ə́ n ə́	b ə̀ b ú n
Class 3	v ù	ŋg ɛ̄	ŋg î	ŋg ə́ s ə́	ŋg ə̄ n ə̄	b ú n
Class 4	v ú	ŋg ɛ̄	ŋg í	ŋg ə́ s ə́	ŋg ə́ n ə́	b ú n
Class 5	v ű	w ɛ̋	v í	w ə́ s ə̄	w ə́ n ə̄	b ú n
Class 13	t û	t ɛ̄	t ī	t ə́ s ə̄	t ə́ n ə̄	t ə̀ b ú n
Class 7	kf ɨ̂	k ɛ̄	k î	k ə́ s ə́	k ə́ n ə́	k ə̀ b ú n
Class 8	kp û	kp ɛ́	p î	kp ə́ s ə́	kp ə́ n ə́	b ə̀ b ú n
Class 9	v ú	ŋg ɛ́	ŋg í	ŋg ə̄ s ə̄	ŋg ə̄ n ə̄	b ú n
Class 10	v û	ŋg ɛ̂	ŋg ī	ŋg ə́ s ə̄	ŋg ə́ n ə̄	b ú n
Class 18a	ŋm ú	ŋm ɛ́	m í	ŋm ə́ s ə́	ŋm ə́ n ə́	m ə̀ b ú n
Class 19	f ú	f ɛ́	f í	f ə́ s ə́	f ə́ n ə́	f ə̀ b ú n
Class 1? D	ɲ ū	n ɛ̄	ɲ í	ŋg ə̀ s ə́	ŋg ə̀ n ə́	b ú n
Class 1? D	ʃ ū	s ɛ̀	ʃ ì	s ə̀ s ə́	s ə̀ n ə́	b ú n
Class 2 D	kp û	kp ɛ̂	p ī	kp ə́ s ə̄	kp ə́ n ə̄	b ə̀ b ú n
Class 2 D	kp ū	kp ɛ̄	p í	kp ə́ s ə́	kp ə́ n ə́	b ə̀ b ú n
Class 8 D	kp ú	kp ɛ́	p í	kp ə́ s ə́	kp ə́ n ə́	b ə̀ b ú n
Class 9 D	ʒ ù	y ɛ̀	ʒ ì	y ə̀ s ə̂	y ə̀ n ə̂	b ú n

22. Note that the Fang class markers also exhibit non-productive (or defective) classes. I have marked these with D.

Table 17. Basaá Possessive Pronoun Paradigm (Hyman 2003a: 266)

	Singular			Plural		
	1	2	3	1	2	3
Class 1	w ɛ m	w ɔ ŋ	w eé	w ɛ̌ s	n a n	w ǎ p
Class 2	ɓ ɛ̂ m	ɓ ɔ́ ŋ	ɓ éé	ɓ ɛ́ s	n â n	ɓ á p
Class 3	w ɛ̂ m	w ɔ́ ŋ	w éé	w ɛ́ s	n â n	w á p
Class 4	ŋw ɛ̂ m	ŋw ɔ́ ŋ	ŋw éé	ŋw ɛ́ s	m í n â n	ŋw á p
Class 5	dʒ ɛ̂ m	dʒ ɔ́ ŋ	dʒ éé	dʒ ɛ́ s	l í n â n	dʒ á p
Class 6	m ɛ̂ m	m ɔ́ ŋ	m éé	m ɛ́ s	m á n â n	m á p
Class 7	j ɛ̂ m	j ɔ́ ŋ	j éé	j ɛ́ s	n â n	j á p
Class 8	gw ɛ̂ m	gw ɔ́ ŋ	gw éé	gw ɛ́ s	b í n â n	gw á p
Class 9	j ɛ m	j ɔ ŋ	j eé	j ɛ̌ s	n a n	j ǎ p
Class 10	j ɛ̂ m	j ɔ́ ŋ	j éé	j ɛ́ s	n â n	j á p
Class 19	hj ɛ̂ m	hj ɔ́ ŋ	hj éé	hj ɛ́ s	h í n â n	hj á p
Class 13	tʃ ɛ̂ m	tʃ ɔ́ ŋ	tʃ éé	tʃ ɛ́ s	d í n â n	tʃ á p

Address for correspondence

Roslyn Burns
Yale University
Dow Hall
370 Temple Street
New Haven, CT 06511
United States

roslyn.burns@yale.edu
https://orcid.org/0000-0001-9081-1197

Publication history

Date received: 17 February 2022
Date accepted: 10 June 2023
Published online: 18 September 2023