

# 6 Language Divergence and Convergence and Deep-Time Population History in the Kwilu-Kasai Region

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## Introduction

With a nearly contiguous geographical spread covering most of Central, Eastern, and Southern Africa, 350 million speakers or a fourth of all Africans, and approximately 550 languages, Bantu is unmistakably Africa's main language family today (Bostoen & Van de Velde 2019; Hammarström 2019; Eberhard *et al.* 2023). And yet, with an estimated time depth of 4,000–5,000 years (Vansina 1995: 52; Blench 2006: 126), it is only a relatively late offshoot of Niger-Congo, the largest language phylum of both Africa and the world, whose time depth is estimated at about 10,000–12,000 years (Blench 2006; Bostoen *et al.* 2025). Bantu's closest relatives within Niger-Congo are the Benue-Congo languages of South-Eastern Nigeria and Western Cameroon, more specifically those known as “(Southern) Bantoid” (Watters 1989; Watters & Leroy 1989; Blench 2015; Good 2020; Marten 2020). Since Greenberg (1972), linguists have considered this area of high linguistic diversity within Benue-Congo as the putative Bantu homeland, i.e., the centre of origin from which Bantu languages started to spread across equatorial Africa and beyond. More recently, geneticists have shown that human migration was the main population process driving the initial dispersal of Bantu languages (Pakendorf *et al.* 2011; Busby *et al.* 2016; Rocha & Fehn 2016; Patin *et al.* 2017; Fortes-Lima *et al.* 2024). This initial dispersion of Bantu languages and people speaking them, a historical macro-event also known as the Bantu Expansion (Oliver 1966; Vansina 1995; Ehret 2001; de Maret 2013; Bostoen 2018, 2020), is one of the most dramatic instances of demic diffusion in recent human history (Li *et al.* 2014; Schlebush & Jakobsson 2018; Fortes-Lima *et al.* 2024).

Just like diversity in the West African genetic component prevalent among modern Bantu speech communities decreases with distance from West Africa (Semo *et al.* 2020; Tallman *et al.* 2023; Fortes-Lima *et al.* 2024), diversification within the Bantu language family also shrinks the further one is removed from the homeland. Bantu languages from Central Africa's equatorial rainforests are in general significantly more diverse than those further east and south (Bastin *et al.* 1999; Nurse & Philippson 2003; Grollemund *et al.* 2015; Philippson & Grollemund 2019; Koile *et al.* 2022). The Congo rainforest and its fringes are home to several major branches of the Bantu family, while the Bantu languages spoken in the savannas of Central,

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Eastern, and Southern Africa belong to one single clade, i.e., the one that branched off last (Pacchiarotti & Bostoen 2020: 156–157; Bostoen 2022: xix). This is why it is widely believed today that the initial expansion and diversification of Bantu languages and speech communities happened within the Congo rainforest, based on linguistic (Bostoen *et al.* 2015; Grollemund *et al.* 2015; Koile *et al.* 2022), genetic (Alves *et al.* 2011; de Filippo *et al.* 2012; Patin *et al.* 2017), and archaeological evidence (de Maret 2013; Russell *et al.* 2014; Bostoen *et al.* 2015; Seidensticker *et al.* 2021).

The BantuFirst project focused on the deep history of one specific branch of the Bantu language family, the one known as “West-Western” (Grollemund *et al.* 2015) or “West-Coastal” (Vansina 1995; de Schryver *et al.* 2015; Bostoen & de Schryver 2018a; Pacchiarotti *et al.* 2019; Koile *et al.* 2022). In the conception stage of the project, the speakers of the most recent common ancestor of West-Coastal Bantu (WCB) were thought to be the first to have settled in the southern margins of the Congo rainforest (Bostoen *et al.* 2015; Grollemund *et al.* 2015) after climate-induced savanna openings in the rainforest core starting around 2,500 years ago (Brncic *et al.* 2009; Ngomanda *et al.* 2009; Maley *et al.* 2012; Neumann *et al.* 2012; Hubau *et al.* 2015; Morin-Rivat *et al.* 2016; Giresse *et al.* 2020). The historical-comparative linguistic research within the BantuFirst project aimed at a better understanding of (i) the centre of expansion and initial divergence within the WCB clade; (ii) subsequent processes of language convergence due to contact among Bantu languages and with languages other than Bantu that once existed but went extinct; and (iii) what reconstructed vocabulary in the most recent common WCB ancestor language can tell us about ancestral lifeways, especially in terms of natural environment, subsistence, and culture.

In this chapter we deal with the first two questions, i.e., diachronic processes of language divergence and convergence within WCB, both inside and outside the Kwilu-Kasai region, and what they tell us about the deep-time history of the communities speaking them. The reconstruction of ancestral vocabulary is dealt with in the following chapter. In the first section, we discuss language divergence in the Kwilu-Kasai area and language expansion out of there. In the second section, we deal with the Kwilu-Kasai area as a zone of language convergence, i.e., the historical processes of contact and interference that accumulate to make languages structurally resembling each other more than before. In the third section, we consider what these historical linguistic processes tell us about the deep-time population history of the ancestral communities involved. Conclusions are in the last section.

### **The Kwilu-Kasai Area as a Centre of Language Divergence and Expansion**

Our elementary insights in the deep genealogical structure of the WCB branch of the Bantu family are mainly based on the phylogeny by Pacchiarotti *et al.* (2019). It is generated on the basis of the variation which present-day languages manifest in their basic vocabulary, i.e., the component of their lexicon supposed to be the most stable (Holman *et al.* 2008) and the least prone to borrowing (Tadmor *et al.* 2010), as it involves concepts considered to be universal in human societies. The more

unique cognates languages share, the closer relatives they are assumed to be. Cognate words which related languages share are words inherited from their most recent common ancestor. They vary from the original ancestral root from which they stem following the regular historical sound changes their respective languages underwent.

Following the phylogeny of [de Schryver et al. \(2015\)](#), which focuses on a discrete branch of WCB, i.e., the Kikongo Language Cluster (KLC), [Pacchiarotti et al. \(2019\)](#) target the remainder of WCB. While [de Schryver et al. \(2015\)](#) only includes a selective set of WCB languages outside of the KLC, [Pacchiarotti et al. \(2019\)](#) sample those much more densely, also in comparison with recent phylogenies targeting the entire Bantu family ([Grollemund et al. 2015](#); [Koile et al. 2022](#)). It turns out that the highest diversity within WCB is situated outside of the KLC, more precisely within the so-called “B80 Tende-Yanzi” group of [Guthrie’s \(1971\)](#) referential (i.e., non-genealogical) inventory of the Bantu languages.<sup>1</sup> While earlier phylogenies ([de Schryver et al. 2015](#); [Grollemund et al. 2015](#)) include only 13 B80 languages, [Pacchiarotti et al. \(2019\)](#) sample 57 different B80 varieties and produce a phylogeny with a more balanced coverage of the diversity within this geographic cluster of languages.

[Pacchiarotti et al. \(2019\)](#) show that Guthrie’s B80 group hosts not only members of all three major WCB subbranches, i.e., Kamtsha-Kwilu, Kwilu-Ngounie, and KLC Extended, but also the four paraphyletic languages at the top of the tree, i.e., Ding, Ngwi, Lwel, and Nzadi (see [Figure 6.1](#)). This paraphyly includes languages which do not share a most recent common ancestor different from the ancestor to the entire WCB branch. Ding, Ngwi, Lwel, and Nzadi are therefore to be considered as discrete subbranches in themselves. So, whereas Guthrie’s B80 group contains languages of all these different clades, all other geographical language clusters of [Guthrie’s \(1971\)](#) inventory belong together to one of WCB’s two

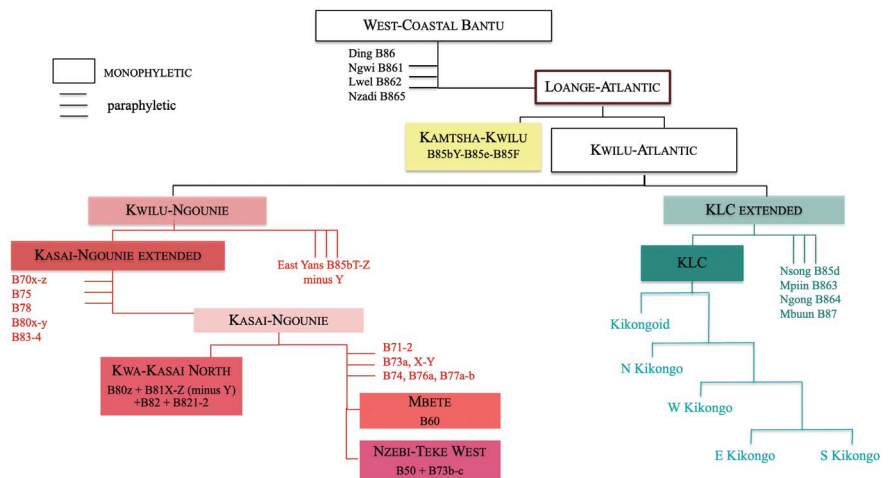


Figure 6.1 Internal lexicon-based phylogenetic classification of WCB ([de Schryver et al. 2015](#); [Bostoen and de Schryver 2018a, b](#); [Pacchiarotti et al. 2019](#))

spatially most expanded subbranches, i.e., Kwilu-Ngounie (B50-70) and KLC Extended (B40, H10, H30, H42, and L12).

This updated WCB phylogeny has inevitably led to a new homeland hypothesis. Based on what was first thought to be the centre of highest heterogeneity, the WCB homeland had been tentatively situated somewhere on the Bateke Plateau, the huge highland straddling the Democratic Republic of the Congo (DRC), the Republic of the Congo, and Gabon, and the Bandundu region (DRC), i.e., around 3°S and between about 14°E and 17°E (de Schryver *et al.* 2015; Grollemund *et al.* 2015). As their phylogeny is based on exactly the same data as Grollemund *et al.* (2015), Koile *et al.* (2022) unsurprisingly also locate the WCB homeland closer to the Atlantic Coast than Pacchiarotti *et al.* (2019). Koile *et al.* (2022) attribute this mismatch to the fact that Pacchiarotti *et al.* (2019) model the WCB homeland “only on the basis of current (updated) locations of languages, not making use of an evolutionary model of the full Bantu family”. It is pretty clear though that the real reason is because Koile *et al.* (2022) gloss over the high lexical diversity within Guthrie’s B80 languages, as do Grollemund *et al.* (2015) and de Schryver *et al.* (2015) for reasons explained above. Koile *et al.* (2022) “augment” their phylogeny with geographic information from languages missing in their phylogeny. Obviously, the phylogenetic position of these “augmented” languages, among which many B80 languages, is not established as they claim but assumed, and in the case of the B80 languages (and possibly of many other “augmented languages”) wrongly assumed. Pacchiarotti *et al.* (2019) do not have to “augment” their tree by adding “missing languages in their established phylogenetic position”, because it covers the languages targeted exhaustively. Because the phylogeny of Pacchiarotti *et al.* (2019) captures the diversity within WCB more fully than one by Koile *et al.* (2022) does, we still consider it more reliable for locating the putative WCB homeland.

With the phylogeny of Pacchiarotti *et al.* (2019), the WCB homeland has moved considerably eastwards, i.e., towards the Kamtsha-Kasai confluence area in DRC’s Kwilu Province, which is today WCB’s epicentre of diversity (see Figure 6.2). The Bateke Plateau turns out to be a node of secondary expansion and diversification, the one where Kwilu-Ngounie’s subgroup Kasai-Ngounie originated. It is somewhat north of where the KLC started to spread across the Lower Congo region. Kwilu-Ngounie and KLC Extended are the WCB’s subbranches which underwent the most significant westward expansions, all the way up to the Atlantic coast (see Figure 6.2). The descendants of their earliest split-offs are still situated near the WCB homeland in DRC’s Kwilu Province: Mbuun (B87), Mpiin (B863), Ngong (B864), and Nsong (B85d) (KLC Extended) roughly between Idiofa and Kikwit in the south and Yans (B85d) (Kwilu-Ngounie) further north along the Kwilu River. All other Kasai-Ngounie and KLC subgroups are located substantially further west, except for Kasai-Ngounie’s Kwa-Kasai North subgroup that spread north towards Lake Mai Ndombe. Otherwise, Kasai-Ngounie expanded from Bateke Plateau all the way west up to the Ngounie River in Gabon. The south-westward spread of the KLC roughly followed the Congo River up to the Atlantic Ocean (de Schryver *et al.* 2015; Bostoen & de Schryver 2018a, b). Its West Kongo subgroup spread

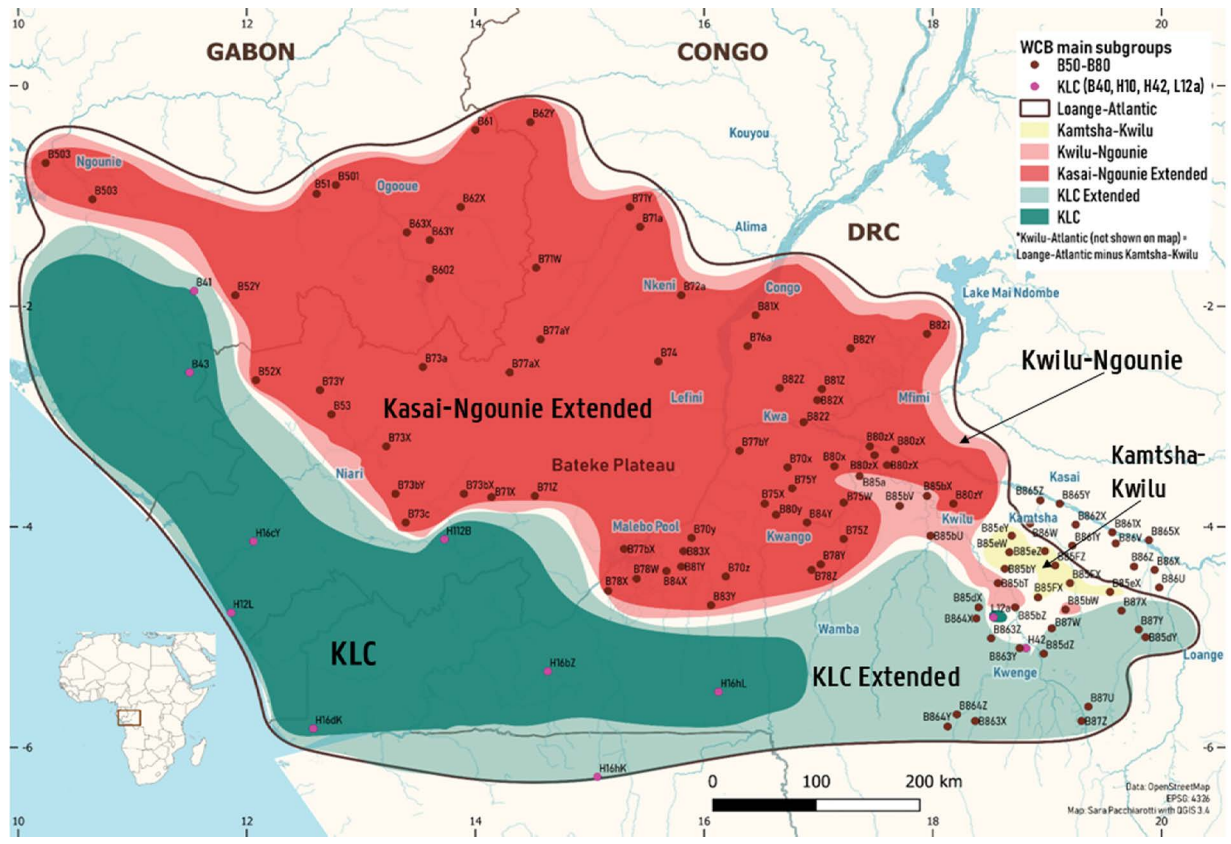


Figure 6.2 Distribution of West-Coastal Bantu and its main subgroups (cf. Figure 6.1)

along the Atlantic Coast towards the north where its northernmost descendants, i.e., Guthrie's B40 languages, are in touch with the westernmost languages of Kasai-Ngounie's Nzebi-Teke West subgroup. Further east, languages of KLC's North Kongo subgroup are in contact with their distant B70 Teke relatives within Kasai-Ngounie. For a diachronic phonological study further finetuning the internal genealogy of the Kwilu-Ngounie subbranch, we refer to interested reader to [Pacchiarotti et al. \(2024\)](#).

### **The Kwilu-Kasai Area as a Language Convergence Zone**

As explained in the previous section, the WCB homeland has been situated in the Kwilu-Kasai area, more specifically the Kamtsha-Kasai confluence area, because the languages spoken there today manifest the highest heterogeneity in terms of basic vocabulary. Remarkably, despite this ancestral genealogical diversity, the languages spoken there and in the wider Kwilu-Kasai area share numerous unique features in terms of phonology, morphology, and syntax which are absent elsewhere in WCB and often also elsewhere in the Bantu family. Hence, these peculiarities are probably innovations that did not happen in the most recent common ancestor of WCB. As the geographic distribution of these shared innovations crosscuts the major genealogical WCB subgroups discussed in the preceding section, we attribute them to contact of some sort between nearby languages, both from inside and outside WCB. We limit ourselves here to phonology, more specifically to six sound changes on which we have already published in more detail elsewhere, in some cases well before we had a clear idea of the internal classification of WCB and the position of the homeland. In decreasing order of geographic spread within the study area, these phonological features are (1) voiced prenasalised consonant cluster reduction ([Pacchiarotti et al. 2024](#)); (2) diphthongisation ([Koni Muluwa & Bostoen 2012](#)); (3) labial-velar stops ([Maselli et al. 2021, 2023; Maselli 2024b](#)); (4) final vowel loss ([Pacchiarotti & Bostoen 2021](#)); (5) umlaut ([Bostoen and Koni Muluwa 2014](#)); and (6) development of interior vowels ([Pacchiarotti et al. 2021](#)). Subsequently, we present a summary map (i.e., [Figure 6.3](#)) showing that the core of the convergence area is situated in the wider Kwilu-Kasai area and try to account for how this convergence area arose historically. Before explaining what these contact-induced phonological features are and what their distribution inside and outside of WCB looks like, we start with clarifying some basic notions of (diachronic) phonology for our historical linguistic analysis to be digestible for scholars outside of linguistics.

#### ***Some Basic Notions in (Diachronic) Phonology***

In this section, we briefly present linguistic notions which are essential to understand the contents of the following subsections. All language data in this chapter are transcribed using the symbols established in the International Phonetic Alphabet (IPA).<sup>2</sup> For ease of exposition and in attempt to be maximally understandable for readers not versed in linguistics, we reproduce the consonant and vowel charts according to IPA in [Tables 6.1](#) and [6.2](#), respectively. These charts represent consonant and vowel sounds that have been recorded across many human languages.

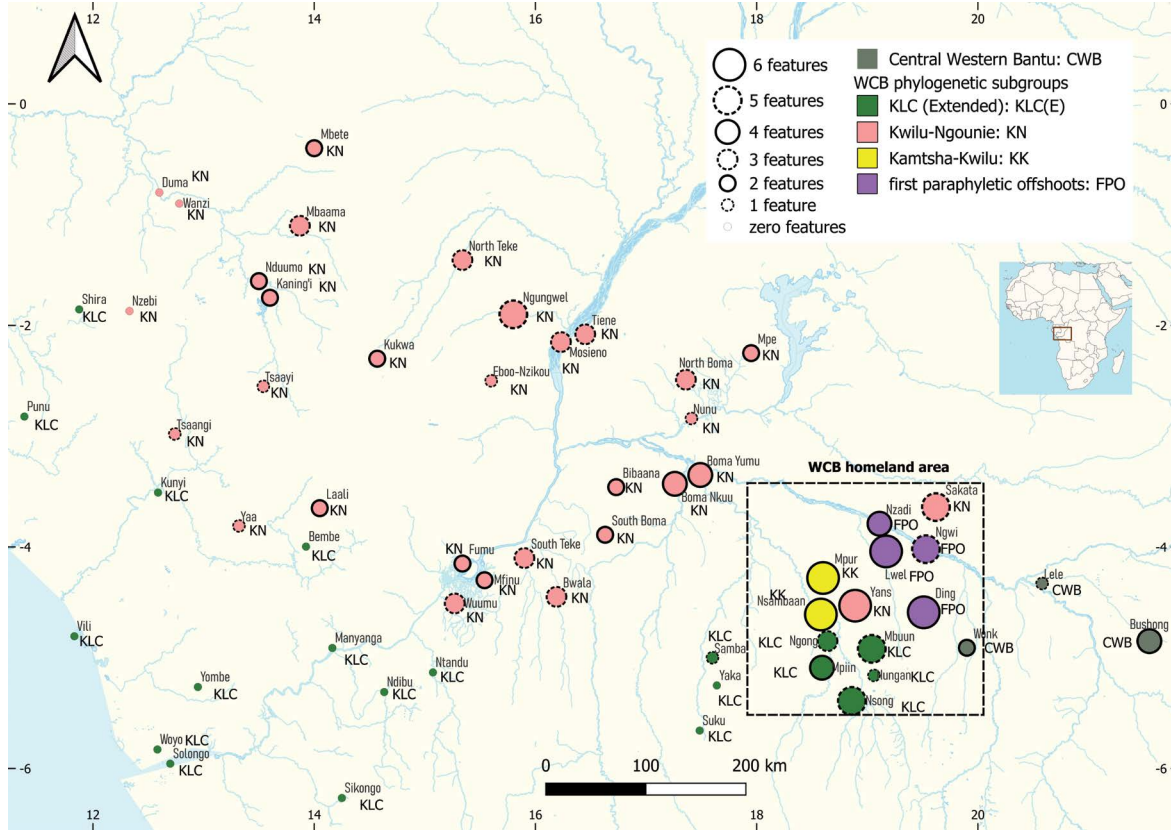


Figure 6.3 The Kwilu-Kasai as a language convergence zone

Table 6.1 IPA Pulmonic consonant chart (reproduced after IPA chart revised to 2018)

	<i>bilabial</i>	<i>labiodental</i>	<i>dental</i>	<i>alveolar</i>	<i>postalveolar</i>	<i>retroflex</i>	<i>palatal</i>	<i>velar</i>	<i>uvular</i>	<i>pharyngeal</i>	<i>glottal</i>
plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
trill	ʙ			r					ʀ		
tap or flap		ⱱ		ɾ		ɽ					
fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
lateral fricative				ɬ ɮ							
approximant		ʋ		ɹ		ɻ	j	ɰ			
lateral approximant				l		ɭ	ʎ	ʟ			

Consonants produced with an egressive or outward-flowing airflow originating in the lungs (cf. pulmonic in Table 6.1) are categorised according to three parameters: (i) the mode of articulation or degree of closure with which they are produced in the mouth or oral cavity (see first column in Table 6.1); (ii) the place of articulation where the articulators that produce them meet in the oral cavity (see first row in Table 6.1); and (iii) voicing, that is, whether a given sound is produced with vocal cords held separately (no vibration of vocal cords—the sound is defined as voiceless) or vibrating together (vibration of vocal cords—the sound is defined as voiced).<sup>3</sup> In Table 6.1, if a cell has two symbols, the one to the right is voiced, while the one to the left is voiceless. Shaded areas denote articulations judged impossible. The mode of articulation in Table 6.1 goes from highest to lowest degree of closure. The place of articulation goes from the furthest to the front to the furthest to the back of the oral cavity. In linguistics consonant are named by using these parameters in the order (iii)–(ii)–(i). For example, [ɣ] is a voiced velar fricative.

Vowels are categorised according to the following parameters: (i) the degree of aperture of the oral cavity involved in their realisation (the vertical axis in Table 6.2);<sup>4</sup> (ii) whether they are produced in the front or in the back of the oral cavity (the horizontal axis in Table 6.2); and (iii) whether their production involved unrounded or rounded lips. Vowels are labelled using these three parameters in the order (i)–(ii)–(iii). For example, [u] is a close back rounded vowel.

Consonants and vowels are usually organised in units called syllables. A syllable is usually made up of a nucleus (vowel). This nucleus can be preceded by an onset (consonant) and a coda (consonant). For example, in the English word *sing* [sɪŋ] [s] is the onset, [ɪ] is the nucleus, and [ŋ] is the coda.

Consonants and vowels in any given human language can have the status of *phoneme* or *allophone*. We will explain what these two terms mean by resorting to English consonants. A phoneme is the smallest language unit able to create a meaning distinction between two or more words. In any given language, to establish whether something is a phoneme, one needs to find a minimal pair, that is, two words which are formally identical in every respect but differ in only one sound. Crucially this sound difference is accompanied by a meaning difference between

Table 6.2 IPA vowel chart (reproduced after IPA chart revised to 2018)<sup>5</sup>

	Front	Central	Back
Close	i y	ɨ ʉ	ɯ u
			ɯ
Close-mid	e ø	ə ɘ	ɤ ɞ
			ə
Open-mid	ɛ œ	ɜ ɝ	ʌ ɔ
			æ
Open	a	ɶ	ɑ ɒ

Symbols to the right of a vertical line represent a rounded vowel

the two words. In English, *pig*, in IPA [p<sup>h</sup>ɪg], and *big*, in IPA [bɪg], constitute a minimal pair which proves that /p/ and /b/ are two phonemes in English. Their status as phonemes is formally indicated by placing slashes around them.

One and the same phoneme can often be pronounced in different ways within a language. We call these different phonetic realisations allophones. Phonetic realisations are conventionally indicated in between square brackets. Free allophones are variations of one and the same phoneme which occur in the same environment and are sometimes due to dialectal/intra-speaker variation. For instance, the word *butter* is pronounced [bʌtəʔ] in many varieties of American English, but as [bʌtə] or [bʌʔə] in varieties of British English. This means that [ɾ], [t], and [ʔ] are free allophones or dialectal variants of the phoneme /t/ in word final position. However, allophones are often contextually conditioned, i.e., the different pronunciations of a given phoneme determined by the phonotactic context in which they occur. In English, for example, the voiceless stop phoneme /p/ (as well as other voiceless stops such as /t/ and /k/ ) is realised as aspirated (with a little burst of air coming out of the oral cavity) in word-initial position. In IPA, aspiration is indicated with a superscript h, i.e., <sup>h</sup>, e.g., *pig* [p<sup>h</sup>ɪg], *pen* [p<sup>h</sup>ɛn]. When /p/ occurs after another consonant, there is no aspiration in its phonetic realisation, see, e.g., *jump* [jʌmp] and not [jʌmp<sup>h</sup>], *carpet* [kɑrpet] and not [kɑrp<sup>h</sup>et]. Phonetic realisations are conventionally indicated in between square brackets. So, English /p/ is realised as the allophone [p] when preceded by another consonant or as the allophone [p<sup>h</sup>] when found in word-initial position. This characterisation can also be expressed by means of rules, e.g., /p/ → [p]/C \_\_\_\_ vs. /p/ → [p<sup>h</sup>]/# \_\_\_\_, whereby / indicates the conditioning environment, C stands for consonant and # for word initial position. Because [p] and [p<sup>h</sup>] are phonologically conditioned allophones of the English phoneme /p/, they are in complementary distribution, that is, wherever [p] occurs [p<sup>h</sup>] does not and vice versa. This means that it is impossible to find a minimal pair in which the opposition of [p<sup>h</sup>] vs. [p] creates a difference in meaning.

Historically, words in human languages derive from earlier forms. If, instead of being based on empirical historical evidence, these earlier forms are reconstructed to a putative ancestor language or proto-language by applying the Comparative Method on present-day data from related languages, they are called proto-forms (Bostoen 2019; Bostoen & Robbeets forthcoming). Reconstructed proto-forms are conventionally indicated with an asterisk in historical linguistics. A reflex of a proto-form is a synchronic or present-day language item considered to be a descendant of that proto-form. For example, the English word *mouth*, IPA [maʊθ], is a reflex of Proto-Germanic \*munþa where the grapheme < þ > was likely [θ] or [ð]. With these concepts in mind, we now turn to sound changes informative of the deep history of WCB languages.

### *Voiced Nasal-Consonant Cluster Reduction*

Consonant clusters are rare in Bantu languages, except for the sequence of a nasal and an oral consonant (Hyman 2019). Eight nasal (N) plus oral consonant (C)

clusters, usually abbreviated as NC clusters have been reconstructed in Proto-Bantu (PB), the putative most recent common ancestor of all Bantu languages, more specifically one series with voiceless oral consonants, i.e., \*mp, \*nt, \*ɲc, \*ɲk, and another series with voiced oral consonants, i.e., \*mb, \*nd, \*ɲj, \*ɲg (Meeussen 1967: 83; Bostoen 2019: 313). Because the sequence of a voiced nasal consonant and a voiceless oral consonant confronts speakers with certain articulatory challenges, \*mp, \*nt, \*ɲc, and \*ɲk have been subject to all kinds of changes across Bantu languages (Kerremans 1980). Their voiced counterparts \*mb, \*nd, \*ɲj, \*ɲg are much more stable, except when affected by Meinhof's rule, a common Bantu sound shift reducing voiced NC clusters in word-initial position to a simple nasal when these are followed by another NC cluster (Meeussen 1962), e.g., PB \*ɲgòndò "moon" > Binji (L321) *ɲóndó* "moon" (Onokoko Onyumba & Koni Muluwa 2019: 19), where \*ɲg is reduced to ɲ due to the presence of \*nd in the same word.

The regular reduction of Proto-Bantu's voiced NC clusters to a simple nasal, i.e., NC<sub>[+voice]</sub> > N that we discuss here happens in word-final position and without any conditioning environment that triggers it. This contrasts with Meinhof's rule described above where the NC cluster reduction in word-initial position is conditioned by the presence of a second NC cluster within the same word. The phenomenon illustrated in (1) is attested only in some parts of the Congo rainforest area, i.e. the Ewondo-Fang and Makaa-Njem groups in southern Cameroon and northern Gabon (Medjo Mvé 1997; Cheucle 2014), some varieties of the Inner Congo Basin's vast Mongo-Nkundo (C60) group such as Nkengo (C61L) and Ngando (C63) (Grégoire 2003: 356, supplemented with several varieties on which Guy Kouarata did fieldwork since 2018), and the wider Kwilu-Kasai area just south of the rainforest.

We have observed the sound shift illustrated in (1) for \*mb, \*nd, and \*ɲg in 38 different varieties of our study area. Languages attesting this kind of voiced NC cluster reduction belong to all major WCB subbranches, that is, Kamtsha-Kwilu, Kwilu-Ngounie, and KLC Extended. The change also occurs in the four paraphyletic languages at the top of the tree, i.e., Ding (B86), Ngwi (B861), Lwel (B862), and Nzadi (B865). Outside WCB, it is attested in nearby Bushong (C83), a language of the Kuba kingdom situated to the northeast of the Kasai-Loange confluence (Vansina 1959, 1964). As shown in (1), Ngwi and Bushong from the Kwilu-Kasai area regularly attest NC<sub>[+voice]</sub> > N (\*mb > m, \*nd > n, and \*ɲg > ɲ) in word-final position. In contrast, Nzebi B52 spoken in Gabon and Congo and belonging to the Nzebi-Teke West subgroup of the Kwilu-Ngounie subbranch and Ntandu (H16g, an East KLC language belonging to the KLC Extended subbranch, are conservative in consistently keeping PB \*NC<sub>[+voice]</sub> (\*mb > mb, \*nd > nd, and \*ɲg > ɲg). This change did not happen in any of the languages belonging to the Nzebi-Teke-West subgroup, spoken along the Atlantic Coast and its hinterland, nor in the KLC subgroup of the Lower Congo region, that is, in the two zones the furthest removed from the WCB homeland area. In all examples presented in this section, the em-dash—means that the language in question has a reflex of a different proto-form for a given concept.

## (1) Prenasalised voiced consonant cluster reduction

<u>Proto-Bantu</u>		<u>Ngwi B861</u>	<u>Bushong C83</u>	<u>Nzebi B52</u>	<u>Ntandu H16g</u>
*cóm̩bà “buy”	>	fūm̩	fwoom̩	sô:mbà	súumba
*dám̩bà “cook”	>	lyám̩	láam̩	là:mbà	láamba
*cín̩dí “squirrel”	>	fín̩	i-fyéén	tfi:ndi	—
*jòndò “hammer”	>	n-dʒín̩	n-coon̩	nzù:ndù	nzuundu
*kín̩gò “neck”	>	n-kín̩	kín̩	ki:ngà	nsiingu
*tóng̩gà “build; plait”	>	tún̩	tóon̩	tó:ngà	túunga
		(BantuFirst fieldwork)	(Vansina 1959)	(Niama-Niama 2022)	(Daeleman 1983)

***Diphthongisation***

Diphthongisation is a sound shift whereby a vowel is broken into a sequence of a vowel and a glide (e.g., *e* > *ey*), or a glide and a vowel (e.g., *e* > *ye*) (Crowley & Bowern 2010: 36). It is common in the world’s languages, but relatively rare in Bantu languages, except again in some parts of the Congo rainforest. Just like voiced NC cluster reduction, it has been reported in the Ewondo-Fang and Makaa-Njem groups in southern Cameroon and northern Gabon (Medjo Mvé 1997; Cheucle 2014), and it is extremely widespread in the Kwilu-Kasai area (Koni Muluwa & Bostoen 2012). We have also identified it in 38 different varieties of our study area, largely the same as for voiced NC cluster reduction, among others Ngwi and Bushong, as shown in (1) with the examples *lyám* and *i-fyéén* respectively. Bushong is again the area’s only language outside of WCB to attest it. Within WCB, it occurs in languages belonging to all major WCB subbranches and in the paraphyly at the top of the tree. As shown in (2), Lwel (B862) and Mfinu (B83) from the Kwilu-Kasai area regularly manifest diphthongisation, while Bembe (H11), a KLC language spoken in Congo does not show diphthongisation. The long vowel [ɔ̃] in Bembe corresponds to [wa] and [wɔ̃] in Lwel and Mfinu respectively.

## (2) Diphthongisation

<u>Proto-Bantu</u>		<u>Lwel B862</u>	<u>Mfinu B83</u>	<u>Bembe H11</u>
*bòmbó “nose”	>	m-bwám̩	m-bwɔ̃m̩	m-bó̃mbó
*kómbà “sweep”	>	kwám̩	kwɔ̃m̩	kó̃mbó̃
*còod “choose”	>	fwál	swɔ̃l	só̃l
		(Khang Levy 1979)	(Daeleman s.d.) <sup>6</sup>	(Kouarata 2016)

Just like voiced NC cluster reduction, diphthongisation is entirely absent in the two areas most distant from the WCB homeland area, i.e., the KLC and the Teke-Nzebi West subgroup. In the Kwilu-Kasai area, however, it is widespread. As the variation between [wa] and [wɔ̃] in (2) suggests and as Koni Muluwa and Bostoen (2012) describe in details we cannot recount here, diphthongisation occurs in many different forms and contexts across the Kwilu-Kasai area, where its

distribution crosscuts different genealogical subunits within and outside WCB and its application rarely affects all suitable targets. Both features, namely contiguous spread across subgroups and irregularity, suggest that diphthongisation is a contact-induced change.

### *The Acquisition of Labial-Velar Stops*

Labial-velar stops are doubly articulated consonants produced with overlapping labial and velar closures. Four different labial-velar stops exist, namely the voiced oral stop *gb*, the unvoiced oral stop *kp*, the nasal stop *ŋm*, and the prenasalised stop *Ngb* usually realised as [*ŋmgb*] or [*ɲgb*] (Connell 1994; Ladefoged & Maddieson 1996). In Africa, where they are the most prolific from a world-wide perspective (Cahill 2008: 380; Maddieson 2011), labial-velar stops occur in several families belonging to three different phyla: Chadic [Afro-Asiatic]; Moru-Mangbetu, Bongo-Bagirmi [Central Sudanic], Nilotic [Nilo-Saharan]; Adamawa, Ubangi, Benue-Congo, Kwa, Gur, Atlantic, Mande, Ijoid, and Kru [Niger-Congo]. They are often seen as a feature typical of the so-called “Macro-Sudan Belt”, a linguistic macro-area south of the Sahara stretching between Senegal in the west and Ethiopia in the east (Clements & Rialland 2008; Güldemann 2008). In Bantu, labial-velar stops are rare, and mainly restricted to languages spoken in the northern part of the Congo rainforest (Grégoire 2003: 353). As they are not a retention from Proto-Bantu (Meeussen 1967: 83; Bostoen 2019: 313), their presence in those languages is commonly attributed to contact-induced change under the influence of languages from the Macro-Sudan belt (Clements & Rialland 2008: 44; Güldemann 2008: 157). Idiatov and Van de Velde (2021) assume more specifically contact with languages from the Ubangi basin, which is a hotbed for labial-velar stops, as the source for their introduction into northern Bantu languages. Other studies have shown that their proliferation in Bantu languages of the Congo rainforest such as Ngombe (C41) might indicate Ubangi substrate interference, i.e., Ubangi speakers leaving traces of their native phonologies while learning Ngombe (Bostoen & Donzo 2013).

Although often overlooked, labial-velar stops are also well attested in several WCB languages of the Kwilu-Kasai region. They have been reported, for example, in Tiene (B81) (Ellington 1977: 28), Nsong (B85d) (Dibata Mimpya 1979: 14), Mpur (B85e) (Kibwenge India’Ane 1985: 39-40), Nsambaan (B85F) (Katona Makani 2017: 16), Ding (B86) (Mula 1977: 7; Munkyen Okab 1990: 208), Ngwi (B861) (Nsumuki 1993: 12), Lwel (B862) (Khang Levy 1977: 20, 1979:4; Maselli et al. 2021), Nzadi (B865) (Crane et al. 2011: 21), Mbuun (B87) (Mundeke 2011: 29), and Sakata (C34) (Bokwankon Bosonkie 1997; Maselli et al. 2023). We have noted their occurrence as phonemes in 20 different varieties spoken in the study area. Their distribution is restricted to the Kwilu-Kasai region but less widespread than that of voiced NC cluster reduction and diphthongisation. Labial-velar stops also have less functional load in that they occur in much fewer words than reduced voiced NC clusters and diphthongs and they are rarely the outcome of regular sound change. This makes it much harder to establish regular sound correspondences as

those in (1) and (2) above. It seems impossible to reconstruct any words with labial-velar stops to the most recent common ancestors of the different main WCB subbranches, not even to Kamtsha-Kwilu which contains only two languages, Mpur and Nsambaan, both displaying labial-velar stops. This is a strong indication that the acquisition of labial-velar stops is a contact-induced feature. Nonetheless, these rare consonants tend to be particularly recurrent in certain old and widespread Bantu words such as those in (3). Labial-velar stops are more common in those words than in others because they naturally emerge out of the temporal compression of sequences like *kuV/kuV* and *guV/guV* with the gliding of the first vowel as an intermediate step: *kuV/kuV* > *kwV* > *kpV*, *guV/guV* > *gwV* > *gbV* (Cahill 1999). However, as the data in (3) show, even in those words, the emergence of labial-velar stops is not systematic — sometimes there is even language-internal variation between *kp/kw*.

## (3) Labial-velar stops

	<u>*gúá</u> “salt”	<u>*kòá</u> “yam”	<u>*kúà</u> “die”	
Nzadi B865	<i>o-kpá</i>	<i>o-kpá</i>	<i>o-kpá</i>	(Crane <i>et al.</i> 2011)
Lwel B862	<i>ŋ-kpɛ</i>	<i>kà-kpɛ</i>	<i>ò-kpɛ</i>	(Khang Levy 1979)
Tiene B81	—	<i>be-kpa</i> ~ <i>kwa</i>	<i>o-kwa</i>	(Ellington 1977)
Tio B75	<i>ɔ-kpá</i>	<i>i-kwa</i>	<i>ó-pfa</i>	(Burssens 1992)
Boma Yumu B80z	<i>mu(n)-gbá</i>	<i>kë-gpá</i>	<i>ó-gpa</i>	(Burssens 1999)
Ngiŋi B76b	<i>món-gbà</i>	<i>è-kpá</i>	<i>ò-kpà</i>	(Kouarata fieldwork 2021)
Ngungwel B72a	<i>ɔŋ-gba</i> ~ <i>ɔŋ-gwa</i>	<i>e-kpá/ekwá</i>	<i>ò-kpá</i> ~ <i>ò-kwá</i>	(Kouarata fieldwork 2021)
Sakata C34	<i>mùŋ-kpá</i>	<i>è-kpá</i>	<i>òkpá</i>	(Maselli <i>et al.</i> 2023)

***Final Vowel Loss***

Open syllables, i.e., syllables ending in a vowel, have been considered a characteristic feature of Bantu languages even since before Johnston (1919: 15), who praised Bantu “for the Italian melodiousness, simplicity, and frequency of its vowel sounds”. Most Bantu languages do not allow closed syllables, i.e., syllables ending in a consonant. However, as Grégoire (2003: 353, 358) observes, several Bantu languages immediately south of the Congo rainforest do allow closed syllables in word-final position. As shown in detail in Pacchiarotti and Bostoen (2021), word-final closed syllables are indeed prolific in the Kwilu-Kasai region due to the historical loss of the word-final vowels. Outside the study area, they have also been reported, just like voiced nasal-consonant cluster reduction and diphthongisation, in the northwestern part of the Congo rainforest (Cameroon and Republic of the Congo), more specifically in Grassfields Bantu (Watters 2003: 236), the Manenguba languages (Hedinger 2006), Mbene (Guthrie 1967: 56 and ff.), Basaa (Heath

2003: 257-260), the Ewondo-Fang (Medjo Mvé 1997), and Makaa-Njem languages (Heath 2003: 337; Cheucle 2008, 2014).

While final vowel loss is more widespread in the northwestern Congo Forest than voiced nasal-consonant cluster reduction and diphthongisation, it is the other way around in the Kwilu-Kasai region. We have observed final vowel loss in 19 different varieties in our sample, which is half the number compared to those attesting voiced nasal-consonant cluster reduction and diphthongisation. However, as those two other phonological innovations, the present-day distribution of final vowel loss also crosscuts genealogical boundaries within and beyond WCB. As shown in (1) and (2) above, the historical loss of the word-final vowel is not only systematic in the WCB languages Ngwi (B861) and Lwel (B862), but also in neighbouring Bushong (C83) not belonging to WCB. At the same time, other WCB languages such as Nzebi (B52), and Mfinu (B83) and Beembe (H11) in (1) and (2) above, miss it. Mfinu in (2) is one of those WCB languages which underwent both voiced nasal-consonant cluster reduction and diphthongisation but not final vowel loss. In (4), the two most closely related languages are Mbuun (B87) and Ntandu (H16g)—both belong to the KLC Extended subbranch. While Mbuun systematically manifests final vowel loss, Ntandu systematically retained word-final vowels and thus open syllables. However, Mbuun's neighbour Ding (B86), one of the paraphyletic languages at the top of the tree, has also systematically deleted final vowels. The only exception in Mbuun and Ding is observed in the word for “die”. This is because the final vowel is only deleted when the stem consists of at least two syllables. That is also why the final vowel is consistently retained in the examples in (3) above, which are all roots consisting of one syllable.

(4) Final vowel loss

Proto-Bantu		Mbuun B87	Ding B86	Ntandu H16g	Nzebi B52
*bòmbò “nose”	>	<i>m-bòm</i>	<i>m-bwam</i>	<i>m-boombò</i>	—
*bóngó “knee”	>	<i>i-bɔŋ</i>	<i>e-bóŋ</i>	—	<i>lè-bó:ŋgò</i>
*pòcò “skin”	>	<i>i-pús</i>	<i>i-puy</i>	<i>m-púsu</i>	—
*cádá “feather”	>	<i>lá-sal</i>	<i>lu-sál</i>	<i>lu-sála</i>	<i>lè-tsála</i>
*tímà “heart”	>	<i>ó-tém</i>	<i>mu-tyem</i>	<i>ù-tíma</i>	<i>mù-témà</i>
*jínò “tooth”	>	<i>i-dzin</i>	<i>i-dzin</i>	<i>dí-inu</i>	<i>dí-inà</i>
*jótò “fire”	>	<i>my-óór</i>	<i>mb-óór</i>	<i>ky-ootó</i>	—
*kúà “die”	>	<i>pfá</i>	<i>kpa</i>	<i>fúa</i>	<i>ù-kwà</i>
		(Mundeke 2011)	(Ebalantshim Masuwan 1980)	(Daeleman 1983)	(Niama-Niama 2022)

Final vowel loss across neighbouring languages belonging to distinct genealogical subgroups is a relatively recent contact-induced phonological change for several reasons: (i) it has a restricted spatial distribution; (ii) it happened only after several other sound shifts such as the loss of intervocalic consonants and umlaut had taken place (Pacchiarotti & Bostoen 2021: 449–451).

***Umlaut***

Umlaut, also known as vowel mutation or metaphony, is the “fronting of a back vowel or the raising of a low vowel under the influence of a front vowel in the following syllable” (Crowley & Bowerman 2010: 43).<sup>7</sup> It is common in the world’s languages, and especially in Germanic (Hock 1991: 66; Trask 2000: 352). It is actually named after the common combination of a vowel and the diaeresis diacritic (e.g., ü, ö, ä) in German spelling, which indicates vowels that are the historical outcome of this sound shift. Although often spelled differently, such vowel mutations are also frequent in other Germanic languages, for example in English irregular plural formation as in *foot/feet* and *tooth/teeth*, originally triggered by the Old English plural suffix *-i* (Crowley & Bowerman 2010: 43).

In Bantu, this sound shift is particularly rare. The Kwilu-Kasai area is actually the only region in the vast Bantu spread zone where umlaut is attested (Bostoen and Koni Muluwa 2014). We have noted it in 15 different languages, all belonging to WCB except for Bushong (C83). The phonetic realisation of umlaut across Kwilu-Kasai languages is diverse, as Bostoen and Koni Muluwa (2014) discuss with details we cannot reiterate here. A major parameter of variation is whether umlaut leads to the emergence of new vowel phonemes or not. As shown in (5), Proto-Bantu’s root-initial back vowel \*o is retained as in the Gabonese KLC language Lumbu (B44), while it shifts to a front vowel in both Ding [æ] and Nsong [ɛ]. This vowel mutation is triggered by the root-final front vowel \*i, which is retained in Lumbu but was deleted in both Ding and Nsong due to final vowel loss. So, umlaut in these two languages from the Kwilu-Kasai region must have happened before the loss of word-final vowels otherwise the final front vowel could not have triggered the fronting of the initial back vowel.

## (5) Umlaut

<u>Proto-Bantu</u>		<u>Ding</u>	<u>Nsong</u>	<u>Lumbu</u>
*còni “shame”	>	<i>n-tsaen</i>	<i>n-tsén ~ n-tswén</i>	<i>tsòni</i>
*dògì “witch”	>	<i>mu-lǽy</i>	<i>m’-lét̥s</i>	<i>mu-lɔyi</i>
*dóóti “dream”	>	<i>n-dǽy</i>	<i>n-dét̥s</i>	<i>bi-roontsi</i>
		(Ebalantshim Masuwan 1980)	(Koni Muluwa & Bostoen 2019)	(Mavoungou & Plumel 2010)

As can be seen in (5), the reflex of the PB root \*còni for shame underwent umlaut in Ding (B86): the final /i/ had an assimilatory effect on the first vowel /o/ which became [æ]: this resulting vowel maintained the roundedness of /o/ but became more front under the influence of /i/ which is a high front vowel (see Table 6.2). In Nsong (B85d) the reflex of the PB root \*còni also underwent umlaut triggered by the final /i/, but in this language; /o/ became [ɛ] under the influence of /i/. Thus, the original /o/ lost its rounded feature and went further to the front of the oral cavity compared to Ding [æ] (see vowel chart in Table 6.2). Note that in languages with umlaut, this phenomenon can co-occur with diphthongisation, see /wɛ/ in the Nsong word for “shame”. In some languages, umlaut led to a bigger vowel phoneme inventory. This is because new vowel phonemes were created by the loss

of an erstwhile conditioning environment. We illustrate the different steps of this process in (6) with examples from Ding.

(6) The phonologisation of /œ/ in Ding<sup>8</sup>

	*còngè “extremity, point, end”	*còngò “smell”
*c > ts (affrication)	tsòngè	tsòngò
NC reduction	tsòŋè	tsòŋò
umlaut triggered by /e/	tsàŋè	—
final vowel loss	tsàŋ	tsòŋ

In (6), we start out with two roots \*còngè and \*còngò. Only in the first root the vowel /o/ undergoes assimilation triggered by the front vowel /e/. Once the final vowel is lost, /œ/ as the result of umlaut is no longer an allophone of /o/ whenever a front vowel is present in V2 position but rather contrasts with /o/ as a phoneme; *tsàŋ* “end, extremity” and *tsòŋ* “smell” form a minimal pair in present-day Ding. Because the conditioning environment, i.e. the final front vowel, was lost [œ] went from being an allophone of [o] to being a phoneme contrasting with /o/, i.e. creating a difference in meaning when opposed to /o/ in a minimal pair. This phenomenon is known in linguistics as phonologisation.

Along with the development of interior vowels, the creation of rounded front vowel phonemes through umlaut is the main reason why certain Kwilu-Kasai languages have more vowel phonemes than Bantu languages tend to have, e.g., 10 vowels in Mpur (B85e) (Kibwenge India’Ane 1985), 11 in Yans (B85) (Rottland 1977) and 11 in Nsambaan (B85F) (Mfum-Ekong 1979).

### *Development of Interior Vowels*

Rounded front vowels as the outcome of umlaut are part of a larger subcategory of vowels known as “interior” vowels. These are non-peripheral vowels located in the interior portion of the vowel space: y ʏ ø œ ɨ ɪ ɘ ɚ ɛ ɜ ɞ ɟ ɣ ʌ (Rolle *et al.* 2017: 100), see Table 6.2. Just like labial-velar stops, interior vowels are considered a phonological feature typical of the so-called “Macro-Sudan Belt” (Clements & Rialland 2008; Güldemann 2008), and are thought to be absent south of this area (Rolle *et al.* 2017, 2020). However, just like labial-velar stops, they do also occur in the Kwilu-Kasai region, although in a limited number of languages. It is the least widespread of the convergence features discussed here. Interior vowel phonemes have been reported in six different Kwilu-Kasai languages only, all belonging to WCB: Ngwi (B861) (Pacchiarotti *et al.* 2021), Lwel (B862) (Khang Levy 1979), Ding (B86) (Mula 1977; Ebalantshim Masuwan 1980), Yans (B85) (Swartenbroeckx 1948; Rottland 1977), Nsambaan (B85F) (Mfum-Ekong 1979), Mpur (B85e) (Mbwetete 1984; Kibwenge India’Ane 1985), and Sakata (C34) (BantuFirst fieldwork data 2021 collected by Lorenzo Maselli & Jean-Pierre Donzo).

While most interior vowels in those languages are rounded front vowels resulting from the fronting of back vowels through umlaut, some interior vowels also

seem to originate in root-initial front vowels which became centralised or backed under the influence of a word-final vowel. In the only diachronic study of the phenomenon so far, [Pacchiarotti et al. \(2021\)](#) show that many of Ngwi’s interior vowel phonemes /ə/ (mid central) and /ɤ/ (close-mid back unrounded) are the result of an assimilation process whereby Proto-Ngwi \*i in  $V_1 > [ə]/\_C_2^*ε, *a, *ɔ$  (7a) and Proto-Ngwi \*i in  $V_1 > [ɤ]/\_C_2^*u$  (7b). Let us unpack these rules with the help of [Table 6.2](#). In the first case, Proto-Ngwi \*i in V1 position within a C1V1C2V2 template (where C = consonant and V = vowel) was pushed towards the centre of the oral cavity and became [ə] under the influence of lower, non-front vowels such as \*ε, \*a and \*ɔ in the following syllable. In the second case, Proto-Ngwi \*i in C1 position was pushed further back in the oral cavity towards the back and became [ɤ] under the influence of the back high vowel \*u in the following syllable. Hence, both /ə/ and /ɤ/ started out as allophones of \*i in the ancestor language of Ngwi. That means that the variable pronunciation of /i/ as [ə] and [ɤ] was originally predictable based on the vowel that followed word-finally. However, as soon as this conditioning environment was lost due to final vowel loss, the predictability was also lost and the erstwhile allophones [ə] and [ɤ] were transformed into phonemes /ə/ and /ɤ/. As was shown above, this means that these two vowels are now in opposition to other vowels and can convey a change in meaning, consider for example the minimal pair *i-púB* “hole” vs. *i-pɤB* “liver”. Except for /u/ vs. /ɤ/, these two words are identical in every respect including their tone pattern marked with ` for a low tone and ^ for a falling tone. The opposition between these two sounds creates a change in meaning. This phonologisation due to the disappearance of the conditioning environment after final vowel loss is identical to the one that created rounded front vowel phonemes from umlaut.

(7) Development of interior vowels in Ngwi.

	<u>Proto-Bantu</u>		<u>Ngwi</u>
a.	*jínà “name”	>	<i>dz-ân</i>
	*kímà “monkey”	>	<i>Ø-ŋkâm</i>
	*cìkà “girl”	>	<i>ò-sâB</i>
	*dìbò “bell”	>	<i>Ø-ndâB</i>
	*kígè “eyelash”	>	<i>è-kâB</i>
b.	*bìdú “cola nut”	>	<i>i-bɤr</i>
	*tígóé “orphan”	>	<i>è-tsɤB</i>
	*pígò “kidney”	>	<i>i-pɤB</i> “liver”
	*cìkò “hiccup”	>	<i>à-sísɤB</i>

### **Summary**

We have reviewed six phonological innovations that are not unique to the Kwilu-Kasai region, but still quite rare within the broader Bantu language family. We

believe them to be contact-induced changes in the sound systems of the languages concerned, i.e., innovations adopted through contact at some point in time with speakers of other languages, rather than purely language-internal developments. This assumption of language contact at their origin is based on several indications: (1) they occur in a geographically contiguous area; (2) they cross-cut genealogical subgroups inside and outside WCB; (3) they are unevenly spread within different genealogical subgroups; and (4) they are rarely fully systematic within languages themselves. The fact that they originate in language contact does not necessarily imply that they are all recent and cannot be reconstructed back to certain ancestral stages of WCB. One thing is clear though: none of them goes back to the most recent common ancestor of all WCB languages. All were initiated after WCB had started its two major expansion pulses towards the Atlantic Coast giving rise to its two most geographically spread out subbranches, i.e., Kwilu-Ngounie in the North and the KLC (Extended) in the South. As [Figure 6.3](#) shows, these features are (almost) completely absent from the KLC and the westernmost subgroup of Kwilu-Ngounie, i.e., Nzebi-Teke West. This suggests that language convergence in the Kwilu-Kasai area only started when the ancestor of the KLC and the ancestor of Nzebi-Teke West had left the WCB homeland.

The Kwilu-Kasai area is not only the WCB homeland, where diversity is highest among languages in terms of basic vocabulary, but also the zone where the remaining WCB and other Bantu languages subsequently grew closer together, especially concerning their sound systems which we specifically reviewed here. The homeland is at the very heart of this convergence area: all languages having all 6 convergence features are situated in between the Kwilu and Kasai Rivers, i.e., Yans (Kwilu-Ngounie), Mpur and Nsambaan (Kamtsha-Kwilu), and Ding and Lwel (first paraphyletic offshoots). This is also true for 3 out of 5 languages having 5 convergence features, i.e., Ngwi (first paraphyletic offshoots), Nsong and Mbuun (KLC Extended). Of the other two, i.e., Sakata and Ngungwel (Kwilu-Ngounie), Sakata spoken north of the Kasai is immediately bordering the area. In our view, the reason why certain features are more widespread and occur outside the core convergence area is that they started earlier and were exported outside the Kwilu-Kasai through the expansion pulses. This is certainly true for the two most widespread features, i.e., voiced nasal-consonant cluster reduction and diphthongisation, which we consider to be innovations that irregularly impacted the ancestral languages of the Mbete and Kwa-Kasai North subgroups and the paraphyletic Teke languages within Kwilu-Ngounie before these left the Kwilu-Kasai region. The initial fragmentation of the Kwilu-Ngounie subbranch must have happened within the Kwilu-Kasai region. Only the ancestral speakers of Nzebi-Teke West migrated sufficiently west to be outside the language convergence zone. Those who stayed in the Kwilu-Kasai region participated in the initial convergence leading to the introduction of voiced nasal-consonant cluster reduction and diphthongisation, before expanding beyond the Kwilu-Kasai region westwards (Mbete) and northwards (Kwa-Kasai North) (see [Pacchiarotti et al. 2024](#) for a more detail account).

Other contact-induced sound shifts such as final vowel loss and umlaut happened in the Kwilu-Kasai region after most Kwilu-Ngounie languages had moved

out. Unlike voiced nasal-consonant cluster reduction and diphthongisation, these innovations did not undergo an expansion-driven dispersal outside of the Kwilu-Kasai region. They remained confined to the Kwilu-Kasai convergence zone and are therefore attested in much fewer languages. They did not start inside the Kwilu-Kasai before the Kwilu-Ngounie divergence phase outside the Kwilu-Kasai region. Apart from geographic distribution, there are also language-internal indications, as discussed above, that final vowel loss must have begun not only after voiced nasal-consonant cluster reduction and diphthongisation, but also umlaut.

Labial-velar stops and interior vowels stand out among the convergent phonological features because they involve the acquisition of new phonemes in the sound inventories of the languages concerned (see also [Maselli 2024a](#)). Of course, the emergence of interior vowels is to a large extent associated with umlaut, though not exclusively, while umlaut itself did not lead to the creation of interior vowels in all languages. Interior vowels are a very specific way in which umlaut can manifest itself. So, both phenomena are to be treated separately. What is even more outstanding about labial-velar stops and interior vowels is that they are both relatively rare in Bantu and are considered typical features of languages of the Macro-Sudan belt spoken north of the Congo rainforest. Interior vowels are spatially more confined than labial-velar stops in that they do not occur outside of the Kwilu-Kasai region. They mostly emerge as the outcome of assimilation and related processes. Labial-velar stops, on the other hand, only arise to a very limited extent as the outcome of regular sound change. They are distributed more haphazardly across the lexicons of the languages concerned suggesting that they may have entered through the borrowing of specific words. This may explain why this contact-induced phonological innovation is much more widespread than interior vowels. A more in-depth comparative study of the number of different types of labial-velar stops and their frequency in the lexicon of the different WCB languages may shed a new light on where the gravitational centre of this innovation is situated.

### **From Language History to Population History**

What do these new insights on historical processes of language convergence and convergence in and around the Kwilu-Kasai region tell us about the deep history of the communities speaking ancestral WCB languages?

Language divergence among present-day languages as represented in the WCB phylogeny (see [Figure 6.1](#)) is commonly interpreted in terms of historical language spread and by extension the migration of the people who spoke those ancestral languages. This extrapolation from languages to peoples should always be taken with a pinch of salt as we know that phenomena such as language shift and language death may complicate the picture. The people speaking WCB languages today do not necessarily all descend from those who originally migrated with ancestral WCB languages. Moreover, certain ancestral WCB languages may have gone extinct so that today's WCB phylogeny represents only part of the original divergence. These caveats notwithstanding, it is clear that present-day diversity

within WCB in terms of basic vocabulary can be best accounted for by a scenario of original expansion from an interior homeland situated in the Kwilu-Kasai area in the east towards the Atlantic Coast in the west. This original westward language dispersal happened in two main pulses, one in the north from which Kwilu-Ngounie emerged, especially its most westward and most conservative subgroup Nzebi-Teke West, and one in the south from which the Kikongo Language Cluster emerged; this group occupies the Lower Congo region today and is in many ways more conservative than its closest relatives further East (KLC Extended). Given the distance between the putative WCB homeland and the Atlantic Coast, i.e., more than 800 km as the crow flies, only migration can explain such vast language expansion, certainly if one reckons that the ancestral speakers of both Nzebi-Teke West and KLC must have been sufficiently removed from the Kwilu-Kasai area once all phonological innovations discussed above kicked in. In the complete absence of deep-time language records, it is obviously hard to tell with any certainty when exactly these early population movements out of the Kwilu-Kasai area would have happened. However, if WCB would indeed originate ultimately in an expansion of Bantu speakers through the Congo rainforest (Bostoen *et al.* 2015; Grollemund *et al.* 2015) following the rainforest's climate-induced crisis around 2,500 years ago (Brcic *et al.* 2009; Ngomanda *et al.* 2009; Maley *et al.* 2012; Neumann *et al.* 2012; Hubau *et al.* 2015; Morin-Rivat *et al.* 2016; Giresse *et al.* 2020), we would assume that they did not start before the last centuries of the last millennium BCE.

As for the phonological peculiarities discussed above, we have argued based on several linguistic indications that they find their ultimate origins in language contact in the Kwilu-Kasai region which started after the first migrations out of the WCB homeland area. We have also concluded that not all these innovations go back to one single contact event, but that there must have been successive and separate phases of language contact and that the earliest contact-induced changes were spread outside the Kwilu-Kasai region due to secondary pulses of language expansion, read population movement. If language contact happened repeatedly but at different points in time, it did not necessarily involve the same people. However, even if ancestral speakers of WCB languages in the Kwilu-Kasai area interacted with different people at different times, their language interactions were certainly not superficial and must have involved multilingualism, at least bilingualism. When languages share contact-induced features that change the very structure of the language, such as the sound system, the contact event underlying their transfer cannot have been just cultural or commercial exchanges between neighbouring communities. Even if such neighbourliness involved intensive communication, it would only lead to the transmission of loanwords in a context where in each community only few people spoke the language of the other community. Foreign sounds in lexical borrowings would then be typically nativised, that is, adapted to match with the sound patterns of the recipient languages (Calabrese & Wetzels 2009: 1), as it usually happens when Bantu languages borrow words from European languages (Batibo 1996; Yengo-ki-Ngimbi 2004; Brinkman & Bostoen 2018). If not through inheritance, the transfer of phonological features and rules such as those dealt with in this chapter is unusual unless it involves high levels of bilingualism in speech

communities in contact (Winford 2003: 54–56). The strong structural impact that the sound changes treated above had on the sound systems of WCB languages in the Kwilu-Kasai area suggests that they were introduced by people originally speaking a different language. It points towards a scenario where ancestral foreign language speakers learned WCB languages imperfectly but were numerous and influential enough for the structural changes they introduced in the sound system to be transmitted to future generations. This phenomenon is known in historical linguistics as substrate influence or shift-induced interference (Thomason 2006) or “imposition” under “source language agentivity” (Van Coetsem 1988). In the process of second language acquisition, foreign language speakers leave a structural impact of their first or source language on their second or recipient language. Think of the accent of second language speakers when speaking English or any other foreign language. When this bilingualism is so massive in a community and the foreign language speakers ultimately shift towards to the new language and give up their ancestral language, the surviving language may undergo irreversible contact-induced change. This is what seems to have happened at different times in the Kwilu-Kasai region, certainly so because the sound changes discussed above involve the creation of full-fledged phonological patterns and not just loan phonemes. However, even in the case of foreign sounds, as labial-velar stops and interior vowels in WCB languages likely are, they normally survive in the sound system of the recipient language only in a social context of pervasive bi- or multilingualism (Bondarko 2000: 56; Dimmendaal 2011: 182). Otherwise, they tend to be replaced by existing sounds as part of loanword nativisation strategies (Calabrese & Wetzels 2009).

Therefore, all contact-induced features treated above point towards widespread multilingualism in the Kwilu-Kasai region after the initial expansion of WCB speakers out of the homeland area. At different points in time, speakers of other languages shifted to WCB languages and permanently changed their sound system, as well as other components of their structure not dealt with here, see, e.g., the breakdown of the verbal derivation system inherited from Proto-Bantu (cf. Guthrie 1956; Bostoen & Mundeke 2011a, 2011b) as well as the innovation of word orders nowhere attested in Bantu (Bostoen & Mundeke 2011b; Crane *et al.* 2011; Koni Muluwa & Bostoen 2014). Given that several of the substrate features discussed above are rather uncommon in Bantu, it is not unlikely that the foreign language speakers who shifted to WCB languages in the Lower-Kasai region had mother tongues that were not Bantu. As discussed in Pacchiarotti and Bostoen (2021), the most plausible shifters here would be the Central-African populations who already inhabited the region before the arrival of Bantu speakers and are commonly seen as the ancestors of modern communities known as “Batwa” or “Pygmies”, even though much uncertainty persists on how deep back in time the ethnographic present of those groups extends (Lupo *et al.* 2014). None of the “pre-Bantu” languages of those ancient relic populations has survived (Bahuchet 2012). In the WCB homeland area itself, there are even no distinct Batwa groups whatsoever in the ethnographic record. The nearest surviving Central-African forager groups live to the north of the WCB homeland, i.e., in the neighbouring Mai-Ndombe, Kasai and Sankuru provinces (von Wissman *et al.* 1891; Hiernaux 1966; Omasombo Tshonda

2019: 66, and also BantuFirst fieldwork in Mai Ndombe in 2021 by Lorenzo Maselli and Jean-Pierre Donzo, in Sankuru in 2022 and in Kasai in 2023 by Jean-Pierre Donzo). None of the phonological features discussed in this chapter seem to occur in the Bantu languages of those Batwa groups today (cf. [Motingea Mangulu 2010](#); [Chabiron et al. 2013](#); [Maselli 2024a, b](#), and also BantuFirst fieldwork in Mai Ndombe in 2021 by Lorenzo Maselli and Jean-Pierre Donzo, in Sankuru in 2022 and in Kasai in 2023 by Jean-Pierre Donzo). Yet, it is impossible to know whether they did not occur in deeper-time pre-Bantu languages, especially because we have no clue of how high the linguistic diversity was among local groups before they shifted to WCB languages. In this regard, it is certainly noteworthy that several of the phonological substrate patterns, especially voiced nasal-consonant cluster reduction, diphthongisation, and final vowel loss also occur in the Bantu languages of the Ewondo-Fang and Makaa-Njem groups in southern Cameroon and northern Gabon ([Medjo Mvé 1997](#); [Cheucle 2014](#)). Voiced nasal-consonant cluster reduction also occurs in some Bantu languages of the Inner Congo Basin ([Grégoire 2003](#): 356, supplemented with several varieties on which Guy Kouarata did fieldwork since 2018). Although it is hard to prove, this could well be due to parallel substrate interference from pre-Bantu languages with similar phonological patterns, whether genealogically related or not.

The merger of Proto-Bantu's velar stops \*g and \*k, which we have not treated here but which [Pacchiarotti and Bostoen \(2020\)](#) reconstruct back to Proto-WCB, is possibly also an instance of such substrate interference. \*g and \*k are two velar stops which only differ in voicing (i.e., whether they are realised with or without the vibration of the vocal cords). The merger happened because the voiced velar stop \*g underwent devoicing and thus merged with the voiceless velar stop \*k which was already present in the consonant system of the protolanguage. In historical linguistics, the loss of voicing in consonants is considered as an instance of strengthening or fortition. The fortition of \*g to \*k is unexpected for at least two reasons: (i) lenition sound changes are much more common than fortition sound changes in human languages;<sup>9</sup> (ii) the merger or neutralisation between \*g and \*k in favour of \*k happened both stem-initially (at the beginning of the word) and stem-finally (at the end of the word) while a strong statistical universal exists for phonological neutralisation targeting word-ends over beginnings (cf. [Wedel et al. 2019](#)). This surprising neutralisation of \*g and \*k across the stem might therefore point to an unusual phonological pattern, i.e., the absence of voiced velar stops, in the sound system of non-Bantu speakers shifting to Proto-WCB. If such is the case, this would be another indication that substrate interference from local pre-Bantu languages happened at different points in time in the Kwilu-Kasai region, even in the period of the initial settlement of WCB speakers in the homeland as the merger of \*g and \*k happened in Proto-WCB before it started to morph into distinct languages. It would also be another indication that the same kind of substrate interference happened in parallel elsewhere, as the \*g > k shift is known to be widespread in the Bantu languages of the Congo rainforest ([Guthrie 1967](#): 62, 75; [Möhlig 1981](#): 299; [Nurse & Philippson 2003](#): 177). [Möhlig \(1981: 270\)](#) considers diagnostic of a "Rain Forest Pre-Bantu stratum".

Finally, it is worth pointing out that not all substrate features are necessarily attributable to the languages spoken by indigenous Central-African populations before the arrival of WCB speakers in the Kwilu-Kasai region. Striking in that regard are labial-velar stops and interior vowels considered to be typical of the Macro-Sudan belt. In the northern Bantu borderland adjacent to the Macro-Sudan belt, the introduction of labial-velar stops in the sound systems of Bantu languages has been attributed to advanced Bantu-Ubangi bilingualism/multilingualism and the substrate interference of Ubangi speakers shifting to Bantu. However, in the Kwilu-Kasai region, Ubangi languages are unattested in the ethnographic record. To account for the presence of labial-velar stops and interior vowels in WCB, we either stop considering these sounds typical of the Macro-Sudan belt and accept that they can also develop independently, or we assume that languages from the Macro-Sudan belt such as Ubangi languages were once spoken as far south as the Kwilu-Kasai region.

## Conclusions

Based on the historical linguistic evidence reviewed in this chapter, we can conclude that the wider Kwilu-Kasai region, where the most extensive archaeological fieldwork campaigns of the BantuFirst project took place (Seidensticker *et al.* 2018; Matonda Sakala *et al.* 2019, 2021; Coutros *et al.* 2022, 2023), was home to several important episodes in the history of WCB languages and the populations speaking them.

To start with, the Kwilu-Kasai is the area where ancestral WCB speakers first settled south of the Congo rainforest, where they first developed into distinct speech communities and from where some of these started to expand westwards towards the Atlantic Coast. These expansions out of the Kwilu-Kasai region must have started relatively soon after the initial settlement of WCB speakers south of the Kasai River, *i.e.*, during the era commonly known as the Early Iron Age (EIA) in Central African archaeology. Seidensticker *et al.* (2021) delineate this period between approximately 800 BCE and 400 CE for the entire Congo rainforest macrozone. With the 20th–21st centuries CE comparative language data on which we rely, it is impossible to narrow down this broad temporal framework. However, if the Central African forest crisis of the mid-first millennium BCE did indeed play any role in the rise of WCB language communities south of the Congo rainforest, we would expect their initial settlement in and westward expansions out of the Kwilu-Kasai region not to have happened before the last centuries BCE. This seems the most plausible hypothesis for now based on historical linguistic insights in conjunction with the general state-of-the-art of EIA archaeology and palaeoecology in Central Africa.

In those areas where supplementary BantuFirst archaeological fieldwork took place, *i.e.*, DRC's Kwango, Mai-Ndombe (Seidensticker *et al.* 2018), Kinshasa (Seidensticker *et al.* 2018; Matonda Sakala *et al.* 2019; Matonda Sakala & Bostoen 2022), and Kongo-Central (Clist *et al.* 2018, 2023) provinces, the earliest immigration of WCB speakers is consequently expected to be more recent than in the Kwilu-Kasai region, more specifically DRC's Kwilu Province. The same holds

for those parts of Congo and Gabon where WCB languages are spoken today but where our team did not do any archaeological research. Nonetheless, as we know that main subgroups within WCB's major KLC Extended and Kwilu-Ngounie subbranches, i.e., the KLC and Nzebi-Teke West respectively, must have split off at a very early stage of WCB history, we would still situate their initial westward expansion within the earliest centuries of the Kwilu-Kasai's EIA. Ancestral KLC speakers must have first colonised what is today DRC's Kwango Province, as languages of its earliest subgroup Kikongoid (see [Figure 6.1](#)) are currently spoken there, and only later on today's Kongo-Central Province, where East, South, and West Kikongo (see [Figure 6.1](#)) are spoken, and the southern parts of Congo and Gabon, where North and West Kikongo (see [Figure 6.1](#)) occur (see also [de Schryver et al. 2015](#); [Bostoen & de Schryver 2018a](#)). The initial migration of Nzebi-Teke West speakers towards the Atlantic Coast must have started concurrently with that of the KLC but further to the north, i.e., north of present-day Kinshasa and Brazzaville (Malebo Pool) across the Bateke Plateau and Congo River. As Nzebi-Teke West languages manifest little evidence for contact with their closest Kwilu-Ngounie relatives, neither from the Mbete and Kwa-Kasai subgroups nor from the paraphyletic Teke languages, they may have reached the hinterland of the Atlantic Coast where they are spoken today relatively soon after their expansion out of the Kwilu-Kasai region. If Nzebi-Teke West speakers had only started to settle in the hinterland of the Atlantic Coast when other Kwilu-Ngounie speech communities started to populate the Bateke Plateau west of the Congo River and beyond, we would have expected more signs of contact-induced language change as we see between those other Kwilu-Ngounie languages ([Pacchiarotti et al. 2024](#)). Even though more research to fully substantiate the claim, Nzebi-Teke West languages and their distant WCB relatives of the West Kikongo subgroup (KLC), especially the so-called B40 Shira-Punu group ([Guthrie 1971](#)), which co-occupy the Atlantic Coast region of the Congo and Gabon and its hinterland, seem to have mutually influenced each other much more through contact. A similar longstanding language contact zone between distant WCB relatives exists further east in the wider Malebo Pool area, more specifically between North Kikongo languages (KLC) and Teke languages of the Kwilu-Ngounie subbranch.

After the initial development of distinct WCB language communities and the subsequent westward migration of some of these during the initial phase of the Kwilu-Kasai's EIA, the WCB-speaking populations who had remained in the homeland area started to adopt shared contact-induced phonological features, i.e., word-final voiced NC cluster reduction and diphthongisation. This initial phase of language convergence was possibly triggered by parallel admixture with shifting non-Bantu speakers from populations already present in the region before the arrival of WCB speakers. Following intermarriage and a period of bilingualism, their offspring may have become integral part of the WCB speech communities to whose languages they shifted to the detriment of their own ancestral languages. It remains to be seen whether any archaeological or genetic evidence would corroborate this language-based hypothesis. In any event, based on the same linguistic evidence, we would postulate that this initial phase of language convergence in the Kwilu-Kasai still took place in the EIA, but towards its later centuries. This

assumption is based on the observation that, unlike later convergence features such as final vowel loss and umlaut, the two earliest features of substrate interference features, i.e., word-final voiced NC cluster reduction and diphthongisation, have undergone a massive exportation outside of the Kwilu-Kasai region due to the expansion of ancestral Kwilu Ngounie languages other than Nzebi-Teke West. Given the deep divergence between the Mbete and Kwa-Kasai North subgroups and other Kwilu Ngounie languages, we would be tempted to still situate their dispersal out of the Kwilu-Kasai region westwards across the Bateke Plateau and the Congo River and northwards across the Kasai/Kwa into the Mai Ndombe within the EIA.

Consequently, later phases of language convergence within the Kwilu-Kasai as observed in substrate features with a more restricted distribution, i.e., labial-velar stops, final vowel loss, umlaut, and interior vowels, probably occurred in what is commonly known as Late Iron Age (LIA) in Central African archaeology. [Seidensticker \*et al.\* \(2021\)](#) delimit this era between about 1000 and 1900 CE for the entire Congo rainforest macrozone. Parallel admixture with local pre-Bantu communities speaking non-Bantu languages could be at the source again of some of these contact-induced phonological changes. As LIA substrate features such as final vowel loss and umlaut are very distinct from those that seeped in during the EIA, i.e., word-final voiced NC cluster reduction and diphthongisation, the bilingualism and language shift at their origin possibly involved local populations speaking languages unrelated to those of EIA shifters. This could point to a high linguistic diversity amongst populations inhabiting the Kwilu-Kasai region before the arrival of Bantu speakers. What is more, the presence of labial-velar stops and interior vowels, often considered to be features typical of the Macro-Sudan belt, could indicate that the mix also involved shifters speaking languages with more northern roots. In the northern Congo rainforest fringe, the proliferation of labial-velar stops in Bantu has been analysed as the outcome of substrate interference from shifting Ubangi speakers ([Bostoen & Donzo 2013](#)). Even if the closest Ubangi language communities today are situated more than 800 km to north, such a scenario is far from inconceivable if one reckons that the Ubangi-Congo-Kwa/Kasai fluvial networks may have facilitated fast migration of Ubangi speakers over long distances, certainly in the LIA. If this were the case, this would mean that Bantu speakers were not the only settlers in the Kwilu-Kasai with ancestry outside of the region. Given the rather limited spread of labial-velar stops in the study area, it seems that those putative Ubangi speakers arrived later than Bantu speakers. Note also in that regard that Ubangi-speaking and local foragers are not mutually exclusive, as some of the southernmost Ubangi language communities today are people such as the Baka, Monzombo, and Ngombe Yaka (Baka), who are generally considered to be autochthonous populations ([Lewis 2002](#); [Eberhard \*et al.\* 2023](#), see also 2023 fieldwork by the last author). Even if any historical evidence for the erstwhile presence of Ubangi speakers in the Kwilu-Kasai is missing, we consider it a language-based hypothesis worth testing against archaeological and genetic evidence, along with the many other inferences about deep population history we have drawn from the linguistic evidence presented in this chapter.

## Notes

- 1 Guthrie's (1971) referential system allows one to refer to a specific language by means of an alphanumeric combination. The entire Bantu-speaking area was divided by Guthrie into fifteen zones indicated by letters (from zone A in Cameroon to zone S in South Africa). Sets of ten after a letter refer to a group of languages (B70, B80, etc.) whereas B82, B83, B84, and so on refer to specific languages within a group.
- 2 We refer the reader to the <https://www.internationalphoneticassociation.org/content/ipa-chart> website for full interactive charts where each symbol is linked to an audio file with a pronunciation of the sound represented.
- 3 This difference can be impressionistically appreciated by placing the tips of two fingers on Adam's apple while pronouncing [p] followed by [b].
- 4 The term "high" is often used instead of "close" because the tongue posture is high when vowels such as i and u are pronounced; similarly, "low" is often used instead of "open" because the tongue posture is low when a vowel such as a is pronounced.
- 5 Where symbols appear in pairs, the one to the right represents a rounded vowel, that is, a vowel produced with rounding of the lips.
- 6 These unpublished Mfinu data originate in Jan Daeleman's research archive that was trusted to Ghent University in 2018.
- 7 A back vowel is produced with the highest point of the tongue positioned relatively back in the oral cavity. Examples in IPA notation are: [ɔ], [u], [o], and [ɔ̞], see Table 6.2. A front vowel is produced with the highest point of the tongue positioned as far forward as possible in the oral cavity. Examples in IPA notation are: [e], [ɛ], [i], and [i̟], see Table 6.2. See [https://www.internationalphoneticassociation.org/IPAcharts/inter\\_chart\\_2018/IPA\\_2018.html](https://www.internationalphoneticassociation.org/IPAcharts/inter_chart_2018/IPA_2018.html) for audible examples.
- 8 Apart from /œ/, Ding also acquired the rounded front vowels /y/, /ø/, and /œ/ as phonemes through umlaut as well as the mid central schwa vowel /ə/ in other ways (Daeleman 1977; Ebalantshim Masuwan 1980; Bostoen & Koni Muluwa 2014).
- 9 An instance of lenition is a decrease in the degree of closure with which a consonant is produced, e.g., from plosive to fricative (see Table 6.1). For example, the voiced alveolar stop /d/ in the Middle English word *moder* [mɔdər] became a voiced alveolar fricative in Modern English *mother*, i.e. [mɔðər] (Honeybone 2012).

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