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1

Representation of Yorùbá Tones by a Talking Drum An Acoustic Analysis

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Abstract

The present paper proposes an articulatory and acoustic study of the representation of Yorùbá tones in *gángan* (a talking drum). The video and spectrographic analyses of the data collected from five native drummers in Nigeria show that the number of syllables in a word directly corresponds to the number of strikes on the drum membrane. As the talking drum resonates from the strikes, the drummers tightened and loosened the drum membrane to articulate the three tones in Yorùbá. Furthermore, tonal processes such as tone contour formation on the second tone in HL or LH sequences are musically rendered. Based on this evidence, this paper concludes that drummers are able to represent syllables, lexical tones and tonal processes of Yorùbá speech with a talking drum.

Keywords

lowering, music, phonetics, raising, syllable, talking drum, tone, Yorùbá.

Résumé

Cet article propose une étude articulatoire et acoustique de la façon dont les tons du yorùbá sont exprimés au moyen du *gángan* (tama ou tambour parlant). Des analyses vidéo et spectrographiques portant sur les données recueillies auprès de cinq tambourinaires nigérians de langue maternelle yorùbá montrent que le nombre de syllabes d'un mot donné correspond exactement au nombre de fois que la membrane du tambour est frappée. De plus, pendant que le tambour résonne, les tambourinaires tendent ou relâchent alternativement la membrane afin de produire les trois tons existant en yorùbá.

En outre, des phénomènes tonals tels que les modulations apparaissant sur le second ton des séquences HL ou LH sont également exprimés musicalement. Il en découle que ces tambourinaires sont capables de transposer au moyen de leurs tamas la structure syllabique du yorùbá, les tons lexicaux de cette langue ainsi que certains des phénomènes tonals qui la caractérisent.

Mots clés

musique, phonétique, syllabe, tama, tambour parlant, ton descendant, ton montant, yorùbá.

1. Introduction

Yorùbá (Kwa, Benue-Congo) has three contrastive tones:[1] H(igh) *bá* 'to meet', L(ow) *bà* 'to land', and M(id) *ba* 'to plait' (Ward 1952; Bamgbose 1966 & 2000; Awobuluyi 1978). In addition to the three contrastive tones, a combination of two of the tones can form, among others, the following tone contours: *ríi* H͡M 'see him/her/it'; *rẹ̀ẹ́* L͡H 'tired him/her'; *jẹ́ẹ́* M͡H 'ate it'.[2]

Vowel initial words in Yorùbá must begin with L or M (Akinlabi 1985; Pulleyblank 1988). With sequences of HL and LH in Yorùbá, a contour tone is formed on the second tone. However, this does not happen in HM, MH, LM or ML sequences (Ward 1952). Consequently, words like /k͡pákò/ 'chew stick' and /ìlú/ 'city' are realised as [k͡pákô] and [ìlŭ] respectively. Furthermore, the pitch value of H is significantly higher in a sequence of HL but not HM (Akinlabi & Liberman 1995). For example, the pitch of H in [bájɔ̋] 'Báyò (name)' is higher than the initial H in [bájɔ] 'exit through (v.)'.

It is widely known that these level tones and contour tones can be musically rendered in the notes of *gángan*, an hourglass shaped pressure drum that belongs to a family of drums called *dùndún* (Arewa & Adekola 1980; Euba 1990; Villepastour 2016; Agawu 2016). This attribute of *gángan* is comparable to those of other Yorùbá drums (*e.g.* Bàtá, Villepastour 2016) and the speech surrogacy system in other cultures (Bagemihl 1988; Agawu 1995 & 2016; McPherson 2019). While most of the research on Yorùbá talking drums espouses socio-cultural and musical perspectives (Beier

1. The funding for this research is from a SSHRC insight grant (435-2016-0369) awarded to Douglas Pulleyblank. For making a recording space available, I thank Demola Lewis and the management of Diamond FM, University of Ibadan. For helpful comments and guidance on various aspects of this work, I thank Douglas Pulleyblank, Rose-Marie Déchaine, Gunnar Hansson, Tolu Odebunmi, Oksana Tkachman, Emily Sadlier-Brown, the anonymous reviewer and the audience at ACAL50 2019. Errors of fact or explanation are my own responsibility.

2. Transcriptions are in standard Yorùbá orthography throughout, unless an example is enclosed in phonemic slants "/ /" or phonetic square brackets "[]". In Yorùbá orthography, [ɔ] = ọ, [ɛ] = ẹ, long vowel = double letters (*e.g.* e = short and ee = long), nasalised vowel = Vn, [ʃ] = ṣ, [k͡p] = p, H = ˊ, L = ˋ, M = unmarked for tone, syllabic nasal = a tone-marked nasal. Tone is indicated throughout, including tonal alternations.

1954; Armstrong 1954; Apter 1985; Euba 1990; Ajayi 1992; Villepastour 2016), the present work is developed within a linguistic perspective.

This work addresses the following questions: (1) How are Yorùbá tones articulated with the drum? (2) Do the drummers represent other linguistic information in addition to tone? (3) What are the acoustic correlates of tone in talking drum notes? (4) Are tonal processes, *i.e.* raising the pitch of H tone in HL or contour formation on the second tone in HL and LH sequences, also represented?

To address these issues, this paper proposes an articulatory and acoustic study on the representation of Yorùbá tones by a talking drum. For ease of comparison with Yorùbá tones, I refer to the tones of Yorùbá words rendered by a talking drum as drum tones.

2. The talking drum: *gángan* and its components

Gángan is an hourglass-shaped pressure drum used by the Yorùbá people of southwestern Nigeria. Given that people communicate with the drum, the Westerners referred to it as "talking drum". The drum's communicative capability is based on the three tones of Yorùbá. With Yorùbá being the source language of the drum, it is designed to produce notes which are analogous to Yorùbá tones (Euba 1990; Villepastour 2016).

Gángan has six components, namely a wooden barrel, two surface membranes, tension cords, a taut rope, a strap, and a curved stick. The wooden barrel is carved into an hourglass shape with a tunnel-like hole linking the two ends. There are two membranes in this drum. The membranes which are made from the skin of a goat's foetus are stretched with threads over the holes of the wooden barrel. These membranes covering the two edges of the drum are connected and tightly held together with cords which are leather strings. These cords run along the body of the drum. Given the fact that the cords are connected to the two membranes of the drum, the membranes can be stretched by tensioning the cords. It is required for the membranes of the drum to be loose or slack on the drum barrel before drumming. However, when the drum has not been used for a while, the drum membrane shrinks and becomes tightly held to the barrel. In such a case, to make the drum suitable for music or communication, the taut rope is used in order to expand the membranes by compressing the cords for at least four hours. The taut rope can be made from wool or leather. A curved stick is used for striking the drum. In order to avoid puncturing the drum, the head of the stick is covered with flat rubber. The drum is suspended over the left or right shoulder of the drummer with a strap and the drum hangs lower by the armpit. This strap is made from a padded cloth. These components are shown in Figure 1, adapted from Arewa & Adekola (1980); the labels are based on

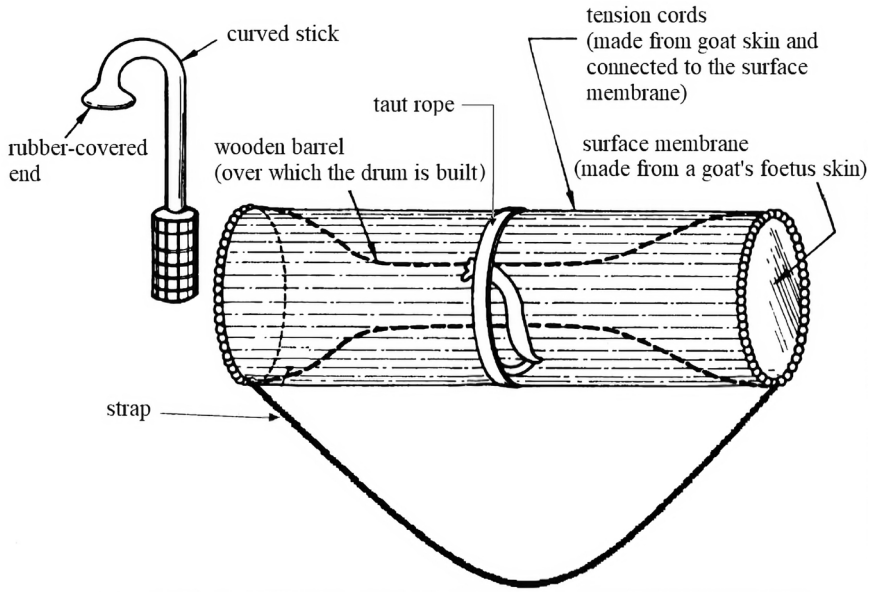

Figure 1 — The small talking drum gángan usually held under the arm (source: Arewa & Adekola 1980)

terms from Villepastour (2016: 80-81). The image has been modified for an accurate description of the drum. The drum emits varying pitches when one of its membrane is struck and stretched at varying degrees.

3. Methodology

Data were elicited from five male drummers who are native speakers of Yorùbá at Diamond FM radio station, University of Ibadan, Nigeria. The data were recorded in a soundproofed room with a SHURE WH30XLR cardioid condenser (a headset microphone) and a Rode NGT2 supercardioid condenser (a shotgun microphone) at the sampling rate of 48.1 kHz in .wav format. The microphones were attached to a zoomQ8 camcorder. The headset microphone captured the speech of the drummer and the shotgun microphone was pointed at the drum. The audio from the two microphones were saved as separate files at the same time as video files. All the participants in the study used the same drum except for one who insisted on using his own drum.

The stimuli in this study are grouped into level tones and contour tones. The stimuli with level tones have monosyllabic and disyllabic words, which are shown in Table 1. The monosyllabic words with level tones are three words with each word bearing either H, L, or M. The disyllabic words with level tones cover nine tonal combinatorial possibilities.

Table 1 — Tone types in mono- and disyllabic stimuli

			Level tone		
			Syllable 2		
			H	M	L
Syllable 1	H	[rá] ‘disappear’	[k͡pá.kó] ‘stick’	[ké.se] ‘infinity’	[k͡pá.kò] ‘chewing stick’
	M	[ra] ‘rub’	[ɔ.kɔ́] ‘hoe’	[ɔ.kɔ] ‘husband’	[ɔ.kɔ̀] ‘vehicle’
	L	[ra̰] ‘buy’	[ì.lú] ‘city’	[ì.lu] ‘puncher’	[ì.lù] ‘city’
Number of words		3	3	3	3

The stimuli with contour tones contain three tone-types, namely L͡H, H͡M, and M͡H tones. These contour tones are from three monosyllabic words with two morae each: *rẹ̀ẹ́* ‘tired it’; *rí̩i* ‘see it’; *jẹẹ́* ‘eat it’.[3]

In total, the stimuli in all the groups contain 15 words (*i.e.* 3 monosyllabic words + 9 disyllabic words + 3 contour-toned words). Each of the drummers drummed each stimulus at least thrice. In other words, there are 45 tokens (15 x 3) for each drummer. Although drumming in a speech surrogacy system involves 3 drum modes, namely a speech mode, a signal mode and a dance mode (Agawu 1995: 91), this study is solely based on speech mode drumming.

4. Results

The visual observations were based on the data from all the drummers. For spectrographic analyses, drum tones were segmented manually in Praat (Boersma 2001). A Praat script was used to extract F0 values (Xu 2013). Among all the sets of data elicited, only data from 3 of the 4 participants who used the same drum were instrumentally analysed. This was done in order to control for the acoustic properties of the drum. Data from the fourth participant who used the same drum were not included because, being a young drummer, he could not drum all the words.

3. In Orie & Pulleyblank (2002), it is argued whether some bimoraic syllables, which are derived through a hiatus resolution, contain a syllable or two. For the token used in this study, we assume here that the combination of a CV verb and a 3SG.OBJ pronoun is monosyllabic.

4.1 Articulatory result

To drum a monosyllabic word, the drummers struck the membrane once and twice for a bisyllabic word. To drum a monosyllabic word with two moras, the drummers also struck the membrane once. To drum H tone, the drummers tightly compressed the tension cords under their arm then struck the membrane. For M tone, they loosely compressed the tension cords then struck the membrane. In drumming L tone, the membrane was struck without compressing the tension cords. To drum H͡M contour, the drummers tightly compressed the tension cords then struck the membrane for the initial H of the contour. As the membrane was vibrating from the strike, the tension cords were then slightly loosened for M. In drumming M͡H, the tension cords were slightly compressed then the membrane was struck for the initial M. As the membrane was vibrating from the strike, the tension cords were tightly compressed for the second H of the contour tone. To drum L͡H, the drummer struck the membrane without compressing the tension cords for the initial L. As the membrane was vibrating, the tension cords were tightly compressed for the H of the contour.

4.2 Acoustic result

Spectrograms show pitch is the main property that distinguishes a drum tone, so the analyses solely focus on pitch. The pitch tracks of level drum tones (H L and M) and contour drum tones (H͡M, M͡H, and L͡H) in isolation are shown in Figures 2 and 3 respectively. The pitch tracks figures are from the same drummer. The pitch tracks of level tones in isolation clearly show a direct correlation between H, L, and M tones and their different pitches.

Since each drum tone was drummed the same way by the 3 participants, I combined all the pitches of each drum tone. The mean values of each drum tone are shown in Table 2. To mitigate the impact of large outliers and aggravate the impact of small ones, the mean values is from a harmonic mean. As shown in Table 2, H has a higher F0 than M, and M a higher F0 than L.

Table 2 — Harmonic mean of drum tone pitch

Drum tone	F0 (Hz)
H	172.307
M	124.7897
L	61.42983

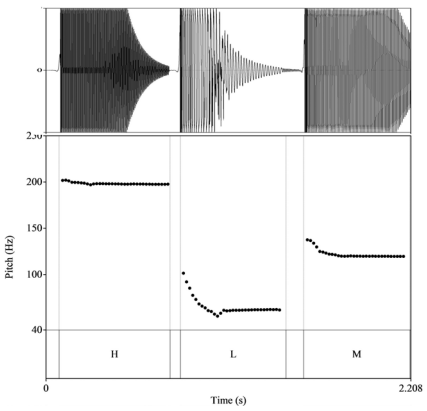

Figure 2 — H L M in isolation; rá 'disappear'; rà 'buy'; ra 'rub'

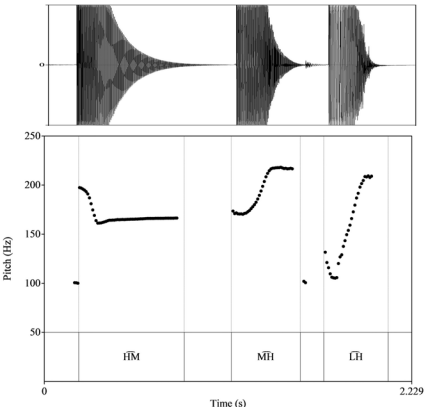

Figure 3 — H͡M, M͡H, L͡H in isolation; ríì 'see it'; jẹ́ẹ́ 'eat it'; rẹ̀ẹ́ 'tired him/her'

4.3 Acoustic result for sequences of tone

With sequences of HL and LH drum tones shown in Figures 4 and 5 respectively, a tonal contour is formed on the second drum tone. For instance, a high-falling contour is formed on the second tone in the drumming of *pákò* 'chewing stick', while a low-rising is formed on the second tone in the drumming of *ìlú* 'city'. However, this does not happen in LM and ML shown in Figures 6 and 7 respectively.

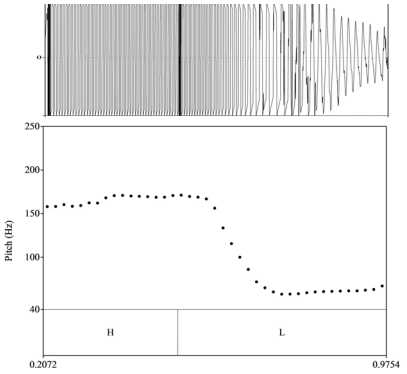

Figure 4 — H L Sequence; pákò 'chew-stick'

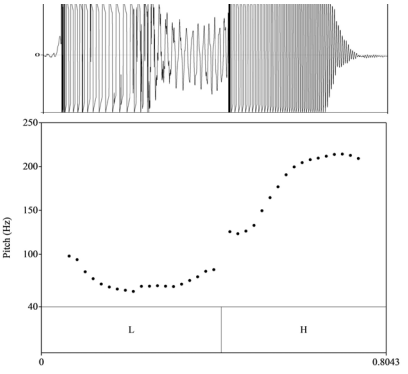

Figure 5 — L H Sequence; ìlú 'city'

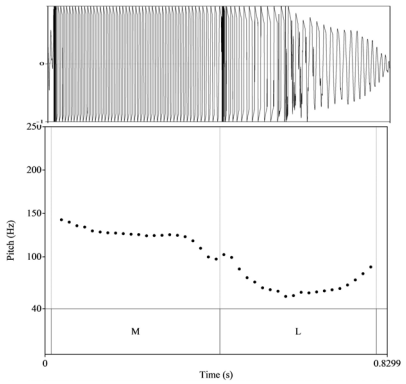

Figure 6 — M L Sequence; ọkọ̀ 'vehicle'

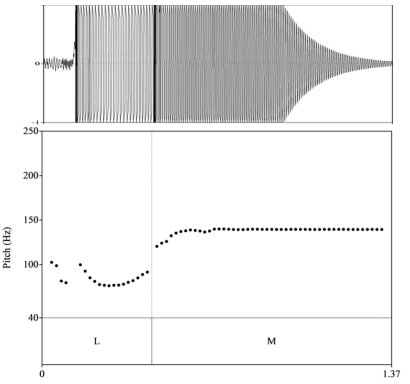

Figure 7 — L M Sequence; ìlu 'puncher'

To check if there is any effect of an adjacent drum tone, the F0 values of each tone in a sequence of two tones were boxplotted in Figure 8 by using ggplot2 (Wickham 2016). Given the contour tone formation on the second tone in HL and LH sequences, only F0 values of word-initial H, L and M drum tones preceding H, L and M were boxplotted. These F0 values were extracted at the 50% point.[4]

Figure 8 shows a clear distinction between H L and M drum tones. For the H drum tone, the F0 value is higher when it precedes an L drum tone. The F0 value of an L drum tone is lower when it precedes an H drum tone. As for M drum tone, it has a higher F0 value when it precedes an M drum tone.

In R (R Core Team 2018),[5] the linear mixed effects (LME)[6] model (Bates *et al.* 2015) was fitted to F0 values of the word-initial drum tones to determine the significant effect of the following tones. For LME, the dependent variable was F0 values taken at the 50% point; the fixed effects were the following tones; the variable subjects (*i.e.* the individual realization of each drummer) was included as the random effect. For fixed effect factor, a following tone which is like the preceding tone was included as the reference level for each tone, *i.e.* H for H, L for L and M for M.

4. The y-axis contains the F0 of the drum tone while the distributional characteristics of the F0 range of each tone in an environment is represented in the box. The box contains the middle 50% of the F0 range. The mid-line in the box marks the median. The top cell of the box contains the maximum 25% of the box and the bottom cell of the box contains the minimum 25% of the box. Each of the lines below and above the box contains 25% of the F0 values which are outside the middle 50%. The dots represent the outliers in the data.

5. R is a free software for statistical analysis and graphics (URL: https://www.r-project.org).

6. LME describes the relationship between a response variable and independent variables, with coefficients that can vary with respect to one or more grouping variables.

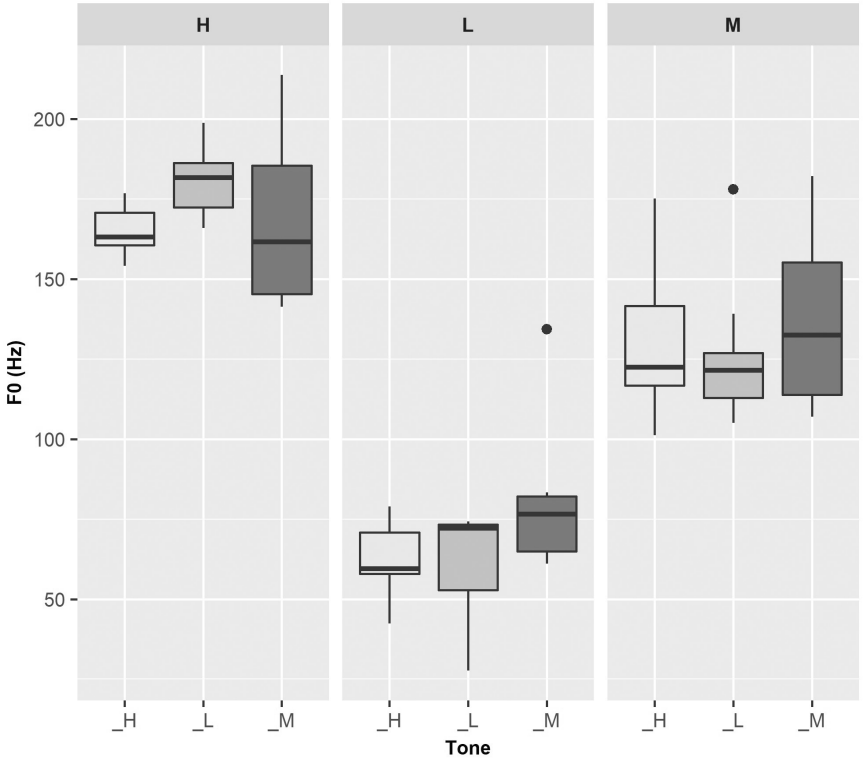

Figure 8 — Word-initial H L and M preceding H L and M

The result shows that the following drum tone had a significant effect on the pitch of the preceding drum tone. For example, the F0 of H tone was significantly higher when it precedes an L tone ($t = 3.3$, $p = 0.0029$).[7] On the other hand, the following M ($t = 0.5$, $p = 0.6$), relative to the following H, had no significant effect on the F0 of the preceding H tone.

Furthermore, the F0 of L tone was significantly lower when it precedes an H tone ($t = 10$, $p = 0.0008$). However, the following L ($t = 0.05$, $p = 0.96$), relative to the following H, had no significant effect on the F0 of the preceding L tone.

Finally, the F0 of M tone was significantly higher when it precedes an M tone ($t = 2.1$, $p = 0.04$). However, the following L ($t = -0.04$, $p = 1$), relative to the following M, had no significant effect on the F0 of the preceding M tone.

7. t: test statistic; p: probability value.

5. Summary, discussion and conclusion

This study shows that the number of strikes the drummers make on the drum membrane directly corresponds to the number of syllables in the presented stimulus. As the drum vibrates from the strikes, the drummer varied the compression of the tension cords in articulating the H, M and L tones in Yorùbá. The acoustics result shows H, M and L drum tones had distinctive pitches. In sequences of HL and LH drum tones, a contour was formed on the second drum tone. The pitch of the H drum tone is significantly raised in a sequence of HL drum tones. However, the pitch of L drum tone is significantly lower in a sequence of LH drum tones.

The pitch distinction between H, L, and M drum tones support previous findings that Yorùbá tones are distinctively rendered with talking drum (Euba 1990; Villepastour 2016). The direct correspondence between the number of syllables in a word and the striking of the drum membrane also suggests that the drummers render the number of syllables in a word with the talking drum. The realisation of a contour tone on the second drum tone in a sequence of HL and LH is similar to the pattern found in Yorùbá speech (Pulleyblank 1988; Akinlabi & Liberman 1995). Raising the pitch of H drum tone in a sequence of HL and lowering the pitch of L drum tone in a sequence of LH in drumming is also similar to the phonetic realisation of tones in spoken Yorùbá (Connell & Ladd 1990; Akinlabi & Liberman 1995). Phonologically, a contrast maximisation for tonal features is considered the functional motivation for the H raising and L lowering in a sequence of HL and LH respectively (Diehl & Lindblom 2004; Yoshida 2011). By extension, it is possibly the case that the H raising and L lowering in the drum tone is a result of the same contrast maximisation. The similarity between drumming and speech tones indicates that the drummers are sensitive to the tonal processes or phonetic properties of speech tones in drumming. An argument for this sensitivity is the conceptualisation of instrumental pairs in some African drumming traditions. For instance, a drum with a low pitch is conceptualised as a male but a drum with a high pitch is conceptualised as a female (Agawu 2016: 83). This conceptualisation can be phonetically corroborated with the results of several studies showing that the pitch range of a female is higher than that of a male (Hollien & Ship 1972; Pegoraro-Krook 1988; Traunmüller & Eriksson 1995).

The contour tone formation on the second syllable in the HL and LH sequences raises an issue on the articulation of tone in drumming considering the fact that the second tone was articulated on the drum without compressing the tension cord: the formation of contours (high falling for HL and low-rising for LH) at the end of the second tone in these sequences (see Figures 4 and 5) should have been unattested since no compression

was made in articulating this second tone. So, (i) the high-falling contour formation at the end of the second drum tone in HL sequence and (ii) the low-rising contour formation at the end of the second drum tone in a LH sequence both suggest that, in addition to varying cord compression, a secondary articulatory strategy is possibly involved in the production of drum tones. Future research on the drumming of Yorùbá words with *gángan* should focus on this additional strategy.[8]

Given the fact that this study was based on lexical tones and that tones perform grammatical functions in certain constructions in Yorùbá (Akinlabi 1985; Liberman & Akinlabi 2000; Laniran & Clements 2003), future research should investigate the representation of the grammatical tones in Yorùbá by a talking drum. The result of a language acquisition study in Orie (2006) shows that rhythmic language and leisurely activities aid L2 acquisition of tones. Considering the fact that a drum language is both rhythmic and leisurely (Agawu 1995 & 2016; Orie 2006), research on L2 acquisition should investigate the effect of the perception and production of drum tones on the acquisition of tones.

Be that as it may, this study clearly shows that Yorùbá drummers faithfully render the number of syllables, the lexical tones and the phonetic realisation of Yorùbá tones with a talking drum.

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2

Was Proto-Kikongo a 5 or 7-Vowel Language? Bantu Spirantization and Vowel Merger in the Kikongo Language Cluster

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Abstract

This article addresses whether Proto-Kikongo (PK), the most recent common ancestor of the Kikongo Language Cluster (KLC), should be reconstructed with an inventory of 5 or 7 vowel phonemes. Based on the synchronic vowel systems of its descendants, the most economic reconstruction would be 5 vowels, as all present-day varieties within the KLC have 5 vowels or once went through a 5-vowel (5V) stage. If such were the case, the reduction of the inherited Proto-Bantu (PB) 7-vowel (7V) system to a 5V system in PK would count as a genealogically significant shared innovation setting apart the KLC as a discrete sub-group within the "West-Coastal" or "West-Western" branch of the Bantu family. Most other West-Coastal Bantu (WCB) languages have either retained the PB 7V system or extended it. However, based on Bantu spirantization (BS) patterns within the KLC, it cannot be excluded that PK actually was a 7V language. Within Bantu, BS and 7>5V reduction are known to be closely interconnected sound changes in that the vowel merger generally takes place after BS. The irregular application of BS at the stem level in several KLC varieties as well as the near-total absence of BS across morpheme boundaries suggest that PK was a 7V language. Different stems manifest irregular patterns of BS in different varieties across the KLC. These irregularities can only be accounted for if we assume that the merger of PB close (/*i/, /*u/) and near-close vowels (/*ɪ/, /*ʊ/) recurrently occurred within the KLC as

an independent innovation after BS had started but before it had affected all possible targets within the language.

Keywords

Bantu spirantization, historical phonology, Proto-Bantu, Proto-Kikongo, vowel merger

Résumé

Cet article vise à déterminer combien de phonèmes vocaliques peuvent être proposés pour la reconstruction du proto-kikongo (PK), l'ancêtre commun le plus récent du groupe kikongo – connu aussi sous le nom de *Kikongo Language Cluster* (KLC). Toutes les variétés actuelles du KLC sont – ou l'ont été dans le passé – à 5 voyelles (5V). En se fondant sur les systèmes vocaliques attestés en synchronie, la reconstruction la plus économique serait donc un système à 5V pour le PK. Si tel était le cas, la réduction du système à 7 voyelles (7V) hérité du proto-bantou (PB) à un système à 5V en PK serait une innovation hautement significative sur le plan phylogénétique pour la classification interne des langues bantoues côtières occidentales (*West-Coastal Bantu* – WCB – ou *West-Western Bantu*). Cette innovation ferait en effet du KLC un sous-groupe à part entière du WCB puisque la plupart des autres langues de ce dernier ont soit conservé le système à 7V, soit développé des systèmes comptant plus de 7 phonèmes vocaliques. Cependant, la façon dont s'est déroulée la spirantisation au sein du KLC suggère qu'il se pourrait bien que le PK ait été une langue à 7V. De fait, au sein de l'ensemble bantou, il est bien connu que la spirantisation et le passage de 7 à 5 unités vocaliques constituent des évolutions phonologiques étroitement liées, la réduction du nombre de voyelles survenant généralement après le phénomène de spirantisation. Le fait que la spirantisation ne se soit produite que de façon irrégulière à l'intérieur des racines et restée exceptionnelle au niveau des frontières entre morphèmes laisse penser que le PK était une langue à 7V. En effet, ce ne sont pas les mêmes radicaux qui manifestent une spirantisation dans les diverses variétés du KLC. Ces irrégularités ne peuvent s'expliquer que si l'on admet que la neutralisation du timbre entre voyelles fermées (/*i/, /*u/) et mi-fermées (/*ɪ/, /*ʊ/) s'est produite à plusieurs reprises dans le KLC, et que ce processus de neutralisation constitue donc une innovation indépendante dans les variétés où il est attesté. On est aussi conduit à supposer que ces neutralisations se sont produites après le début du phénomène de spirantisation, mais avant que ledit phénomène n'ait affecté toutes les cibles possibles dans les langues concernées.

Mots clés

neutralisation de timbre, phonologie diachronique, proto-bantou, proto-kikongo, spirantisation

1. Introduction

The Kikongo Language Cluster (KLC) is a group of closely related Bantu languages spoken in a contiguous area covering parts of southern Gabon, southern Congo-Brazzaville, southwestern Congo-Kinshasa and northern Angola including Cabinda. According to phylogenetic classifications relying on basic vocabulary (de Schryver *et al.* 2015; Grollemund *et al.* 2015; Bostoen & de Schryver 2018a), the KLC constitutes a discrete sub-clade of West-Coastal Bantu (WCB) languages (Vansina 1995), also known as "West-Western Bantu" (Grollemund *et al.* 2015), itself a major clade within the Bantu family. So far, the status of the KLC as a genealogical subgroup is substantiated by very little non-lexical evidence. Potential non-lexical evidence is limited to some shared morphological innovations in the tense-aspect system, such as the past ending *-idingi* and the preverbal future marker *si* (Dom & Bostoen 2015), and the compound reciprocal marker **izyan* in the domain of verbal derivational morphology (Dom *et al.* forthcoming). From a phonological point of view, a possibly significant shared innovation for genealogical subgrouping is the reduction to 5-vowel (5V) of the 7-vowel (7V) system inherited from Proto-Bantu (PB) (Meinhof 1932 [1910]: 27; Meeussen 1967: 82). All present-day KLC varieties but one have a 5V system. As is often the case across Bantu languages, the PB 7V phonemes were reduced to 5 in the KLC by merging the two highest degrees of aperture. PB /*i/ /*ɪ/ /*e/ /*a/ /*o/ /*ʊ/ /*u/ evolved into the KLC's prevailing /i/, /e/, /a/, /o/, /u/ inventory. Most KLC varieties lost the near-close vowels /*ɪ/ and /*ʊ/. This merger happened after a mutation of consonants before the close vowels /*i/ and /*u/. In this article, we refer to this consonant mutation as Bantu spirantization (BS).[1] As shown in (1) with data from the West Kikongo variety Cizali (Congo-Kinshasa), PB /*b/ shifted to /v/ in front of the close vowels /*i/ and /*u/, while its regular reflex elsewhere is /b/. In this way, the opposition between /*i/ and /*ɪ/ and between /*ʊ/ and /*u/ in PB led to the presence *vs.* absence of consonant mutation, *e.g.* /v/ *vs.* /b/ in Cizali.

1. In Bantu studies, the regular change of PB stops into fricatives (or affricates in certain languages) in front of the PB close vowels /*i/ and /*u/ is known as "spirantization" (Schadeberg 1995; Nurse & Philippson 2003; Bostoen 2008), "frication" (Hyman 2003a; Hyman & Merrill 2016) or "assibilation" (Coupez 1954; Bastin 1983). In this paper we use the term "Bantu spirantization" instead of simply "spirantization" because this term as used by Bantuists does not entirely correspond to its definition in other language families (Bostoen 2008: 306).

(1)	BLR3 (Bastin *et al.* 2002)			Cizali (Vandenabeele 2016)
	**bímb*	‘swell’	>	*víímb*
	**bíd*	‘call, announce, tell’	>	*bíl*
	**béed*	‘be ill’	>	*bél*
	**bá*	‘oil-palm’	>	*li-bá*
	**bòd*	‘be rotten’	>	*ból*
	**bód*	‘break, smash; kill’	>	*búl*
	**búdà*	‘rain’	>	*m-vúla*

Kihungan (H42, Congo-Kinshasa) is the only language within the KLC to have 7 vowel phonemes, *i.e.* /i/ /e/ /ɛ/ /a/ /ɔ/ /o/ /u/ (Bostoen and Koni Muluwa 2011). Nevertheless, its system does not directly reflect the 7 vowels of PB, *i.e.* /*i/ /*ɪ/ /*e/ /*a/ /*o/ /*ʊ/ /*u/ (ibid.). Kihungan also underwent the common Bantu 7>5V reduction subsequent to BS. As illustrated in (2), the PB high front vowels /*i/ and /*ɪ/ and back vowels /*u/ and /*ʊ/ merged into /i/ and /u/ respectively, after the spirantization of /*d/ in C1 position into /ʣ/ in front of /*i/ and /*u/. Elsewhere, the regular intervocalic reflex of /*d/ is /l/, except when followed by the PB near-close front vowel /*ɪ/, in which case /d/ is preserved in Kihungan, as is often the case in Bantu (Hyman 2003a: 54). Kihungan created a new opposition between e and ɛ and between ɔ and o out of the reflexes of PB /*e/ and /*o/. The close-mid vowels /*e/ and /*o/ have /e/ and /o/ as reflexes respectively when the stem ends in a high vowel, as in **dèdù* ‘beard’ and **dògì* ‘witch’. They have /ɛ/ and /ɔ/ as reflexes respectively, when the final vowel is not high, as in **dédé* ‘cloth’ or **dòg(-à)* ‘bewitch’. This originally phonetic distinction was phonologized through the loss of the final vowel, which used to condition the complementary distribution of [ɛ] and [e] and of [ɔ] and [o] in V1 position of the stem (Bostoen & Koni Muluwa 2011). In (3) we present three minimal pairs, two of them opposing /ɛ/ and /e/ and one opposing /ɔ/ and /o/.

(2)

BLR3 (Bastin *et al.* 2002)			Kihungan (Bostoen & Koni Muluwa 2011; Koni Muluwa & Bostoen 2015)
**dím*	‘extinguish’	>	*ɗím*
**dìm*	‘cultivate’	>	*dim*
**dèdù*	‘beard’	>	*ki-léf*
**dédé*	‘cloth’	>	*mú-lɛl*
**dài*	‘long’	>	*léy*
**dòg*	‘bewitch’	>	*lɔ́k*
**dògì*	‘witch’	>	*mu-lók*
**dók*	‘vomit’	>	*lúk*
**dùmbù*	‘belly’	>	*ɗúm*

(3) Kihungan minimal pairs opposing /ɛ/ *vs.* /e/ and /ɔ/ *vs.* /o/ (Bostoen & Koni Muluwa 2011: 256)

mulêk	‘virgin’	*vs.*	*mulêk*	‘accompany him! (IMP)’
tek	‘bone marrow’	*vs.*	*tɛk*	‘sell! (IMP)’
mu-lók	‘witchdoctor’	*vs.*	*mulɔ́k*	‘bewitch him! (IMP)’

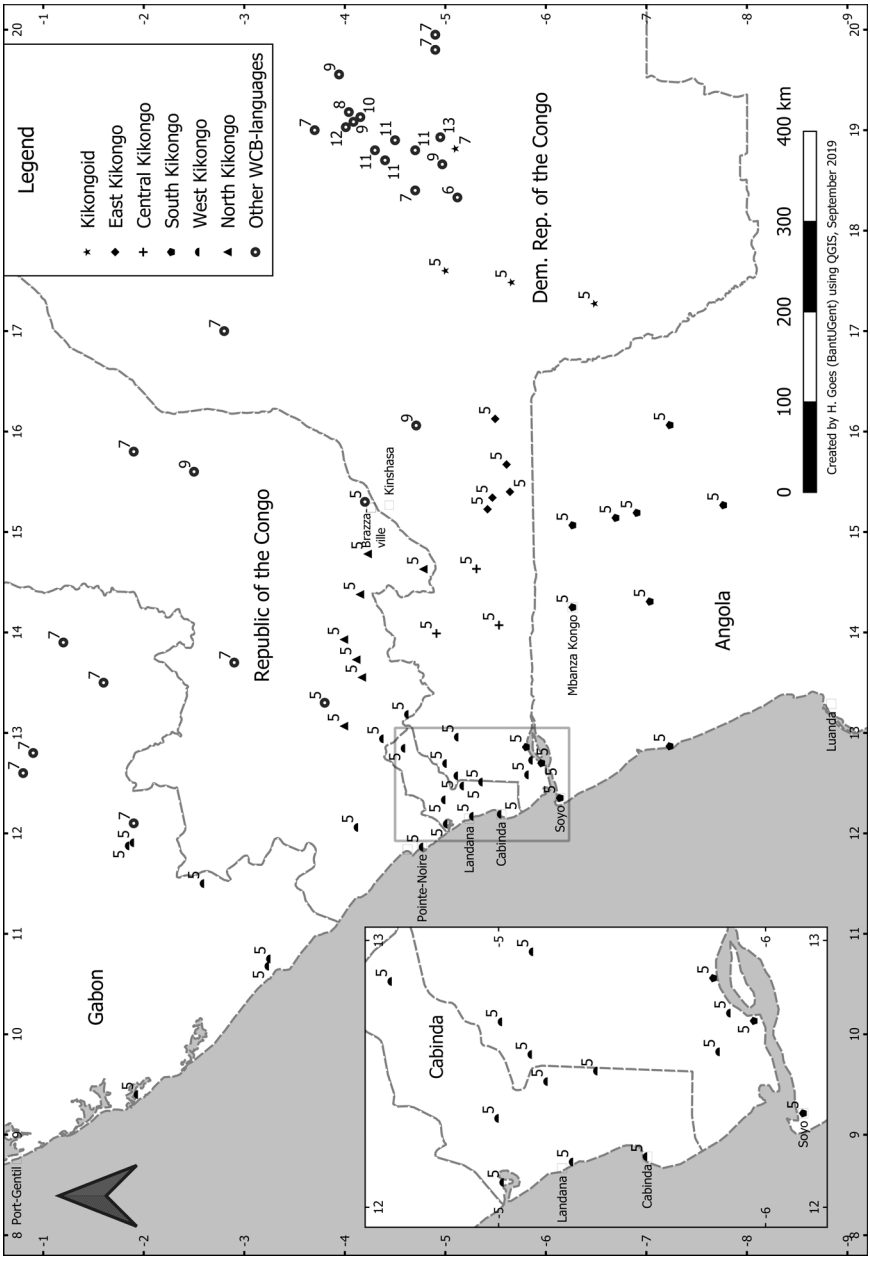
Taking into account that all current-day varieties within the KLC have the same 5V phoneme inventory, which was originally found in Kihungan before the vowel split discussed above, and following the principle of Occam’s razor commonly applied in historical linguistics (Hock 1991 [1986]: 538ff; Dimmendaal 2011: 18; François 2014: 164; Weiss 2014: 129), the most parsimonious assumption would be that the 7>5V reduction took place only once, *i.e.* in Proto-Kikongo (PK). In other words, the most recent common ancestor of the KLC would have had the very same 5V system that prevails in the KLC today. If this were the case, the reconstruction of the /*i/ /*e/ /*a/ /*o/ /*u/ inventory to PK would also be significant for internal classification. Table 1 presents a non-exhaustive list of WCB languages from outside the KLC subclade. As can be seen, most of them have 7 vowel phonemes or more, notwithstanding some exceptions, such as Iyaa (B73c) and Ifumu (B77b), which would have only 5. This implies that the immediate ancestor of PK, *i.e.* Proto-WCB, still had 7V and that the 7>5V merger could be a shared innovation corroborating the status of the KLC as a discrete subgroup within WCB. In such case, the reduction of the vowel inventories of languages such as Iyaa (B73c) and Ifumu (B77b) to 5V would be the result of independent parallel innovations, just like the extension of others up to 13 vowel phonemes (Daeleman 1977; Rottland 1977; Bostoen & Koni Muluwa 2014).

Table 1. — Non-exhaustive overview of (oral) vowel phoneme inventories in WCB languages

Code[2]	Language	Number of vowel phonemes	Source
B501	Liwanzi	7	Mouele (1997)
B51	Liduma	7	
B52	Inzebi	7	
B53	Itsengi	7	
B61	Limbete	7	Ndouli (2001)
B62	Limbamba	7	Guthrie (1971)
B63	Lindumu	7	
B72a	Engungwel	7	Rurangwa (1982)
B73c	Iyaa	5	Mouandza (2001)
B74	Eboo-Nzikou	9	Raharimanantsoa (2012)
B77b	Ifumu	5	Makouta-Mboukou (1977)
B81	Ketiene	7	Ellington (1977)
B82	Iboma (North)	7	Stappers (1986)
B83	Emfinu	9	Daeleman (1958)
B85	Iyansi	11	Rottland (1977)
B85d	Ensong	7	Koni Muluwa (2010)
B85e	Impur	10	Kibwenge India'Ane (1985)
B85F	Kinsamban	11	Mfum-Ekong (1979)
B86	Idzing	13	Mertens (1938)[3]
B86	Idzing	12	Ebalantshim Masuwan (1980)
B86	Idzing	10	Mekani Mwan (1984)
B862	Kəlwel	8	Khang Levy (1979)
B863	Ngong	6	Koni Muluwa (2010)
B864	Mpiin	9	
B865	Nzadi	7	Crane *et al.* (2011)
B87	Mbuun	7	Koni Muluwa (2010)

2. This code consisting of a capital letter, a decimal number and sometimes a lower-case letter refers to the referential classification of the Bantu languages (Guthrie 1971). Languages having a 3-digit number code or a 2-digit number code followed by a capital letter were not part of the original Guthrie classification, but were incorporated in the updates by Maho (2003; 2009).

3. While Mertens (1938) and Ebalantshim Masuwan (1980) both report on the Kamtsha variety of Idzing, Mekani Mwan (1984) deals with the language's Lesye variety.



Map 1. — Distribution of vowel phoneme inventories within WCB, KLC subgroups vs. the rest.

Map 1 presents the distribution of vowel phoneme inventories within the WCB area according to their size. Numbers associated with ⓿ represent languages outside the KLC. Numbers associated with other symbols refer to the different subgroups within the KLC: Kikongoid (★), South Kikongo (⬟), East Kikongo (◆), West Kikongo (◓), Central Kikongo (✚), and North Kikongo (▲) (de Schryver *et al.* 2015; Bostoen & de Schryver 2018a). In this article, we argue, in contradiction to Occam's razor, that PK still had a 7V system and that the 7>5V reduction recurrently took place as a parallel innovation after the most recent common ancestor of the KLC had diverged into different languages. Our argumentation is based on BS patterns within the KLC. After having reconstructed the PK BS pattern in Section 2 and having identified innovations of the PK BS pattern in Section 3, we discuss its irregular application within the stem in Section 4 and the near-absence of its occurrence across morpheme boundaries in Section 5. In Section 6, we conclude that the irregular application of BS within the stem in several KLC varieties as well as the near-total absence of this sound change across morpheme boundaries can be accounted for most convincingly if one reconstructs PK with a 7V system. The reduction to a 5V system took place as an independent innovation in different subgroups. It happened before BS had affected all targetable stems and morphological environments, but different targets escaped in different subgroups.

2. The Proto-Kikongo BS Pattern

BS patterns within the stem are remarkably uniform across the KLC. This homogeneity suggests that this sound shift was already quite advanced in PK. In this section, we present the common KLC reflexes of PB stops, both voiceless (*p *t *k) and voiced (*b *d *g),[4] in front of both /*i/ (Section 2.1) and /*u/ (Section 2.2).

2.1 Stem-Internal BS in front of /*i/

In front of the PB high front vowel /*i/, the voiceless labial stop /*p/ generally yields /f/ throughout the KLC, as shown in (4) with reflexes of *pìn 'press, squeeze' (BLR3 2572).[5] More evidence is presented in (42) in the Appendix. Reflexes are grouped per KLC subgroup: KD = Kikongoid; NK = North Kikongo; WK = West Kikongo; CK = Central Kikongo; EK = East-Kikongo; SK = South Kikongo. A table with the KLC varieties corresponding to the abbreviations used below and their respective sources is presented at the beginning of the Appendix.

4. Note that <g> is commonly used in Bantu language studies as the grapheme representing the voiced velar stop whose IPA symbol is [ɡ]. We stick to this convention here.

5. After all Bantu lexical reconstructions, the unique BLR3 index number is provided (Bastin *et al.* 2002).

(4) KD: *fin-á* (YK), *fin* (SKa); NK: *fin-à* (HGLa); WK: *fiín-a* (YMB1), *u-fin-a* (LMBa, PNa), *ku-fin'* (VL2a), *ɣu-fin-a* (NGB), *ɣu-fin-ə* (SHR), *fín-a* (ZL, WY1); CK: *fin-a* (MNYa); EK: *fin* (NTD), *ku-fín-a* (MBT); SK: *fin-a* (SKGb), *ka-fin-a* (TSTb)

The voiceless alveolar stop /*t/ and the voiceless velar stop /*k/ both have /s/ as a regular reflex in the same context, as shown respectively in (5) with reflexes of *tíngà 'bow-string; tendon, vein' (BLR3 2941) illustrating the shift in C1 position, and in (6) with reflexes of *jíkì 'smoke' (BLR3 3442) illustrating the shift in C2 position. More evidence is to be found in (43) and (44) in the Appendix with examples in both C1 and C2 positions.

(5) KD: *n-síngá* (YK), *mu-síng* (HGNa), *mu-síŋ* (HGNb), *mu-síínga* (SMB); NK: *sìŋgà* (HGLa); WK: *n-siínga* (YMB1), *mu-siinga* (LMBa), *n-siinga* (ZL), *n-singa* (WY2a), *n-síínga* (MBL); CK: *n-singa* (MNYa); EK: *ǹ-singa* (NTD); SK: *n-xinga* (SKGb)[6]

(6) KD: *mw-îf* (HGNb)[7], *mw-ísi* (SKa); NK: *mw-ísì* (HGLa), *mu-isi* (DNDa); WK: *mw-íisi* (YMB1), *mu-isi* (LMBa), *mw-ïsi* (VL2a), *mu-isi* (WY2a); CK: *mw-isi* (MNYa); EK: *mw-iisí* (NTD); SK: *mw-isi* (DHG), *mw-ixi* (SKGb)

The same pattern is observed in the reflexes of PB voiced stops. Labial /*b/ shifts to /v/ in front of the PB high front vowel /*i/, as shown in (7) with reflexes of *bímb 'swell' (BLR3 240). Both alveolar /*d/ and velar /*g/ change to /z/, as shown in (8) and (9) with reflexes of *dìık 'bury' (BLR3 1044) and *gì 'fly' (BLR3 1389)/*gìngì 'fly' (BLR3 1406) respectively. In the Appendix, more evidence is presented for each of these sound changes in (45), (46) and (47) respectively with examples in both C1 and C2 positions.

(7) KD: *ku-vímb-a* (SMB); NK: *kù-vìímb-á* (KMB); WK: *víímb-á* (YMB1), *víímb-a* (ZL, MBL); CK: *vimb-a* (MNYa, NDB); EK: *víimb* (NTD); SK: *vímb-a* (SL2), *vimb-a* (TSTb, ZMBc)

(8) KD: *zíík-á* (YK), *ku-zík-a* (SMB); NK: *zììk-à* (HGLa), *kù-zììk-á* (KMB); WK: *zíík-a* (YMB1), *ziik-a* (ZL), *ziik* (WY1), *zik-a* (WY2a); CK: *zik-a* (MNYa); EK: *ziik* (NTD); SK: *ziik-a* (SL2), *zik* (MBM), *jik-a* (SKGb)[8]

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6. <x> in Kisikongo (H16a) stands for [ʃ], which results from a later innovation, *i.e.* the palatalization of /s/ in front of /*i/.

7. /ʃ/ in Kihungan (H42) also results from the palatalization of /s/ in front of /*i/.

8. <j> in Kisikongo (H16a) stands for [ʒ] and results from the regular palatalization of /z/ in front of /*i/.

(9) KD: *n-ʤíínʤí* (YK)[9]; NK: *n-zí* (DNDb), *ba-n-zí* (BMBa); WK: *du-n-zi* (PNa, VL2a), *n-zinzi* (KC, KWK, LNJ2, SND, WY2a, WY2c), *n-zíínzi* (WY1, ZL); CK: *n-zi* (MNYa); EK: *n-zinzi* (NTD); SK: *n-zi* (SKGc), *m-bwa-nzi* (TSTb, ZMBc)

The common KLC spirantization pattern in front of /*i/ is summarized in Table 2 for both C1 and C2 positions. It involves a preservation of the original PB voicing contrast in combination with a partial merger of places of articulation. The PB contrast between alveolar and velar stops is lost. Both shifted to alveolar fricatives, while the original contrast with PB labial stops was maintained in that the latter muted into labiodental fricatives. Direct reflexes of this pattern are attested in all subgroups of the KLC. We consider it to be a retention inherited from PK.

*Table 2. — Reflexes of PB stops in front of PB close /*i/ reconstructable to PK*

PB		**/*pi/**	**/*ti/**	**/*ki/**	**/*bi/**	**/*di/**	**/*gi/**
PK	**C1**	/fi/	/si/	/si/	/vi/	/zi/[10]	/zi/
	C2	/fi/	/si/	/si/	/vi/	/zi/	/zi/

As shown in (10), the BS pattern in front of PB close /*i/ inherited from PK is also attested in the oldest surviving dictionary of a Bantu language, *i.e.* the *Vocabularium Latinum, Hispanicum, e Congense* (Van Gheel 1652), which documents seventeenth-century South Kikongo as spoken at Mbanza Kongo, the capital of the Kongo kingdom, and its vicinity (Bostoen & de Schryver 2018b).

9. In Kiyaka (H31), fricative /z/ is strengthened to affricate /ʤ/ when preceded by a non-syllabic nasal.

10. The Kihungan (H42) reflex /ʤi/ of PB /*di/ could be taken as evidence for the fact that the PK reflex of /*d/ in front of /*i/ was not a fricative but an affricate. However, the Kihungan reflex of /*di/ is either /ʤi/ or /ʒi/, the former possibly being a contact-induced strengthening under the influence of B80 languages where /ʤi/ is one of the reflexes of /*di/ (Koni Muluwa 2010: 146). Hence, both /ʤi/ and /ʒi/ are probably innovations from PK /zi/.

(10) BS in front of PB close /*i/ in seventeenth-century South Kikongo (Van Gheel 1652)

**pígò*	'kidney'	>	*ń-fio*	'*nephus*, *ren*'
**píp*	'suck'	>	*cú-fiba*	'*súgo*'
**tínà*	'root'	>	*e-ssina*	'*origo*; *principiúm*'
**tíngà*	'bow-string'	>	*lu-çinga*	'*chorda*'[11]
**kíndò*	'noise, footfall'	>	*mu-sindú*	'*strepitus*'
**kíngó*	'neck'	>	*n-çingú*	'*collum*'
**bímb*	'swell'	>	*cú-úimba*	'*inflo; obsturgao; túmeo*'
**bìì*	'excreta'	>	*tú-úi*	'*fimus*'
**dìık*	'bury'	>	*cú-zica*	'*humo; operculo; púlso*'
**dìtò*	'heavy'	>	*qui-zitú*	'*grauitas; onús; pondus*'
**gìdà*	'taboo'	>	*u-zila*	'*impudicitia; túrpitudo*'

2.2 Stem-Internal BS in front of /*u/

In front of /*u/, all PB voiceless stops have the same reflex, *i.e.* /f/. This is shown in (11) for /*p/ with reflexes of *púdò 'foam' (BLR3 2677)[12], in (12) for /*t/ with reflexes of *túnd 'teach; punish, accuse' (BLR3 3122), and in (13) for /*k/ with reflexes of *kú 'to die' (BLR3 2089). More evidence for this regular sound shift is presented in (48), (49), and (50) in the Appendix.

(11) KD: *fúl-ful* (HGNb), *fúlu* (YK); NK: *fulu* (BMBa); WK: *di-fúúlú* (YMB1), *i-fulu* (LMBa, PNa), *tshi-fulu* (VL2a), *li-fúlu-fulu* (ZL), *fúlú* (MBL); CK: *fulu* (MNYa); EK: *fúlu* (NTD); SK: *e-fulu-fulu* (SKGb)

(12) KD: *fúúnd-á* (YK), *kú-fúnd* (HGNb); NK: *fund-a* (DND/KMB/KNY); WK: *fúúnd-á* (YMB1), *fúúnd-a* (ZL), *fúund-a* (WY1), *fund-a* (WY2a), *fund-e* (VL1c); CK: *fund-a* (MNYa); EK: *fúund* (NTD); SK: *fúúnd-a* (SL2)

(13) KD: *kú-fa* (HGNb), *ku-fw-a* (SKa); NK: *fw-á* (HGLa), *fu* (LDa); WK: *fw-á* (YMB1), *fuw-a* (WY2b), *ku-fw-a* (VL1c, VL2b), *fw-a* (MBL), *u-fu* (LMBa, PNa, SNG1, SNG2), *ɣu-fu* (SHR); CK: *fw-a* (NDB); EK: *fú* (NTD); SK: *ku-fw-a* (DHG), *fw-a* (ZMBa, SKGb, TSTa)

11. In the *Vocabularium Latinum, Hispanicum, e Congense*, both the graphemes <ç> and <ss> are used to render /s/, while <u> may represent both /w/ and /v/ (De Kind *et al.* 2012).

12. Within the KLC, the final vowel of **púdò* 'foam' generally underwent heightening under the influence of the high vowel in V1 position.

All PB voiced stops also have the same reflex in front of /*u/, *i.e.* /v/, as shown in (14) for /*b/ with reflexes of **búdà* 'rain' (BLR3 368), in (15) for /*d/ with reflexes of **dúʊd* 'take off (clothes)' (BLR3 1241) and in (16) for /*g/ with reflexes of **dàgù* 'palm wine'.[13] In (16), no reflexes from Kikongoid and East Kikongo are given, because they all underwent further devoicing of C2 from /vu/ to /fu/ (cf. *infra*). Other regular reflexes of /*bu/, /*du/ and /*gu/ providing evidence for this pattern are presented in (51), (52), and (53) of the Appendix.

(14) KD: *m-vula* (SKa, SKb); NK: *vúlá* (HGLa), *m-vula* (DNDa, KNY), *m-vùlà* (KMB); WK: *m-vúúlá* (YMB1), *vul'* (VL2a), *n-vula* (VL1c), *N-vula* (LMBa), *m-vula* (PNa, WY1, WY2a, WY2b); CK: *m-vula* (MNYa, NDB); EK: *m-vúla* (NTD), *m-vula* (MBT); SK: *m-vula* (SKGb, SL1a, SL1b, DHG, PMB, TSTa), *m-bvula* (ZMBa)[14]

(15) KD: *vúúl-a* (YK); NK: *vùùl-à* (HGLa); WK: *vúúl-a* (YMB1), *vuul-a* (ZL), *vuul-a* (WY1), *ku-vhül'* (VL2a), *u-vhuul-a* (LMBa); CK: *vuul-a* (MNYa); EK: *vúúl* (NTD); SK: *vula* (SKGb)

(16) NK: *ma-lavu* (DND/KMB/KNY), *mà-làvú* (LDb); WK: *ma-laávu* (YMB1), *ma-lávu matsáámba* (ZL), *ma-lávu* (WY2c); CK: *ma-lavu* (MNYa, NDB); SK: *ma-lavu* (SKGb, SL1a), *ma-lavù* (ZMBa)

The common KLC BS pattern in front of /*u/ is summarized in Table 3 for both C1 and C2 positions. As before /*i/, the original PB voicing contrast is maintained. However, unlike before /*i/, a full merger of places of articulation is observed in front of /*u/.[15] The PB contrast between labial, alveolar and velar stops is lost in favor of labiodental fricatives. Direct reflexes of this pattern are attested in all subgroups of the KLC. We consider it to be a retention inherited from PK.

*Table 3. — Reflexes of PB stops in front of PB close /*u/ reconstructable to PK*

PB		**/*pu/**	**/*tu/**	**/*ku/**	**/*bu/**	**/*du/**	**/*gu/**
PK	**C1**	/fu/	/fu/	/fu/	/vu/	/vu/	/vu/
	C2	/fu/	/fu/	/fu/	/vu/	/vu/	/vu/

13. The reconstruction **dàgù* 'palm wine' is not present in BLR3 (Bastin *et al.* 2002). We propose this new reconstruction for PK in analogy with the existing reconstruction **dògù* 'wine; beer' (BLR3 1108) with reported attestations in Guthrie's zones A B D K L R (*ibid.*). Apart from V1, these two reconstructions correspond in both form and meaning.

14. The stem-initial affricate observed in the Kizombo (H16h) reflex is a strengthening resulting from the contact between the homorganic non-syllabic nasal prefix of class 9 and stem-initial /s/.

15. For unclear reasons, one stem does not comply with this full merger of places of articulation, *i.e.* **dùt* 'pull' (BLR3 1267). As shown in (52e) in the Appendix, it yields reflexes with /zu/ instead of /vu/. This exception could indicate that also in front of /*u/ the merger of places of articulation was originally only partial in PK and that this specific stem escaped the leveling process.

As shown in (17), the BS pattern in front of PB close /*u/ inherited from PK is also attested in seventeenth-century South Kikongo.

(17) BS in front of PB close /*u/ in seventeenth-century South Kikongo (Van Gheel 1652)

**púan*	'be fitting'	>	*cu-fuana*	'*pertinere; sufficio*'
**púdò*	'foam'	>	*e-ffúlú*	'*spúma; spúmatio*'
**túd*	'hammer; forge'	>	*cú-ffúla*	'*cudo*'
**kú*	'die'	>	*cú-fúa*	'*morior; mors; obitus; pernicies*'
**kúmú*	'chief'	>	*n-fumu*	'*dominus*'
**búì*	'white hair'	>	*n-úú*	'*cani; canities*'
**búdà*	'rain'	>	*n-úúla*	'*imber; plúúia*'
**dùm*	'roar, rumble'	>	*cú-úúma*	'*floreo; horreo; timeo; tono*'
**dùmbí*	'continuous rain'	>	*mu-uumbi*	'*diluuium*'
**dògù*	'beer'	>	*n-dúúú*	'*múltibubus, potor*'

3. Innovations of the Proto-Kikongo BS Pattern

The most widespread and genealogically diagnostic innovation in the BS pattern reconstructed for PK is spirant devoicing, both in C2 (Section 3.1) and C1 (Section 3.2) positions. Other innovations are much more scattered and often restricted to specific languages. One of them is the spirant palatalization in front of /*i/. It occurs regularly in Kisikongo, where PK /*zi/ yields /ʒi/ —often written as <ji>, cf. (8)— and /*si/ yields /ʃi/ —often written as <xi>, cf. (6). In Kihungan, such spirant palatalization is also observed but not in an entirely regular way. The spirant is also sometimes affricated in Kihungan, both in front of /*i/ and /*u/ —cf. (2). Such affrication is also irregularly observed in B40 languages and Kiyombe (H16c) subsequent to the devoicing of PK /*zi/ to /si/, as discussed in Section 3.1 below.

3.1 Spirant Devoicing in C2 Position

Reflexes of PB voiced stops that underwent BS often undergo further devoicing. This sound shift is known as "spirant devoicing" in Bantu studies (Nurse & Hinnebusch 1993: 206) and often used as a diagnostic feature for genealogical subgrouping (Nurse 1999; Labroussi 2000; Bostoen 2009). Within the KLC, the devoicing of the spirant reflexes of PB stops is especially frequent in C2 position, before the reflexes of both PB /*i/ and /*u/. At the end of the stem, PK /vi/, /zi/ and /vu/ recurrently shift to /fi/, /si/ and /fu/ respectively. This is shown in (18) for PB /*bi/ with reflexes of **jíbì*

'thief' (BLR3 3396), in (19) for PB /*di/ with reflexes of **bàdì* 'yesterday, tomorrow' (BLR3 44), in (20) for PB /*bu/ with reflexes of **gòbú* 'hippopotamus' (BLR3 1480) (without attestations in WK), and in (21) for PB /*du/ with reflexes of **dèdù* 'beard; chin' (BLR3 897). Evidence for the devoicing of reflexes of PB /*gi/ and /*gu/ is missing due to the scarceness of reconstructed stems ending in these sequences. More evidence of spirant devoicing in stem-final reflexes of /*bi/, /*di/ and /*du/ is presented in the Appendix, more specifically in (54), (55), and (56), respectively.

(18) KD: *mú-úfi* (YK), *mw-îf* (HGNb); NK: *mw-ììfi* (KMB); WK: *mw-ifi* (YMB1)[16], *mw-ĩfi* (VL2a), *mw-ifi* (MNN), *mu-ifi* (LMBa); EK: *mw-iifí* (NTD, MBT, MBK)

(19) KD: *m-básí* (YK), *m-báf* (HGNb), *m-bác* (SMB); NK: *m-bàsi* (KMB); WK: *m-baási*/*m-baázi* (YMB1), *m-basi* (VL2a), *N-batsi* (LMBa), *m-bătsì* (YMB3a); EK: *m-basi* (NTD, MBT, MBK, NKN)

(20) KD: *n-gúfu* (YK), *ń-guf* (HGNb); NK: *n-gùfù* (KMB), *n-gùfù* (BMBa); EK: *n-gufú* (NTD), *n-gufu* (MBT, MBK)

(21) KD: *yi-léfu* (YK), *ki-léf* (HGNb); NK: *mà-n-dyéfò* (KMB)[17]; WK: *má-n-dèfù* (YMB3a), *tshi-defu* (VL2a), *i-defu* (LMBa), *ma-n-défu* (MBL); EK: *ki-lefo* (NTD), *ki-lefu* (MBK)

As can be observed from the data in (18)-(21), spirant devoicing in C2 position does not occur in all KLC subgroups. It is absent from South Kikongo and Central Kikongo and only attested as a phonological innovation in West Kikongo, North Kikongo, East Kikongo and Kikongoid. However, based on the available evidence, it would be difficult to posit spirant devoicing in C2 position as a shared innovation that would have taken place in a more recent common ancestor shared only by those four subgroups but not by South or Central Kikongo. Although this phenomenon seems to occur across all languages belonging to East Kikongo and Kikongoid, several West and North Kikongo languages miss this innovation, *e.g.* Ciwoyo/Iwoyo (WK) and Cilaadi (NK), or apply it irregularly, *e.g.* Kiyombe (WK) and Cizali (WK). As a consequence, for the time being, it seems safer to consider spirant devoicing in C2 position as a parallel innovation that took place independently in each of those subgroups.

16. This devoiced reflex was found in Biyoko Mabua (2017). Both Bittremieux (1923-1927) and De Grauwe (2009) report the voiced equivalent *muivi/mwíivi*, suggesting that spirant devoicing is not fully regular in Kiyombe (H16c).

17. Several reflexes of **dèdù* 'beard; chin' (BLR3 897) have a final mid vowel due to vowel lowering under the influence of the stem's initial mid vowel.

As for Kikongoid and East Kikongo, it is likely to have occurred in the ancestor language of each of the subgroups. Spirant devoicing as such is not solid enough a proof to propose a unique ancestor language for both Kikongoid and East Kikongo unless corroborated by other shared innovations still to be identified. So far, no specific innovations only shared by these two subgroups have been observed. They also do not emerge as more closely related to each other than to other subgroups in the lexicon-based phylogenetic classification of the KLC (de Schryver *et al.* 2015; Bostoen & de Schryver 2018a & 2018b).

Within West and North Kikongo, the innovation must have been initiated subsequent to the split-up of their respective ancestor languages. In West Kikongo, it is fully consistent in the B40 languages plus Civili (H12) and Kiyombi (H16c), while less so in the H10 languages spoken further south, *i.e.* just north of the Congo delta. This division between a northwestern and southwestern cluster coincides with the split observed within West Kikongo in the lexicon-based phylogenetic classification of de Schryver *et al.* (2015: 140). Spirant devoicing seems to corroborate the status of the B40 languages plus Civili (H12) and Kiyombi (H16c) as a distinct subgroup within West Kikongo. Kiyombi (H16c) and the B40 languages further share the regular affrication of stem-final /si/ to /tsi/. Spirant devoicing is also not attested in the oldest available source for West Kikongo, *i.e.* the eighteenth-century Kikongo-French/French-Kikongo dictionary (Anonymous 1772a & 1772b), compiled by French missionaries who operated in the kingdom of Kakongo in present-day Cabinda (Angola) (van Bulck 1954; Drieghe 2014). Just like seventeenth-century South Kikongo —cf. (10) and (17)—, eighteenth-century West Kikongo retained the BS pattern inherited from PK.

(22) Absence of spirant devoicing in eighteenth century West Kikongo (Anonymous 1772a & 1772b)

**jíbì*	‘thief’	>	*u mu-ivi*	‘brigand; voleur’
**kádí*	‘woman, wife’	>	*ou(u)m-kazi*	‘épouse’
**gì*	‘fly’	>	*i n-zi*	‘mouche’
**gìngì*	‘fly’	>	*i n-zinzi*	‘moucheron’
**bú*	‘year’	>	*u m-vu*	‘saison’
**dèdù*	‘beard; chin’	>	*zi n-dévo*	‘barbe; moustache’
**kódù*	‘reptile: tortoise’	>	*i kuvu*	‘tortue’
**dàgù*	‘palm wine’	>	*ma-lavu ma samba*	‘vin de palme’

3.2 Spirant Devoicing in C1 Position

Spirant devoicing in C1 position is much less pervasive than in C2 position in the KLC. Leaving aside monosyllabic stems like *biì ‘excreta’ (BLR3 6425) (see (54) in the Appendix), where C1 is the only stem consonant and so also in stem-final position, the devoicing of spirant C1 is only found in two subgroups which display this sound shift consistently also in C2 position, *i.e.* Kikongoid and the northwestern cluster of West Kikongo. However, in neither of these two subgroups is spirant devoicing entirely regular. Within Kikongoid, it only occurs in Kihungan (H42), but not systematically. Within West Kikongo, it is regularly attested in certain B40 languages, such as Yilumbu (B44) and Yimenaane (B44A), and only inconsistently in others, such as Yipunu (B43). It is also not systematic in Civili (H12) and Kiyombe (H16c), which did undergo systematic spirant devoicing in C2.

This phenomenon is illustrated below for /*bi/ in (23) with reflexes for **bimba* ‘entire, full’, for /*di/ in (24) with reflexes of **dìtò* ‘heavy’ (BLR3 1076) and in (25) with reflexes of **dítà* ‘knot’ (BLR3 1075), for /*bu/ in (26) with reflexes of **búdà* ‘rain’ (BLR3 368) and in (27) with reflexes of **bùmò* ‘abdomen; pregnancy’ (BLR3 375), for /*du/ in (28) with reflexes of **dùmbi* ‘corpse’, and for /*gu/ in (29) with reflexes of **gùbó* ‘hippopotamus’ (BLR3 1532).[18]

(23) KD: *m-fĭmb* (HGNb); WK: *fi-m-bala* (LMBa, MNN, PNa), *fimb’l’* (VL2a)

(24) WK: *u-tsir-a* ‘be heavy’ (LMBa), *ku-tsir’* ‘be heavy’ (VL2a); BUT KD: *ki-ʒít* (HGNb)

(25) WK: *di-sit-a* (LMBa, MNN, PNa), *li-sit’* (VL2a)

(26) KD: *m-ful* (HGNb); WK: *m-fulə* (PNb), *fulə* (SGN1, SGN2), *fula* (NGB), *m-fulə* (SHR)

(27) WK: *yi-fumu* (LMB), *di-fumu* (NGB, SHR, SNG1, SNG2)

(28) WK: *N-fuumbi* (LMBa), *m-fuumbi* (MNN); BUT *m-vuumbi* (PNa, VL2a)

(29) WK: *N-fubu* (LMBa), *m-fubu* (MNN); BUT *m-vubu* (PNa, VL2a)

18. The reconstructions in (23) and in (28) do not occur in BLR3 (Bastin *et al.* 2002). We propose **bimba* ‘entire, full’ for a comparative series that is widespread in the KLC. It is possibly a derivation from **bímb* ‘swell’ (BLR3 240). The new reconstruction **dùmbi* ‘corpse’, also corresponding to a widespread comparative series within the KLC, is likely to be an agentive derivation from **dùmb* ‘smell’ (BLR3 1258), *i.e.* ‘the one who smells’.

Given its scattered distribution and irregular application, spirant devoicing in C1 must be an innovation that occurred relatively late in the history of the KLC. Therefore, it has little diagnostic value in terms of genealogical classification, except maybe for the northwestern cluster of West Kikongo where it is more pervasive than anywhere else within the KLC.

4. Irregularities in Stem-Internal BS and 7V in Proto-Kikongo

The BS pattern reconstructable to PK (Section 2) and its minor innovations in the daughter languages (Section 3) are widespread within the KLC, but not systematically followed. Numerous exceptions are observed, especially in certain subgroups such as West Kikongo and North Kikongo. Several stems manifesting BS elsewhere in the KLC are found in those languages with their original stop consonant, sometimes even with stems going back to PB. Exceptions occur in front of both /*i/ and /*u/ and with several stops, both unvoiced and voiced. Such irregularities in the PK BS pattern are illustrated below for /*pi/ in (30) with reflexes of **pígò* 'kidney' (BLR3 2568), for /*ti/ in (31) with reflexes of **tím* 'dig' (BLR3 2918), for /*ki/ in (32) with reflexes of **kíngó* 'neck; nape; voice' (BLR3 1845), for /*di/ in (33) with reflexes of **dìdì* 'cold' (BLR3 1032), for /*tu/ in (34) with reflexes of **túmʊd* 'take (firewood) from fire, tear asunder' (BLR3 3111), for /*bu/ in (35) with reflexes of **bùmá* 'fruit' (BLR3 374) and for /*du/ in (36) with reflexes of **dùt* 'pull' (BLR3 1267). Similar exceptions can be found in (42c, d), (43c), (44b) and (52b) in the Appendix.

(30) WK: *mu-piɣu* (LMBa, PNa), *n'piwu* (VL2a) —compare with (42a) in the Appendix

(31) WK: *u-tim-a* (LMBa), *u-tim-a* (PNa), *tíím-un-a* (ZL), *tím-ún-a* (MBL); NK: *tim* (LDa) —compare with (43b) in the Appendix

(32) WK: *kiŋgu* (PNb); NK: *ŋ-kììŋgú* (BMBc), *kingu* (BMBd) —compare with (44a) in the Appendix

(33) WK: *ma-didi* (MBL, ZL); NK: *ma-didi* (LDc) —compare with (46c) in the Appendix

(34) WK: *tum-un-a* (WY2a), *u-tumun-a* (LMBa, PNa), *ku-tum-un'* (VL2a), *tum-ún-a* (WY1); SK: *tum-un-a* (SKGc) —compare with (49b) in the Appendix

(35) WK: *zi-m-buma* (ZL) —compare with (51b) in the Appendix

(36) WK: *u-dut-a* (LMBa), *u-dut-ə* (PNb, SNG1, SNG2), *ɣu-dut-ə* (SHR) (compare with (52e) in the Appendix)

All of the stems in (30)-(36) and those in (42c, d), (43c), (44b) and (52b) in the Appendix go back in time far beyond PK. Several of them, such as **dùb* 'fish', **dùt* 'pull', **kíndò* 'noise, footfall', **kíngó* 'neck; nape; voice', **pígò* 'kidney', **pìn* 'press, squeeze', **tím* 'dig', have been reconstructed back to PB. None of these stems is thus a lexical innovation posterior to PK, which could explain why these lexical items undergo BS in some KLC subgroups but not in others. All these stems are assumed to have already existed in PK. This implies that they either had not undergone BS in PK yet or they had undergone BS but this mutation was subsequently undone. In either case, this would imply that after different subgroups emerged out of PK, these stems received a variable treatment. Whatever the actual scenario may have been, both require PK to have been a 7V language.

Throughout the Bantu domain, BS is known to have happened before 7>5V reduction. Although there are several 7V languages that underwent BS and others that did not, there are almost no 5V languages that did not undergo it (Schadeberg 1995; Bostoen 2008). In most of those having 5V without BS, such as Kinshasa Lingala (C30B, DRC; Meeuwis 2010: 23-24) and Lozi (K21, Zambia; Gowlett 1989), the vowel reduction occurred as a contact-induced change. Even if 7>5V reduction has rarely taken place without having been preceded by BS, the latter does not necessarily imply the former. The existence of 7V languages manifesting BS proves this point. However, BS allows a 7V language to reduce its vowel repertoire to 5V without the risk of homonymic clash. As shown in (1) above, the original vocalic opposition between close (/*i/ /*u/) and near-close (/*ɪ/ /*ʊ/) vowels is "transphonologized" to a consonantal opposition between fricatives or affricates before the former close vowels on the one hand, and stops before the former near-close vowels on the other (see also Hyman 2003b: 56). With reference to the examples in (1), for instance, before the 7>5V reduction, Bantu languages maintained a consonantal and vocalic contrast between the reflexes of the stems **búdà* 'rain' and **bód-à* 'break, smash; kill', *i.e. vúlà* 'rain' *vs. bólà* 'break'. As soon as Bantu languages reduce their vowel inventory to 5V through the merger of the first two vocalic degrees, the originally predictable phonetic contrast, *i.e.* fricative/affricate in front of close vowel and corresponding stop elsewhere, becomes a phonological one in that it is no longer predictable due to the loss of the conditioning environment. The contrast becomes exclusively consonantal, *i.e. vúlà* 'rain' *vs. búlà* 'break'. Hence, 7>5V reduction irreversibly transforms BS from an allophonic variation into a phonological distinction. As long as a language has 7V, one of the contrasts (vocalic between close and near-close or consonantal between fricative/affricate and plosive) is redundant and can be undone. Most Bantu languages —including those from

the KLC— have undone the original vocalic opposition. This is why the exceptions in BS observed for the stems in (30)-(36), (42c, d), (43c), (44b) and (52b) can be most plausibly accounted for by positing that PK was actually a 7V language in which those stems had not undergone BS yet. While they underwent BS in some of its daughter languages before they turned into 5V languages, they did not in others. On the other hand, it is not inconceivable that the stems above had undergone BS in PK, but lost the redundant consonantal contrast again in some daughter languages (while not in others) before these reduced their vowel inventories to 5 phonemes.

Another key element supporting the assumption that PK must have been a 7V language before distinct daughter languages evolved out of it is the fact that stem-internal BS no longer applies once a language reduces its vowel repertoire from 7 to 5 phonemes. In the merger between /*i/ and /*ɪ/ and between /*u/ and /*ʊ/, the close vowels originally triggering BS, *i.e.* /*i/ and /*u/, are the ones which are maintained. However, once the merger has taken place, neither /*i/ nor /*u/ ever triggers BS within the stem. In other words, the consonantal contrast between *vúlà* 'rain' *vs. búlà* 'break' will never be given up in favor of homophony, *e.g. vúlà* 'rain' *vs.* **vúlà* 'break'. After the close vowels have "absorbed" the originally near-close vowels, they may trigger further sound shifts, but these rarely lead to a loss of the phonemic contrast between the consonants that originally occurred before PB close vowels and those that occurred before PB near-close vowels. For instance, as discussed at the start of Section 3, the close front vowel /i/ triggers the palatalization of fricatives resulting from BS in Kisikongo (H16a) and Kihungan (H42). Regardless of whether it is a reflex of PB close /*i/ or near-close /*ɪ/, /i/ in these two languages has the same palatalizing effect on other fricatives not resulting from BS, such as the reflex of PB *c, *e.g.* PB **cìmb* (close) 'prevent; cease' > Kisikongo *ximb-a* [ʃimba]; *cí (near-close) 'ground; country; underneath' > Kisikongo *n-xi* [nʃi] (Bentley 1887-1895).

Elsewhere in the KLC, reflexes of PB stops other than *c and *j rarely palatalize in front of /i/. If they do, the outcome is still different from the output of BS even after palatalization. Velar palatalization, for instance, is regular in one subgroup of the KLC, *i.e.* West Kikongo, more specifically the southwestern cluster. As shown in (37), it affects the voiceless velar stop, whether this is a reflex of PB /*k/ or /*g/, in front of a front vowel whether this is reflex of /*i/, /*ɪ/ or /*e/. The resulting voiceless palatalized stop is phonologically distinct from any of the possible outcomes of BS. Moreover, fricative reflexes of /*k/ or /*g/ having undergone BS do not undergo palatalization in West Kikongo.

(37) Velar palatalization in West Kikongo

**kín* 'dance, play' (BLR3 1805)	>	WK: *ku-cin'* (VL2a), *cín-á* (WY2b), *cin-a* (WY2a, KC, LNJ2)
**kímà* 'monkey' (BLR3 1798)	>	WK: *n-cim'* (VL2a), *n-cima* (WY2a, KC, LNJ2)
**dògì* 'witch' (BLR3 7089)	>	WK: *n-dóci* (WY1), *n-dócìyé* (WY2b), *ndotshi* (VL2a)
**kèd* 'cut' (BLR3 1755)	>	WK: *ku-tshel'* (VL2a), *cíyél-á* (WY2b)[19], *tchel-a* (VL3, SND, KC, KWK, LNJ2, WY2c)

In other words, if PK had undergone both BS and 7>5V reduction, it is difficult to conceive that the stems in (30)-(36) and those in (42c, d), (43c), (44b), and (52b) in the Appendix would have undergone BS after the vowel merger in some subgroups but not in others, because stem-internal BS usually ceases to apply once the 7>5V reduction has taken place. The other way around would even be less likely. If the original distinction between close and near-close vowels was lost in PK, how could BS in the very same stems, *i.e.* (30)-(36), (42c, d), (43c), (44b), and (52b), have been undone in certain subgroups but not in others? Given that as soon as a Bantu language reduces its vowel inventory to 5V, the originally predictable phonetic contrast between a fricative/affricate in front of a close vowel resulting from BS and the corresponding stop elsewhere becomes phonological due to the loss of the conditioning environment. It is no longer predictable and thus not reversible anymore. All of this pleads in favor of the hypothesis that PK was a 7V language in which BS had already affected most of the available targets in the lexicon, though not all.

5. BS Across Morpheme Boundaries and 7V in Proto-Kikongo

Across Bantu languages, BS not only occurs tautomorphemically, *i.e.* within the stem, but also heteromorphemically, *i.e.* across morpheme boundaries. Heteromorphemic BS is often triggered by (i) the adjectival derivational suffix **-u*; (ii) the causative suffix **-i*; (iii) the agentive suffix **-i*; and (iv) the tense-aspect suffix **-ide* (Bastin 1983; Labroussi 1999; Hyman 2003b). However, not all Bantu languages manifesting tautomorphemic BS display heteromorphemic BS as a (regular) sound shift. Such is the case within the KLC, where heteromorphemic BS is only rarely observed, especially as a synchronic morphophonological change.

19. The sequence /cíy/ corresponds here to the /*k/ in C1 position. It results from the unpacking of the palatal stop resulting from the palatalization of the originally velar stop.

A reflex of the adjectival derivational suffix *-*u* is not reported in any of the KLC varieties as a productive strategy to derive adjectival stems from verb roots. Historical derivations formed with *-*u* (both adjectival stems and nouns derived from them) are not easy to identify, because the reflexes of the adjectival derivational suffix *-*u* are hard to distinguish from the reflexes of the PB suffix *-*o* used to derive noun stems referring to actions, results and instruments from verb roots (Schadeberg 2003: 80-81). This is because within the KLC, the reflex of *-*u* tends to be lowered to /o/ following mid root vowels, while the reflex of *-*o* tends to be heightened to /u/ when suffixed to a root having a vowel that is not mid. One way to distinguish between the two is that heteromorphemic BS is triggered by *-*u* but not by *-*o*. However, this sound shift does not systematically apply across this morpheme boundary in the KLC (and beyond). For instance, the Kiyombe (H16c) stems in (38a) ending in /u/ are possibly the result of a historical *-*u* derivation, but in most cases the synchronic verb root to which this derivation would have applied could not be identified. If the forms in (38a) are in fact historically derived with the *-*u* adjectival suffix, then /v/ and /f/ in root-final position could be considered as the outcome of BS. However, as shown in (38b), Kiyombe (H16c) also has adjectival stems ending in /u/ but preceded by a stop consonant, thus lacking evidence for BS. Most of them do have a corresponding verb stem, though not necessarily the one from which they were historically derived. The derived stems in (38b) could be of a more recent origin than the ones in (38a). They were possibly derived at a stage where BS had stopped to apply across the morpheme boundary between the verb root and the *-u* suffix. The stems showing signs of BS in (38a) would then have been lexicalized before this deactivation occurred.

(38) Possible reflexes of the PB adjectival suffix *-*u* in Kiyombe (De Grauwe 2009)

a. *káámv-ú* ‘something or someone coarse, strong and well built’
kááv-u ‘something damaged, torn, broken, shredded’
kyaáv-u ‘diameter, width, thickness’
bu-léemv-u ‘obedience, docility’; cf. *léémb-á* ‘soothe, calm; water, moisten’
túúf-u ‘something folded’

b. *tuúng-u* ‘full, swollen, serious, important’; cf. *tuung-úk-a* ‘become important, profitable’, *tuung-ub-úk-a* ‘swell, inflate’, *tuung-um-úk-a* ‘increase in volume (*e.g.* a ball)’
khíít-ú ‘changing, metamorphosing’; cf. *kíít-úl-a* ‘change into’
khaat-u ‘without condiments (food)’; cf. possibly *kaát-a* ‘stretch very hard, give more attention to, insist, emphasize; strike by throwing sth.; put a lot of pilipili in the eyes or a dish’

Two causative allomorphs with a complementary distribution have been reconstructed for PB: **-i* after C and **-ici* after V (Bastin 1986: 130; Schadeberg 2003: 73). Within the KLC, only reflexes of the long PB causative suffix, which do not trigger BS, have survived as productive causative suffixes. The short PB causative **-i* was lost and can be observed synchronically only in lexicalized forms. As shown in (39a) with examples from Kiyombe, it only survived as a segment after verb roots ending in a nasal, namely as a palatal glide in front of the final vowel of the verb stem. We assume these glides are reflexes of PB **-i* because of the causative semantics and transitivity of the verb stems in question. However, none of them corresponds to an underived verb root that is intransitive. Either there is no corresponding base verb root or if there is one, it seems to have the same meaning as the apparently derived stem (cf. the three last examples in (39a)). As shown in (39b), following stops, the short causative suffix caused BS. Its reflex in this case is simply a fricative, a process commonly known as "y-absorption" in Bantu studies (Bastin 1986; Hyman 2003b; Bostoen 2008). Here as well an easily identifiable underived verb root is most often missing. If a corresponding verb root ending in a stop is available in the synchronic lexicon, its meaning can most often not be considered as the one from which that of the causative stems was derived, as in the first example in (39b). In the last example in (39b), the morphologically causative verb stem *léénzá* and its supposed underived verb stem *leénda* are even identical in meaning.[20]

(39) Possible reflexes of the PB short causative suffix **-i* in Kiyombe (De Grauwe 2009)

a. *buún-y-a* 'tear off with the teeth'
veén-y-a 'lift up cloths to be freer in one's movements'
kweén-y-a 'nibble'
veev-án-y-a 'make an abundant meal without being able to finish it'
koón-y-a 'pluck feathers, remove leaves', cf. *koón-a* 'pluck feathers, remove leaves'
voón-y-a 'tear, devour', cf. *voón-a* 'tear, devour'
fyóón-y-a 'wipe, clean', cf. *fyóón-a* 'wipe, clean'

b. *vúúnz-á* 'prevent, disturb; postpone, delay; cancel an appointment or a promise', cf. *vuúnd-a* 'rest, stop (intr.)'
biínz-a 'hurt morally; offend someone by telling things crudely; strike hard', cf. *bíínd-úl-a* 'suffer from an evil which resumes and becomes complicated'
léénz-á 'hate, despise, neglect', cf. *leénd-a* 'hate, despise, insult'

20. The fact that verb stems including a reflex of the PB short causative develop semantic properties that are not completely derivable or predictable from the morphemes of which they consist is a clear sign of lexicalization (cf. Brinton & Traugott 2005: 96).

Throughout the KLC, verb stems derived with the PB short causative suffix *-*i* tend to manifest BS when their root historically does not end in a nasal. This is not surprising, as the causative suffix *-*i* constitutes the most favorable context for heteromorphemic BS across Bantu. Nearly all Bantu languages manifesting BS tautomorphemically —especially those having 5V— also attest it in this particular morphological context (Bastin 1986: 131-140). In contrast to the other high vowel morphemes potentially triggering BS, causative *-*i* is usually followed by the final vowel of the verb and thus realized as a palatal glide, *i.e.* [CyV]. The greater constriction of this glide facilitates BS (Bastin 1983: 25; Hyman 2003b: 58).

The two morphological contexts in which Bantu languages display most cross-linguistic variation in terms of heteromorphemic BS are in front of the agentive suffix *-*i* and before the anterior and/or past tense suffix *-*ide*.

As for the agentive suffix *-*i*, Bostoen (2008: 337) already identified KLC varieties such as Yipunu, Kimanyanga, Kiyaka, and Kisuku as languages attesting so-called "limited agent noun spirantization". These are languages in which nearly none of the deverbative agent nouns ending in *-i* manifest BS, except for old stems such as **jíbì* 'thief' (BLR3 3396) derived from **jíb* 'steal' (BLR3 3387), and **dògì* 'witch' (BLR3 7089) derived from **dòg* 'bewitch' (BLR3 1100). As shown in (18) above and (45) in the Appendix, the reflexes of **jíbì* 'thief' do systematically display BS within the KLC. The reflexes of **dògì* 'witch', however, manifest BS only in Yipunu (B43) and Yimenaane (B44a), *i.e. mu-losi* (Mavoungou & Plumel 2010). In all other KLC varieties, final **gì* has /ki/ as a reflex, which then undergoes velar palatalization in certain West Kikongo varieties (cf. (37)). As illustrated in (40), another PB deverbative agent noun manifesting BS within the KLC, not identified by Bostoen (2008), is **dèdì* 'educator' (BLR3 7788) derived from **dèd* 'bring up; caress, hold on knees; bear (child)' (BLR3 882).

(40) WK: *n-deési*, *n-deéze* (YMB1), *n-dézi* (ZL), *n-deezi* (WY1);
CK: *n-dezi* (MNY); SK: *n-dezi* (ZMBa)

Other deverbative agent nouns ending in *-i* generally do not manifest any signs of BS within the KLC, *e.g.* Kiyombe (H16c) *n-sung-i* 'watchman' from *sung-a* 'watch over'; *n-zod-i* 'the one who loves' from *zol-a* 'love' (De Clercq 1921: 74); Cisundi (H131) *m-komb-i* 'sweeper' from *komb-a* 'sweep' (Futi 2012: 96); Kisikongo (H16a) *n-long-ì* 'teacher' from *long-a* 'teach', *m-vond-ì* 'executioner' from *vond-a* 'kill', *m-bang-ì* 'witness' from *bang-a* 'testify', *n-zod-i* 'amorous, passionate' from *zol-a* 'love'

(Luntadila Nlandu 2015: 121). As argued in Bostoen (2008), the only three agent nouns manifesting (irregular) BS within the KLC go back to PB and underwent the sound shift in analogy with underived noun stems ending in /*i/, such as **jíkì* 'smoke' (BLR3 3442) in (6) or **gìngì* 'fly' (BLR3 1406) in (9). The reflexes of **jíbì* 'thief' and **dèdì* 'educator' were lexicalized with a stem-final fricative before BS was blocked as a morphophonological change across morpheme boundaries. As for **dògì* 'witch', one possible explanation is that this noun form had not undergone BS in PK yet and was only innovated afterwards in Yipunu (B43) and Yimenaane (B44a). Alternatively, it could be that this noun form had already undergone BS in PK, but was retained as such only in those two languages and leveled out elsewhere in the KLC. The reason why BS would be pushed back across the morpheme boundary between the verb root **dog* 'bewitch' and the agentive suffix *-i* in the case of **dògì* 'witch' is known in historical linguistics as "Sturtevant's Paradox" (Anttila 1989 [1972]: 95; Dimmendaal 2011: 102): "Phonetic laws are regular but produce irregularities. Analogic creation is irregular but produces regularity" (Sturtevant 1947: 109). When BS regularly applies, it creates irregularity in that the verb root **dog* ends in a fricative when followed by the agentive suffix *-i*, but with a stop when followed by any other morpheme. Speakers of certain varieties may proceed to "analogical levelling" (McMahon 1994: 73) or "paradigm levelling" (Hock 1991 [1986]: 168) by pushing back BS in agent nouns so that a same verb root has the same final consonant in all contexts. In this way speakers restore "paradigm uniformity" (Steriade 2000). Only in old and frequently used agent nouns, such as **jíbì* 'thief' and **dèdì* 'educator', for which BS became fossilized and the derivational link with the base verb less strongly perceived, the irregularity could be maintained. This explains why these two stems systematically display BS within the KLC, unlike **dògì* 'witch', for which BS was only preserved in Yipunu (B43) and Yimenaane (B44a) and pushed back elsewhere.

The leveling out of BS in front of agentive **-i*, as observed for instance with **dògì* 'witch', must have happened before it became a contrastive marker of agentive morphology. As explained extensively in Bostoen (2008), BS can only stop to be a morphophonological alternation as part of the productive phonological system when a Bantu language reduces its vowel inventory from 7 to 5 phonemes. Only then is the phonological contrast lost between the vowels of suffixes starting with a PB close front vowel /*i/, such as the short causative and the agentive, and those with a near-close front vowel /*ɪ/, such as applicative **-ɪd* and long causative **-ɪcɪ*. Only after the vowel merger can BS be morphologized as a signal of morphological structure, if it has not been pushed back through analogi-

cal leveling. Such morphologization of BS through "dephonologization" is thus closely linked with the 7>5V reduction. The fact that nowhere in the KLC BS has become a productive marker of agentive morphology indicates that it was pushed back as a morphophonological alternation before the most recent common ancestor of the KLC reduced its vowel repertoire from 7 to 5 vowels.

The hypothesis that PK was a 7V and not a 5V language is further corroborated by the total absence of BS in front of the PB tense/aspect suffix *-*ide*. As discussed in Dom & Bostoen (2015: 169), reflexes of this verb ending are attested in all subgroups of the KLC. In none of the KLC varieties does this TA suffix ever trigger BS of the preceding consonant. As such, this is not very surprising, given that *-*ide* is known to be the morphological context in which heteromorphemic BS is least frequent across Bantu. Out of a representative sample of about 150 Bantu languages, only some 20 manifest BS in front of the reflex of *-*ide* (Bastin 1983: 28-37). The sound shift is never found as a morphophonological alternation in front of *-*ide* in present-day 7V languages. Moreover, not one language missing regular BS in agent nouns has it in front of *-*ide* (Bostoen 2008: 335). There is thus a clear hierarchy of morphological contexts for the heteromorphemic application of BS in front of PB /*i/: a language manifesting it in front of the reflex of *-*ide* will also regularly have it in front of the agentive and causative suffixes, a language having regular BS with agent nouns will also have causative BS, while the opposite scenarios are not necessarily true (Bastin 1983; Labroussi 1999; Hyman 2003b). In line with Hyman (2003b: 58), this hierarchy of BS contexts can be summarized as follows: if it occurs in front of *-*ide*, it also occurs in front of agentive *-*i*; if in front of the agentive, then also in front of causative *-*i*; and if in front of the causative, then also root-internal.

Taking into account that BS is rarely observed with agent nouns within the KLC, it would have been unexpected to find it as a regular morphophonological change in front of *-*ide*. As this suffix is involved in verbal inflection, traces of BS that *-*ide* might have once triggered cannot become fossilized, unlike with derivational agentive *-*i*. In any event, if *-*ide* once triggered heteromorphemic BS in PK, it was most likely leveled when the most recent common ancestor of the KLC was still a 7V language. If *-*ide* (still) had triggered BS of the stem-final consonant when PK became a 5V language, it could have been morphologized as a marker of this specific TA inflection. If PK was a 7V language, BS remained contextually predictable as a morphophonological shift and could never become fully morphologized before *-*ide*. It was easier for PK to block or push back BS in front of this TA suffix as long as it was a 7V language.

Nevertheless, **-ide* is not totally exempt from BS within the KLC. While **-ide* was reconstructed in PB with two vowels of distinct aperture, its reflexes in the KLC always have two identical vowels. It is very likely that PK innovated **-ide* into **-idi* through the heightening of its final vowel in harmony with its initial vowel. While the PK verb ending was retained in most varieties of the KLC, some southern West Kikongo varieties further innovated it by applying BS to its consonant. It should be stressed that the vowel causing BS in this case was the final /i/ in **-idi* and not the one preceding the verb root/stem. In line with tautomorphemic BS of /*di/, Cizali, Iwoyo and Ciwoyo have *-izi* as the regular reflex of PB **-ide* and PK **-idi* (Dom & Bostoen 2015: 188). The examples in (41) from Iwoyo show that the ending *-izi* is lowered to *-eze* when the root has a mid vowel.[21]

(41)	*ùkótèzé*	(°*ù-kót-ìzì*) [SP3SG-R-PRF]	'He has gone back.'	(Mingas 1994)
	ùnòngèzé	(°*ù-nòng-ìzì*)	'He has collected.'	
	ùvélèzé	(°*ù-vél-ìzì*)	'He has picked.'	

This uneven application of BS within the reflexes of PK **-idi* is a further indication that the most recent common ancestor of the KLC must have been a 7V language. Because **-idi* is a case of morpheme-internal BS in the specific KLC subgroup discussed above, it is very much comparable with the irregularities in the tautomorphemic application of the PK BS pattern discussed in Section 4. If *-idi* had undergone BS in PK and if the ancestor language had then undergone 7>5V reduction before it broke apart into different languages, it would be hard to conceive how the effects of BS could have been undone in the daughter languages. The sound shift would have become fossilized due to the loss of the originally contextual predictability. One would then expect to find *-izi*/*-isi* reflexes throughout the KLC. Either **-idi* had not yet undergone BS in PK and only did so at a later stage in a subset of West Kikongo languages or it had undergone BS in PK but was undone in most varieties except in Cizali, Iwoyo, Ciwoyo and Civili. The first scenario seems the most economical. In any event, neither scenario would work if PK were not a 7V language. If it were already a 5V language, it could not have taken place in West Kikongo and not elsewhere, because BS no longer takes place as a diachronic shift once the vowel merger has occurred. It could also not have been pushed back

21. In Civili, *-izi* was further devoiced to *-isi* in line with the more general pattern of spirant devoicing in the language (cf. Section 3). This ending is not subject to vowel harmony when the root has a mid vowel, *e.g. lu vondisi* (°*vond-idi*) 'You have killed' (Marichelle 1907).

once the high front vowel that had triggered it was no longer distinct from close front vowels having their origin in a near-close vowel. Analogical leveling happened more likely when BS was still phonologically predictable, *i.e.* before the vowel merger. Both scenarios (no BS within **-idi* in PK or BS that was ultimately leveled out) are valid only if we assume that the 7>5V reduction happened independently in several subgroups of the KLC. To judge by the confined distribution of *-izi*/*-isi*, it might actually have been quite a late innovation within West Kikongo, which implies that West Kikongo varieties maintained 7V for quite a long time.

6. Conclusions

As all present-day varieties within the KLC have 5 vowels or once went through a stage with 5 vowels, it would be most plausible, according to the economy principle of Occam's razor, to reconstruct PK with an inventory of 5 vowel phonemes. This simplification of the inherited PB 7V system in the most recent common ancestor of the KLC would be a highly significant shared innovation from a genealogical point of view. It would set apart the KLC as a discrete sub-group within the "West-Coastal" or "West-Western" branch of the Bantu family. Most other WCB languages have either retained the PB 7V system or amplified it to inventories of up to 13 vowels, suggesting that Proto-WCB had retained the 7V of PB.

However, the BS patterns within the KLC that have been closely examined in this article indicate that Occam's razor does not seem to work in this case and that PK was most likely a 7V language.

The widespread distribution of a common pattern of tautomorphemic BS throughout the KLC indicates that this sound shift was already far advanced in PK. Although the voicing opposition was maintained between PB voiced and unvoiced stops, BS was accompanied by a partial merger of places of articulation in front of /*i/ (/*pi/ > /fi/; /*ti/, /*ki/ > /si/; /*bi/ > /vi/; /*di/, /*gi/ > /zi/) and a total merger of places of articulation in front of /*u/ (/*pu/, /*tu/, /*ku/ > /fu/; /*bu/, /*du/, /*gu/ > /vu/). The only relatively frequent innovation of the PK pattern is spirant devoicing, *i.e.* the loss of the voicing contrast, which is attested in C2 position in West Kikongo, North Kikongo, East Kikongo and Kikongoid, and in C1 position in Kikongoid and the northwestern cluster of West Kikongo only.

In spite of the far-advanced application of BS within PK, the irregular application of BS within the stem in several KLC varieties as well as in the PK reflex **-idi* of PB **-ide* suggests not only that it had not yet reached all possible targets but also that the common ancestor language was still a 7V language. Otherwise, there would be no way to account for why certain stems manifest tautomorphemic BS in certain varieties of the KLC but not

in others, while other stems miss it again in still other varieties. Different stems manifest irregular patterns of BS in different varieties across the KLC. The near-total absence of BS as heteromorphemic sound shift offers further evidence for PK as a 7V language. This type of BS was blocked as a morphophonological alternation in front of the agentive suffix **-i* and in front of the anterior/past verb ending **-ide* and never morphologized into a marker of these specific morphological structures. Such systematic analogical leveling was more likely if BS was still phonologically predictable in front of these suffixes and was not de-phonologized yet through the loss of the original contrast between close and near-close front vowels.

The irregularities observed in the application of tautomorphemic BS and the very limited occurrence of BS across morpheme boundaries within the KLC can only be accounted for if we assume that PK was a 7V language after all. Hence, the 7>5V reduction must have recurrently occurred within the KLC as an independent innovation before BS had affected all possible targets within the language.

As an afterthought, we point out that the hypothesis of PK being a 7V language is actually in line with the results of a lexicon-based phylogenetic study of the WCB languages carried out after the writing of this article. In this new phylogeny of WCB, based on a more extensive set of Bantu B5080 languages than any previous genealogical classification, the KLC constitutes a discrete subclade together with 4 languages from the DRC's Kwilu province, *i.e.* Nsong (B85d), Mpiin (B863), Ngong (B864) and Mbuun (B87) (Pacchiarotti *et al.* 2019). These 4 B80 languages all have 7 vowel phonemes or more (Ngulu Kibiakam 1986; Mundeke 2006; Koni Muluwa 2010; Koni Muluwa & Bostoen 2019).

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Appendix

Language Varieties

Abbreviation	Language Variety	Reference
BMBa	Kibembe	Kouarata (2015)
BMBb	Kibembe	Nguimbi-Mabiala (1999)
BMBc	Kibembe	Jacquot (1981)
BMBd	Kibembe	Bastin *et al.* (1999)
DHG	Dihungu	Teca Fieldwork 2015 (Angola)
DMB	Kindamba	
DNDa	Kidoondo	Mfoutou (1985)
DND/ KMB/ KNY	Kidoondo/ Kikamba/ Kikunyi	Lumwamu (1974)
DNDb	Kidoondo	KongoKing Fieldwork 2015 (DRC)
HGLa	Kihangala	Nguimbi-Mabiala (1999)
HGLb	Kihangala	Nkouanda (1997)
HGLc	Kihangala	Bastin *et al.* (1999)
HGNa	Kihungan	Kasuku-Kongini (1984)
HGNb	Kihungan	Koni Muluwa Fieldwork 2010 (DRC)
KC	Ikoci	KongoKing Fieldwork 2015 (Angola)
KK	Kakongo	Anonymous (1772a)
KMB	Kikamba	Bouka (1989)
KNY	Kikunyi	Bastin *et al.* (1999)
KWK	Ikwakongo	KongoKing Fieldwork 2015 (Angola)
LDa	Kilaadi	Dhienda (1972)
LDb	Cilaadi	Jacquot (1982)
LDc	Kilaadi	Bastin *et al.* (1999)
LMBa	Yilumbu	Mavoungou & Plumel (2010)
LMBb	Yilumbu	ALGAB*
LNJ1	Cilinji	KongoKing Fieldwork 2012 (DRC)
LNJ2	Cilinji	KongoKing Fieldwork 2015 (Angola)

Abbreviation	Language Variety	Reference
MBK	Kimbeko	KongoKing Fieldwork 2012 (DRC)
MBL	Cimbala	
MBM	Kimboma	Kisilu Meso (2001)
MBT	Kimbata	KongoKing Fieldwork 2012 (DRC)
MNN	Yimenaane	Mavoungou & Plumel (2010)
MNYa	Kimanyanga	Laman & Meinhof (1928-1929)
MNYb	Kimanyanga	Makokila Nanzanza (2012)
NDB	Kindibu	Coene (1960)
NGB	Yingubi	ALGAB
NKN	Kinkanu	KongoKing Fieldwork 2012 (DRC)
NTD	Kintandu	Daeleman (1966)
PMB	Kipombo	Teca Fieldwork 2015 (Angola)
PNa	Yipunu	Mavoungou & Plumel (2010)
PNb	Yipunu	ALGAB
SBM	Ki(/si/)mbemba	Teca Fieldwork 2015 (Angola)
SHR	Yishira	ALGAB
SKa	Kisuku	Dhienda (1972)
SKb	Kisuku	Koni Muluwa Fieldwork 2013 (DRC)
SKc	Kisuku	Kifindi (1997)
SKd	Kisuku	Piper (1977)
SKGa	Kisikongo	KongoKing Fieldwork 2012 (Belgium)
SKGb	Kisikongo	Bentley (1887-1895)
SKGc	Kisikongo	Van Wing & Penders (1928)
SL1a	Kisolongo	Tavares (1915)
SL1b	Kisolongo	KongoKing Fieldwork 2012 (Angola)
SL2	Kisolongo	KongoKing Fieldwork 2012 (DRC)
SND	Cisundi (Cabinda)	KongoKing Fieldwork 2015 (Angola)
SNG1	Yisangu Mbigou	ALGAB
SNG2	Yisangu Mimongo	

Abbreviation	Language Variety	Reference
SMB	Kisamba	Van Acker Fieldwork 2015 (DRC)
TSTa	Kitsootso	Baka (1992)
TSTb	Kitsootso	KongoKing Fieldwork 2015 (Angola)
VL1a	Civili (Congo)	Nguimbi-Mabiala (1999)
VL1b	Civili (Congo)	Bastin *et al.* (1999)
VL1c	Civili (Congo)	Loëmbe (2005)
VL2a	Civili (Gabon)	Mavoungou & Plumel (2010)
VL2b	Civili (Gabon)	Bastin *et al.* (1999)
WY1	Ciwoyo	KongoKing Fieldwork 2012 (DRC)
WY2a	Iwoyo	Anonymous (1948)
WY2b	Iwoyo	Mingas (1994)
WY2c	Iwoyo	KongoKing Fieldwork 2015 (Angola)
YK	Kiyaka	Ruttenberg (2000)
YMB1	Kiyombe	De Grauwe (2009)
YMB2	Kiyombe	KongoKing Fieldwork 2015 (Angola)
YMB3a	Kiyombi	Nguimbi-Mabiala (1999)
YMB3b	Kiyombi	Bastin *et al.* (1999)
ZB	Kizobe	KongoKing Fieldwork 2012 (DRC)
ZMBa	Kizombo	Carter and Makondekwa (1987)
ZMBb	Kizombo	Bastin *et al.* (1999)
ZMBc	Kizombo	KongoKing Fieldwork 2015 (Angola)
ZL	Cizali	KongoKing Fieldwork 2012 (DRC)

* ALGAB refers here to the *Atlas linguistique du Gabon* project supervised by Prof. Lolke Van der Veen at Université Lumière Lyon 2 (cf. http://www.ddl.ish-lyon.cnrs.fr/equipes/index.asp?Langue=FR&Equipe=8&Page=Action&ActionNum=48). All data cited in this paper is basic vocabulary also used in the recent phylogenetic studies by de Schryver *et al.* (2015) and Grollemund *et al.* (2015).

Regular Stem-Internal BS in front of /*i/

(42) **/*pi/ > /fi/ (C1 & C2)**

a. **pígò* ‘kidney’ (BLR3 2568) > KD: *m-fíku* (YK); WK: *lu-fyó* (YMB1); CK: *m-fyó* (MNYa); EK: *m-fyo* (NTD)

b. **píc* ‘hide, cover’ (BLR3 2563) > KD: *fíik* (SKa), *ku-fíik-a* (SMB); WK: *bii-fík-a* (YMB1), *u-fik-il-a* (LMBa, PNa), *ku-fitsh-il’* (VL2a); CK: *fik-a* (MNYa); SK: *fík-a* (SL2)[22]

c. **pìn* ‘press, squeeze’ (BLR3 2572) > KD: *fín-á* (YK), *fin* (SKa); NK: *fìn-à* (HGLa); WK: *fiín-a* (YMB1), *u-fin-a* (LMBa, PNa), *ku-fin’* (VL2a), *ɣu-fin-a* (NGB), *ɣu-fin-ə* (SHR), *fín-a* (ZL, WY1); CK: *fin-a* (MNYa); EK: *fin* (NTD), *ku-fín-a* (MBT); SK: *fin-a* (SKGb), *ka-fin-a* (TSTb)
Exception. WK: *u-piŋ-i* (SNG2)

d. **pìnd* ‘remain silent’ (BLR3 2576) > WK: *fíínd-á* ‘discuss, argue’ (YMB1), *fiind-a mpáka* ‘discuss’ (WY1); EK: *fiind* ‘be obstinate, sulk’ (NTD)[23]
Exception. NK: *pììnd-à* (HGLa)

e. **kápí* ‘paddle’ (BLR3 1725) > NK: *ŋ-káfi* (HGLb); WK: *n-kháfi* (ZL), *n-kháfi* (WY1, MBL); CK: *n-kafi* (MNYa, NDB), EK: *n-káfi* (NTD)

22. The root-final consonant /k/ found throughout the KLC for this comparative series does not regularly correspond to PB *c. An alternative reconstruction *pík or *píg with the same meaning is not available in BLR3 (Bastin *et al.* 2002).

23. Considering the present-day meanings of its KLC reflexes, the semantic value of this reconstruction possibly needs revision.

(43) **/*ti/ > /si/ (C1 & C2)**

a. **tínà* 'root, base of tree trunk; banana-tree' (BLR3 2926) > KD: *sína* (YK), *kí-sina* (SMB); WK: *sina* (WY1); CK: *sina* (MNYa); EK: *sína* (NTD)

b. **tím* 'dig' (BLR3 2918) > KD: *ku-sim-a* (SKa), *sím-á* (YK), *ku-sím-a* (SMB); CK: *sim-a* (SKGc)

c. **tínd* 'accompany, send' (BLR3 2928) > WK: *u-sind-iɣ-ə* (SNG1); EK: *síind* (NTD)

Exceptions. WK: *tíínd-a* (YMB1), *u-tiind-ə* (PNb), *tínd-am-a* (ZL); SK: *tíínd-a* (SL2)

d. **tínd* 'push, push back' (BLR3 2933) > WK: *u-sind-il-ə* (LMBb, PNb), *u-sind-iɣ-ə* (SNG1, SNG2); EK: *síind* (NTD)

e. **kòtì* 'nape of neck; neck; occiput' (BLR3 1963) > KD: *kóʃ* (HGNb); NK: *kòsí* (HGLa); WK: *(di)-koósé* (YMB1), *le-kósi* (ZL); CK: *kosi* (MNYa); EK: *kosi* (NTD)

f. **mòtí* 'one' (BLR3 2212) > KD: *moši* (SKd); NK: *mòsì* (HGLa), *mósi* (BMBa); WK: *mosi* (YMB1, PNa), *mɔsi* (NGB), *moosi* (SGN1, SGN2), *ɣi-moosi* (SHR); EK: *mósi* (NTD)

(44) **/*ki/ > /si/ (C1)**

a. **kíngó* 'neck; nape; voice' (BLR3 1845) > KD: *tsiŋ* (HGNb), *tšiingu* (SKb); NK: *n-si:ngu* (HGLa), *n-singu* (LDb); WK: *tsííngú* (YMB1), EK: *n-síingu* (NTD)[24]

b. **kíndò* 'noise, footfall' (BLR3 1841) > EK: *ǹ-síindu* (NTD); SK: *mu-sindu* (SKGc)

Exceptions. WK: *kííndú* (YMB1), *mi-kiindu* (LMBa); EK: *n-kíindu* (NTD)

(45) **/*bi/ > /vi/ (C2)**

**jíbì* 'thief' (BLR3 3396) > WK: *mw-íivi* (YMB1), *mu-ivi* (WY2a), *mw-ívi* (WY1), *mw-ívi* (MBL); CK: *mw-ivi* (MNYa)

24. The stem-initial affricate observed in a number of **kíngó* reflexes is a strengthening resulting from the contact between the homorganic non-syllabic nasal prefix of class 9 and stem-initial /s/.

(46) **/*di/ > /zi/ (C1 & C2)**

a. **díng* 'turn round, tr. intr.; wind round, wrap up' (BLR3 1062) > NK: *zíiŋg-á* (HGLa), *zing* (LDa); WK: *zíing-á* (YMB1), *ziinga* (ZL, WY1); CK: *zing-a* (MNYa), *zíing* (NTD); SK: *zing* (MBM), *ziinga* (SL2)

b. **bídì* 'fish, animal' (BLR3 6135) > WK: *m-bíízí* (YMB1), *m-bízi* (WY1); EK: *m-bizi* (NDB); CK: *m-bizi* (DHG)[25]

c. **dìdì* 'cold' (BLR3 1032) > WK: *zizi* (WY2a); EK: *n-zizi* (NTD); SK: *n-ziízì* (ZMBb), *n-zizi* (SKGc)

(47) **/*gi/ > /zi/ (C1)**

**gìdà* 'taboo' (BLR3 1397) > KD: *ki-zíla* (SMB); EK: *ki-zila* (NTD)

Regular Stem-Internal BS in Front of /*u/

(48) **/*pu/ > fu (C1 & C2)**

a. **púan* 'resemble each other' (BLR3 2670) > NK: *fwáán-ì* (HGLa); WK: *fwáán-í* (YMB1), *fwaan-an-a* (WY1); EK: *fwáán* (NTD), *ma-fwán-a* (MBT)

b. **pùpù* 'flour' (BLR3 5123) > NK: *fŭf* (HGNb); WK: *fufu* (LMBa), *fufu* (PNa, VL2a), *m-fúfu* (ZL); CK: *m-fumfu* (MNYa); SK: *n-fúúnfu* (SL1b, SL2)

(49) **/*tu/ > fu (C1 & C2)**

a. **túkɔ̀* 'night' (BLR3 3105) > WK: *fúúkú* (YMB1); CK: *fuku* (MNYa); EK: *fúku* (NTD); SK: *fuku* (SKGb, SL2), *u-fuku* (DHG), *fùkù* (ZMBb)

b. **túmɔd* 'take (firewood) from fire, tear asunder' (BLR3 3111) > NK: *sum-un-un* (LDa); EK: *sum-un-* (NTD)

c. **ketu* '(red) pepper'[26] > WK: *n-kyéfú-kyéfú* (YMB1), *du-ghefu* (LMBa), *tshefu* (VL2a)

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25. Although **bídì* 'fish, animal' was reconstructed with a close front V1, the latter never triggers spirantization in the KLC. This might require the reconstruction of a near-close V1, *i.e.* /*ɪ/ instead of /*i/.

26. This reconstruction does not figure in BLR3 (Bastin *et al.* 2002). It is proposed on the basis of comparative data from outside the KLC, presented in Koni Muluwa (2010: 482), suggesting that C2 should be *t, *e.g.* Myene (B11) *ogéru*, Tsogo (B31) *kyètu* 'Piper guineense' (Raponda-Walker & Sillans 1995 [1961]).

(50) **/*ku/ > fu (C1 & C2)**

a. **kúkam* 'to kneel' (BLR3 2111) > NK: *fùkàm-à* (HGLa); WK: *fúúkám-a* (YMB1), *u-fukam-a* (LMBa), *ku-fuk'm'* (VL2a), *fúkám-a* (ZL), *fúkam-a* (WY1), *fukam-a* (WY2a), *fúkam-a* (MBL); CK: *fukam-a* (MNYa); EK: *fúk-ám* (NTD)

b. **kùt* 'tell lies' (BLR3 2135) > WK: *u-fur-a* (LMBa, PNa, MNN)

c. **tákun* 'to chew' (BLR3 2742) > KD: *kú-tafun* (HGNb); WK: *tá-fun-a* (ZL, MBL); CK: *tafun-a* (MNYa); EK: *táfún* (NTD)

(51) **/*bu/ > vu (C1 & C2)**

a. **bùmò* 'abdomen; pregnancy' (BLR3 375) > KD: *vúm* (HGNb), *yi-vúmú* (YK); WK: *vuúmu* (YMB1), *ci-vumu* (VL1c, VL2a), *vuumu* (MBL); CK: *vumu* (MNYa, NDB); EK: *ki-vumu* (MBT), *vumu* (NTD); SK: *vúmu* (SKGa), *ki-vumu* (DHG, PMB), *vumu* (SL1a, SL1b, ZMBa)

b. **bùmá* 'fruit' (BLR3 374) > EK: *m-vuma* (NTD); SK: *m-vuma* (SKGc)

c. **gòbú* 'hippopotamus' (BLR3 1480) > NK: *-gúvù* (HGLa); WK: *n-gúuvu* (YMB1), *n-gúvu* (ZL, MBL), *n-guvu* (WY1); CK: *n-guvu* (NDB), SK: *n-guvú* (ZMBa)

(52) **/*du/ > vu (C1 & C2)**

a. **dùm* 'roar, rumble' (BLR3 1256) > WK: *vum-ís-a* (ZL, WY1); EK: *vum* (NTD)

b. **dùb* 'fish' (1244) > WK: *vuúb-a* (YMB1), *vub-a* (WY1), *vub-a* (KK)

EXCEPTION. EK: *dub* 'block and blur the water (in fishing)' (NTD)

c. **dèdù* 'beard; chin' (BLR3 897) > WK: *zi-n-dévo* (ZL), *n-devo* (WY2); CK: *lu-yevo* (MNYa), *n-zevo* (NDB); SK: *lu-zévo* (ZMBa)

d. **kódù* 'tortoise' (BLR3 2015) > WK: *khúúvú* (YMB1), *n-khúvu* (ZL), *n-khuvu* (WY1), *n-kúvu* (MBL)

EXCEPTION. **dùt* 'pull' (1267) > NK: *zùt-à* (HGLa), *zut* (LDa); EK: *zut* (NTD)

(53) **/*gu/ > vu (C1)**

a. **gùnd* 'be rotten' (BLR3 1542) > KD: *vúúnda* (YK); WK: *vund-úl-a* (WY1); CK: *vund-ul-a* (MNYa)

b. **gùbó* 'hippopotamus' (BLR3 1532) > WK: *m-vúubu* (YMB1), *m-vubu* (VL2a, PNa); CK: *m-vubu* (MNYa)

Spirant Devoicing in C2 Position

(54) **/*bi/ > /fi/ (C1/2)**

**biì* 'excreta' (BLR3 6425) > KD: *ma-túu-fi* (SKd); NK: *tú-fi* (HGLa), *tù-fi* (KMB); WK: *túu-fi*/*túu-vi* (YMB1), *ru-fi* (LMBb, MNN), *tu-fi* (VL2a); EK: *tuu-fí* (NTD). Compare with WK: *tuu-vi* (ZL, WY1); CK: *tu-vi* (MNYa); SK: *túú-vi* (SL1), *tu-vi* (SKGc, MBM)

(55) **/*di/ > /si/ (C2)**

a. **bídì* 'fish, animal' (BLR3 6135) > KD: *m-bisi* (SKc); NK: *m-bits* (HGNb); WK: *m-bíísí* (YMB1), *m-bitsi* (LMBb); EK: *m-bísi* (MBT)

b. **gàdí* 'oil-palm; nut of oil-palm' (BLR3 1300) > KD: *m-aši* (SKb); NK: *gásì* (HGLa), *m-asi* (BMBd); WK: *yí-n-gâtsì*, *má-àtsì* (YMB3a); EK: *ma-así* (NTD), *n-gási* (NKN, MBK); SK: *ma-asi* (SKc)

c. **dòòdí* 'dream' (BLR3 1098) > KD: *n-dosi* (SMB), *n-dósí* (YK); NK: *dòsí* (HGLa), *n-dòòsì* (KMB); WK: *N-doosi* (LMBa), *n-doosi* (MNN, PNa), *n-dösi* (VL2a), *n-doce* (WY2a), *n-dóósi* (ZL), *n-dósi* (MBL); EK: *n-dosi* (NTD)

(56) **/*du/ > fu (C2)**

**kódù* 'tortoise' (BLR3 2015) > WK: *khúúfú* (YMB1)

Abbreviations

3SG	third-person singular
5V	5-vowel system
7V	7-vowel system
BS	Bantu spirantization
CK	Central Kikongo subgroup
EK	East Kikongo subgroup
KD	Kikongoid subgroup
KLC	Kikongo Language Cluster
NK	North Kikongo subgroup
PB	Proto-Bantu
PK	Proto-Kikongo
PRF	perfect aspect
R	Root
SK	South Kikongo subgroup
SP	subject prefix
TA	tense and aspect
WCB	West-Coastal Bantu
WK	West Kikongo subgroup

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3

Minding the Gaps in the Wolane Verbal System

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Abstract

Meyer (2006) classifies the verbs of the Ethiosemitic language Wolane into three major types and several subtypes, according to the surface vocalizations of the three stems of each verb. In this paper I show that this classification creates several gaps and asymmetries in the system. Following Voigt (1990) and Goldenberg (1994), I propose a reanalysis according to which there are no verbal types or subtypes. All verbs involve the same vowels in the same positions inside the "discontinuous" root; all surface differences result from the interactions of these vowels with the lexical elements of the root. The existence of such a system is of significance to the debate around the discontinuous root as a morphological object in Semitic.

Keywords

morphology, root, Semitic, verb, Wolane.

Résumé

En se fondant sur la réalisation phonétique des voyelles de chacun des trois radicaux associés à un item verbal donné, Meyer (2006) classe les verbes du wolane (langue éthiosémitique) en trois types principaux et plusieurs sous-types. Dans cet article, je montre que cette classification conduit à proposer un système présentant des lacunes (« cases vides ») et des asymétries. En accord avec Voigt (1990) et Goldenberg (1994), je propose ici une réanalyse qui ne distingue à l'intérieur du système verbal ni types ni sous-types. Tous les verbes font intervenir les mêmes voyelles dans les mêmes positions à l'intérieur de racines « discontinues » et toutes les réalisations phonétiques résultent des

interactions de ces voyelles avec la composante lexicale de la racine. L'existence d'un tel système revêt une importance cruciale dans le débat sur la racine discontinue en tant que concept morphologique dans les langues sémitiques.

Mots clés

morphologie, racine, sémitique, verbe, wolane.

1. Introduction

Wolane is an Ethiosemitic East-Gurage language spoken in Ethiopia. It is closely related to Silt'e. The only grammar of the language, and the only source of data in this paper, was published by Meyer in 2006 based on the author's fieldwork. In the present paper I discuss four distributional gaps and two asymmetries that I found in Meyer's description of the verbal system. I propose an account that eliminates these gaps and asymmetries from the system. In addition, the classification of a previously exceptional verb is made possible. The emerging system conforms to Goldenberg's (1994) proposal for Semitic in general: there are no verbal types at all, and the form of the verb follows from the number of radicals (*i.e.*, the lexical, arbitrary elements of the stem). Learners, it follows, need only memorize these basic elements, usually consonants, of the different stems. This conclusion is relevant to an ongoing discussion of how verbs are stored in the mental lexicon: as the abstract non-surface-true entities known as "roots", or as pronounceable stems (Bat-El 2001, 2002 & 2003; Prunet 2006; Faust & Hever 2010).

2. Data: gaps and asymmetries

The verbal systems of Ethiosemitic languages are usually described using the notion of verbal "types". Meyer (2006) identifies five such types in Wolane. I will be concerned with the three most widely attested ones. Meyer's classification is based first and foremost on the first vowel of the perfective stem. Type A is characterized by the vowel [ɛ], type B by the vowel [eː] and type C by the vowel [aː]. All three types distinguish three stems: perfective, imperfective and jussive. As in all Semitic languages, all verbs must belong to one of these types, and so the phonological form of verbal stems is very restricted. I will return to the systematic differences between the stems below.[1]

Within each type, Meyer classifies verbs according to the number of stem consonants. Stems with two consonants are classified into three groups, according to the second vowel of the perfective stem: (i) verbs whose per-

1. I follow Meyer's practice of using the 1sg stem as the citation form. Unlike Meyer, I give the form of the jussive stem before a C-initial suffix, rather than the unsuffixed form. This choice exposes the quality of the final vowel of 2C-a verbs, which is reduced to [ɛ] word-finally.

fective stem ends in [aː] (1a, henceforth referred to as "2C-a"); (ii) verbs whose perfective stem does not have a second vowel (1b, henceforth referred to as "2C-Ø"); and (iii) verbs whose perfective stem ends in [eː], which will not concern us here. The second vowel [aː] of 2C-a verbs is absent from the imperfective stem, while in 2C-Ø verbs the absence is true of all three stems. In addition to such verbs, there are also verbs with three or four consonants (1c,d).

(1) Wolane types A-C and the subtypes in Meyer (2006)

	Type A			Type B			Type C		
	PERF	IMPERF	JUSS	PERF	IMPERF	JUSS	PERF	IMPERF	JUSS
a. 2C-a	bɛl**a**ː-	jᵘ-bɛl	lɛ-bl**a**ː-	me:l**a**ː-	jᵘ-me:l	lɛ-m**ila**ː-	(gap)		
b. 2C-Ø	(gap)			ɟ͡ʃˀ**e**:tˀ-	jᵘ-ɟ͡ʃˀ**e**:tˀ	lɛ-ɟ͡ʃˀ**i**tˀ-	z**a**ːf-	jᵘ-z̲**i**̲f	lɛ-z**a**ːf-
c. 3C	nɛkɛs-	jᵘ-nɛks	lɛ-nkɛs-	kˀ**e**:sɛt-	jᵘ-kˀ**e**:st	lɛ-kˀ**i**st-	d**a**ːβɛr-	jᵘ-d**a**:br	lɛ-d**a**:br-
d. 4C	dʰnɛβɛtˀ-	jᵘ-dnɛptˀ	lɛ-dnʰptˀ-	(gap)					

(*bɛla*ː- 'eat', *me:la*ː- 'fill', *ɟ͡ʃˀe:tˀ*- 'be tired', *zaːf*- 'pull', *nɛkɛs*- 'bite', *kˀe:sɛt*- 'splice', *daːβɛr*- 'become fat', *dʰnɛβɛtˀ*- 'be frightened')

Three gaps and an asymmetry are apparent in (1). The gaps are signaled by the white cells containing the word "(gap)". They are: (i) the absence of 2C-Ø verbs from type A; (ii) the absence of 2C-a verbs from type C; and (iii) the absence of 4C verbs from types B and C. Type C also exhibits an asymmetry: in biconsonantal stems, the stem vowel in the imperfective is [i] (in bold and underlined), while triconsonantal imperfective stems in type C are vocalized with [aː].

The fourth gap concerns the sound [ʔ]. According to Meyer, the language has a phoneme /ʔ/. For instance, he proposes a phonemic representation /ʔɛgɛd-ɛ/ for [ʔagɛdɛ] 'he tied'. If /ʔ/ is indeed a phoneme of the language, one expects it to be distributed in all possible positions in the verbal stem. But Meyer provides no verb in which /ʔ/ is the second or third consonant of the stem.[2]

A second asymmetry is apparent when comparing 3C and 4C verbs in type A. The different stems are distinguished in 3C verbs by the following characteristics. The perfective stem, which is always suffixed, involves two [ɛ] vowels, after the first consonant and before the last one: its template is QɛTɛL.[3] 4C stems also involve these two vowels, with the additional spec-

2. Indeed, as we will see below, this phoneme is realized as [ʔ] only in word-initial position.

3. Throughout this paper, I use the letter symbols Q, T, L for the three consonants of the canonical stem (with an additional D for a forth consonant). Unlike the widespread use of C_1, C_2, C_3 etc., this practice allows one to pronounce the shape of the template in silent speech or out-loud. I also use the symbol √ when referring only to the set of lexical elements of the stem, to the exclusion of its general vocalization, *e.g.* √QTL.

ification that the first appears after the second consonant Qᵊ TɛLɛD. The first two consonants are separated in the 4C perfective by the mid-central vowel [ᵊ]. This vowel is epenthetic: Wolane does not generally allow for initial clusters.[4] The imperfective stem, which is always prefixed, involves only one vowel [ɛ]. This vowel appears after the first consonant in 3C QɛTL, and after the second in 4C QTɛLD. This leaves a final cluster, which the language allows for in general (with some phonotactic restrictions). In addition, the prefix of the imperfective is vocalized with an epenthetic vowel, which after [j] is the high front lax [ᵻ]. The jussive is also prefixed (with an almost identical set of prefixes), but the prefix vowel is [ɛ]. So far, 3C and 4C stems are identical except for the number of consonants. The asymmetry is found in the jussive stem: while 3C verbs exhibit a vowel [ɛ] before the last consonant (lɛ-QT**ɛ**L), 4C stems exhibit no lexical stem vowel. Instead, epenthetic [ᵊ] appears after the second consonant (lɛ-QTᵊLD).

This asymmetry is in fact not limited to 4C verbs. Stepping back from type A, one notices that the jussive stem vowel [ɛ] is also absent from 3C verbs in types B and C. Indeed, only type A 3C verbs seem to involve a jussive stem vowel [ɛ]. Understanding the logic behind this asymmetry is especially important for a unified account: with the exception of this vowel, all verbs have the same vocalization.

These are the gaps and asymmetries in Meyer's description that will be addressed in this paper. The list in (2) restates them in question form, and is rearranged according to the order in which these questions will be addressed:

(2) Summary of gaps and asymmetries

Gaps:

a. Why are 2C-Ø stems absent from type A?
b. Why does /ʔ/ appear only stem-initially?
c. Why are there no 4C verbs in types B and C?
d. Why are 2C-a stems absent from type C?

Asymmetries:

e. Why do 2C-Ø and 3C verbs in type C have different imperfective vowels?
f. Why do 3C verbs in type A differ from all other verbs in their jussive vowel?

The paper is structured as follows. The next section examines the phoneme /ʔ/ and the alternations that it produces. Section 4 shows how these alternations give rise to verbs whose stems seem to involve two conso-

4. The exception is clusters in which the second consonant is a liquid. I note epenthetic vowels in superscript to convey their non-phonemic status.

nants, when in fact they involve three, one of which is /ʔ/. This section eliminates gaps (2a) and (2b), as well as asymmetry (2e). Section 5 moves to 4C verbs. Asymmetry (2f) is first resolved, by showing that the jussive /ɛ/ behaves somewhat like an epenthetic vowel: it is absent when it is syllabically unnecessary. Continuing in this path, and following Voigt (1990) and Goldenberg (1994), I make an analogy between 4C verbs and verbs in types B and C. This analogy leads to the elimination of gaps (2c) and (2d). Furthermore, it is shown to account for a verb that Meyer left unclassified. In the concluding Section 6, I comment on the importance of the analysis for the discussion of the Semitic root.

3. The glottal stop and the alternations around it

Meyer analyzes many verbs as based on roots with an initial phonemic glottal stop. However, even in these verbs, the glottal stop is realized only in absolute word-initial position. When the stem is prefixed, other realizations arise.

The situation is illustrated in (3), where it is also compared to a regular 3C verb for reference. The imperative (3a) is simply the jussive stem with no prefix, and so /ʔ/ is word-initial and followed by a consonant (/ʔgɛd/). The glottal surfaces followed by an epenthetic [ᵊ]. Similarly, in the perfective stem (3b), the glottal is word-initial and therefore realized as [ʔ]. The first /ɛ/ vowel of the stem lowers to a short [a]. The conditional (3c) is formed by prefixing /bɛ-/ to the perfective stem, as shown by the regular 3C verb. In /ʔ/-initial stems, the result of the sequence /ɛʔɛ/ is the elision of /ʔ/ and the surfacing of one long vowel [aː]. Finally, the jussive of regular 3C verb is formed with a prefix /lɛ-/ (3d). With /ʔ/-initial stems, this would yield the underlying sequence /lɛ-ʔgɛd/. This sequence /CɛʔC/ surfaces as [CiC], with no glottal stop.[5]

(3) /ʔ/-initial verbs

	Type A			
	a. IMPERATIVE (2SG.M)	b. PERFECTIVE (3SG.M)	c. CONDITIONAL (3SG.M)	d. JUSSIVE (3SG.M)
√ʔgd ‘tie’	ʔᵊgɛd	ʔagɛd-ɛ	b-aːgɛd-	l-igɛd
√nks ‘bite’	nᵊkɛs	nɛkɛs-ɛ	bɛ-nɛkɛs-	lɛ-nkɛs

The three generalizations as to the realization of /ʔ/ are given in (4a-c). A fourth environment, not included in (3) above, is /CʔɛC/. Meyer is not consistent in his transcription of the realization of such cases, sometimes transcribing the result as [CaːC], other times as [CaC]. Only in one occa-

5. Glottal stops do appear in preconsonantal positions, but only as an allophone of /kˀ/. For instance, [kˀɛtɛl-ku] ‘I killed’, [lɛ-ʔtɛl] ‘I should kill’.

sion does he explicitly comment on one such form, which he analyzes as /j-ʔɛdʒ/ 'I pierce'. He then remarks that "the glottal stop is regularly deleted" and that despite that the usual [a]-quality of the vowel /ɛ/ after a glottal stop remains, "but gets lengthened to [aː]: /j-ʔadʒ/ > /j-adʒ/ > [j-aːdʒ]" (Meyer 2006: 70).[6] This adds the fourth generalization (4d). I emphasize here that none of the generalizations in (4) is an interpretation of mine: they are all mentioned by Meyer.

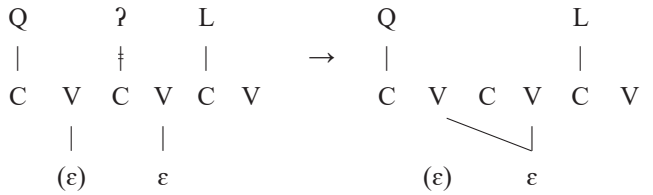
(4) The realization of /ʔ/
   a. Lowering
      /#ʔɛ/ => [ʔa]
   b. Coalescence
      /CɛʔɛC/ => [CaːC]
   c. Raising
      /CɛʔC/ => [CiC]
   d. Compensatory lengthening
      /CʔɛC/ => [CaːC]

Let us examine these rules one by one. Lowering of /ɛ/ into [a] after [ʔ] (4a) is unremarkable phonetically. I will leave it at this descriptive level. More remarkable is what can be learned about the vowel /ɛ/ from coalescence (4b), whereby a lengthened /ɛ/ is realized as [aː]. A possible conclusion, which Meyer does mention, is that [ɛ] is in fact a short /a/. Two short /a/s then yield a long [aː]. This conclusion is supported by comparison to the vowel systems of other Ethiosemitic languages. In addition, within Wolane the vowel /ɛ/ has many allophones, depending on its environment, with the common denominator being "lowness": [ɛ, o, e, œ, a].

Let us examine how coalescence can be formalized. As mentioned, the radical /ʔ/ appears as [ʔ] only in word-initial position. Elsewhere, it disappears. Assuming the templatic representations in Lowenstamm's (1986) strict CV framework, this effect can be regarded as compensatory lengthening. As in (5), a lengthened /ɛ/ spreads to the previous V-slot. Long /ɛ/ is realized as [aː], a statement that Meyer himself makes (Meyer 2006: 44). Through this prism, the deletion of /ʔ/ can be regarded as obligatory whenever /ɛ/ can spread to a position before it. Only word-initially is this impossible. Thus, the representations in (5) in fact cover compensatory lengthening (4d) as well (*viz.* the placement of [ɛ] in parentheses).

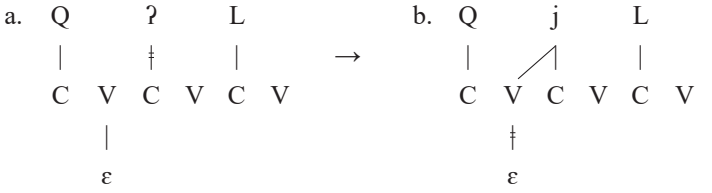
6. In this citation, I changed Meyer's transcription symbols into standard IPA ones and added slashes and square brackets.

(5) /Q(ɛ)ʔɛL/ => [Qa:L]



More intriguing is the raising apparent in the interpretation of the sequence /CɛʔC/ as [CiC]. A possible analysis relies on the illicitness of the glottal in coda position (though see fn 5). This leaves the position of the /ʔ/ radical empty (6a). Assuming that there is a need to realize non-final, empty consonantal positions, I propose that a glide /j/ is epenthesized, yielding /ɛj/ (6b). The passage from /ɛj/ to [i] is less surprising, and is in fact a general rule within the Wolane verbal system (Meyer 2006: 67). It can be represented as the /j/ spreading leftward to occupy the position of /ɛ/, thereby evacuating it.

(6) /QɛʔL/ => [QijL] (=[QiL])



According to the analysis in (6), [CiC] is in fact /CijC/. Indeed, the sequence [CijC] is unattested word-medially in Wolane. I will return to this analysis in Section 5 below, when I examine the jussive vowel /ɛ/.

Moving away from /ɛ/, one may criticize Meyer's decision to consider /ʔ/ as a phoneme of the language. Indeed, since it appears only word-initially, it might be considered epenthetic: no word in Wolane begins with a vowel. Meyer counters such an analysis with the imperative [ʔᵊged], claiming that if [ʔ] were epenthetic, the form would be [gɛd]. But the argument is not a strong one: it is possible that the insertion of [ʔ] is motivated not by syllabic requirements, but by templatic ones. The template of the imperative involves three C-slots, as illustrated by the form [nᵊkɛs] 'bite!' in (3a): it is /CVCɛC/ (the first V is realized through epenthesis). Assuming that /g,d/ can be lexically specified as the second and third radicals of this verb, the first position of this template would remain empty. It is possible that the [ʔ] surfaces in this case in order to occupy this empty position. I

return to the issue of the radical /ʔ/ briefly in Section 5, where I also mention an alternative view of the identity of /ʔ/.

Whether /ʔ/ is underlying or not, and whether [ɛ] is in fact a short /a/ or not —these are theoretical issues that are tangential to the concerns of this paper. For the present purpose, only the following fact is crucial: all of these alternations, including raising, are general in the language. Thus, whenever Meyer's /ʔ/ is found between two /ɛ/ vowels, the result is [aː]. And whenever the sequence /CɛʔC/ is expected, the surface form is [CiC]. For instance, Meyer analyzes the noun [ʔufur] 'mouse' as /ʔfur/; when the prefix /bɛ-/ 'with' is attached, the result is [bifur] 'with a mouse' (p. 32). It cannot therefore be argued that raising is a morphologically-dependent paradigm merger within the verbal system.

The general nature of these alternations will prove crucial in the reanalysis of the system in the next sections.

4. Eliminating the first two gaps and the first asymmetry

Meyer claims that /ʔ/ is not a possible root-medial element. Yet this is a hasty claim. As we saw, assuming Meyer's own generalizations in (4) above, if /ʔ/ were a root-medial element, it would never surface as [ʔ]. It becomes necessary to examine what /ʔ/ would yield in other positions in the root. Beginning with the root-medial position, the table in (7) predicts, on the basis of the templates of the regular type A 3C verb (7a, illustrated by 7b), what the underlying representation of a 3C /ʔ/-medial root would be (7c). The expected realizations are provided in (7d).

(7) Predictions for √QʔL

	PERFECTIVE	IMPERFECTIVE	JUSSIVE
a. type A 3C template	QɛTɛL-	-QɛTL	-QTɛL
b. regular root √nks 'bite'	nɛkɛs-	-nɛks	-nkɛs
c. hypothetic root √QʔL	/QɛʔɛL/	/QɛʔL/	/-QʔɛL/
d. expected realization	[Qaː L-]	[-QiL]	[-Qaː L]

The pattern in (7d) is familiar from (1) above: it is exactly the one exhibited by Meyer's type C 2C-Ø verb, [zaːf, -zif, -zaːf] 'push'. This type of verb was strangely absent from type A (gap 2a), and moreover exhibited an imperfective vocalization that was different from that of 3C verbs of type C (asymmetry 2e). Under the reanalysis in (7), such verbs are in fact /ʔ/-medial 3C verbs in type A. This reanalysis immediately eliminates the asymmetry between 2C-Ø and 3C verbs in type C, since the verbs in ques-

tion are neither in type C nor biradical. As type A 3C verbs with a medial /ʔ/, their vocalization is completely expected under the rules in (4).

The same reanalysis paves the way to eliminating the first two gaps. First, let us consider the /ʔ/-gap. We began with /ʔ/ being absent from all positions but the first. It was then suggested that /ʔ/-medial verbs do exist. How would a /ʔ/-final verb look? If one repeats the exercise in (7) for a hypothetical root √QTʔ, one derives (8b). In this set of underlying forms, /ʔ/ is encountered in a new position: at the stem edge. The preceding context is either a vowel /ɛ/ (in the perfective and jussive) or a consonant (in the imperfective). We know the glottal does not appear in these environments. Its disappearance leaves /ɛ/ in the perfective and jussive and nothing in the imperfective. Plausibly, as argued above for the initial glottal stop of the imperative [ʔˢgɛd], the templatic position that /ʔ/ would have occupied does not disappear. This leaves space for the preceding vowel, if there is one, to lengthen by way of compensation. If no vowel precedes the /ʔ/, it remains silent. A pattern corresponding to (8c) is therefore Meyer's type A 2C-a verbs, [bɛlaː-, -bɛl, -blaː-] 'eat'.[7]

(8) Predictions for √QTʔ

	PERFECTIVE	IMPERFECTIVE	JUSSIVE
a. type A 3C template	QɛTɛL-	-QɛTL	-QTɛL
b. hypothetic root √QTʔ	/QɛTɛʔ/	/QɛTʔ/	/-QTɛʔ/
c. possible realization	[QɛTaː]	[QɛT]	[QTaː]

2C-a verbs in type A are therefore not 2C verbs at all. They are 3C verbs with a final /ʔ/. This reanalysis closes the /ʔ/-gap: /ʔ/ appears in all three root positions.

As Meyer mentions, most 2C-a and 2C-Ø verbs are found in types A and C respectively. These are exactly the verbs I have reanalyzed as being 3C verbs, involving /ʔ/ in non-initial positions. There are 4 remaining 2C verbs in Meyer's grammar, all four in type B: (i.) two 2C-Ø verbs [ɣʔeːtʔ-] 'tire' and [heːd-] 'go', and (ii) two 2C-a verbs, [meːlaː-] 'fill' and [kʔeːraː-] 'look after'. The latter two are parallel to /ʔ/-final verbs in type A, and so they are not really 2C verbs. There are therefore no 2C-a verbs in Wolane.

7. Recall that the jussive stem is presented in its suffixed form. When unsuffixed, this stem is realized [blɛ]. As Meyer notes (p. 36), the contrast between [aː] and [ɛ] is neutralized word-finally in favor of the latter. This generalization extends beyond the native vocabulary, such that an [a]-final word from a donor language is pronounced with a final [ɛ] in Wolane. A further complication must be mentioned: when a C-initial suffix is added, a stem-final /ɛʔ/ sequence is in the _C environment. According to (4c), it is expected to be realized as [i]. It seems that at the right stem edge, lengthening takes precedence over (4c).

The former two are plausibly analyzed as 3C verbs in type A with √QjL roots, rather than 2C-Ø roots in type B.[8] Meyer's 2C verbs are thus eliminated from the system.

Alongside this simplification, the reanalysis proposed here is welcome for at least one other reason. As mentioned in the introduction, there is an additional type of 2C verbs not considered in depth here, namely 2C-e verbs. These verbs can be regarded as based on √QTj roots. Roots with initial /j/ are also attested, and so /j/, like /ʔ/, is freely distributed within roots.

The elimination of Meyer's 2C subtype is welcome from yet another perspective. Across Semitic, there are many verbs whose last two consonants are identical, such as Arabic [ħabb] 'love' or Modern Hebrew [garar] 'drag'. Since McCarthy (1979), such verbs are claimed to be derived from sets of only two consonants (see also Bat-El 2003; Lowenstamm 2010 for discussion). In Wolane, they figure in types A, B and C, *e.g.* [kɛsɛs-] 'accuse', [feːtɛt-] 'be wide', [tɛ-kaːsɛs-] 'accuse each other'.[9] In other words, biconsonantal verbs exist in Wolane, but they do not remain biconsonantal on the surface. If Meyer's 2C verbs were truly biconsonantal, one would have to somehow distinguish them from reduplicated biconsonantals.

The system from (1) is recast in (9) according to the reanalysis proposed. There is no /ʔ/-gap and there are no 2C verbs. (9c) is not in type C, and therefore does not result in an asymmetry in vocalization.

(9) Wolane types A-C: interim reanalysis

	Type A			Type B			Type C		
	PERF	IMPERF	JUSS	PERF	IMPERF	JUSS	PERF	IMPERF	JUSS
a. √QTL	nɛkɛs-	jᵎ-nɛks	lɛ-nkɛs-	kʔeːsɛt-	jᵎ-kʔeːst	lɛ-kʔist-	da:βɛr-	jᵎ-da:br	lɛ-da:br-
b. √QTʔ	bɛlaː-	jᵎ-bɛl	lɛ-blaː-	meːlaː-	jᵎ-meːl	lɛ-milaː-	(gap)		
c. √QʔL	za:f-	jᵎ-zif	lɛ-za:f-						
d. √ʔTL	ʔagɛd-	j-aːgd	l-igɛd-						
e. √QjL	ʧʔeːtʔ-	jᵎ-ʧʔeːtʔ	lɛ-ʧʔitʔ-						
f. 4C	dˢnɛβɛtʔ-	jᵎ-dnɛptʔ	lɛ-dnˢptʔ-	(gap)					

(*nɛkɛs-* 'bite', *kʔeːsɛt-* 'splice', *daːβɛr-* 'become fat', *bɛlaː-* 'eat', *meːlaː-* 'fill', *zaːf-* 'pull', *ʔagɛd-* 'tie', *ʧʔeːtʔ-* 'be tired', *dənɛβɛtʔ-* 'be frightened')

8. Meyer analyzes these verbs as type B because like 3C verbs in this type, they exhibit a vocalization [i] in the imperfective, *e.g.* [ʧʔeːtʔ-, ʧʔeːtʔ-, ʧʔitʔ-], cf. [kʔeːsɛt-, kʔeːsɛt-, kʔist-]. In the present reanalysis of these verbs as belonging to type A, the implication is that the underlying sequence /QjɛL/ of the jussive is realized as [QiL]. This view is compatible with the general instability of the jussive stem vowel, discussed in the next section.

9. The last verb is a reciprocal verb derived from the type A [kɛsɛs-]. Reciprocal verbs often transform their stems into type C stems.

Although two gaps and an asymmetry have been explained, we are still quite a way from our journey's end. There are two more gaps and one more asymmetry to examine. The two gaps are (i) the absence of /ʔ/-final stems from type C; and (ii) the absence of 4C verbs from types B and C. The asymmetry is the absence of the jussive [ɛ] from 4C type A and 3C types B and C. Possibly more worrisome, however, is the fact that the reanalysis seems to create more gaps than there were initially! Instead of subtypes being unevenly distributed among major types, we find that weak roots — roots with /j/ or /ʔ/— all appear in type A. Why are there no weak roots in types B and C? Have we simply traded one set of gaps for another?

5. Quadriradical stems

5.1 The jussive vowel /ɛ/

The jussive vocalization of 3C verbs in type A includes a short vowel [ɛ] before the last consonant, *e.g.* [-nkɛs-]. This vowel is absent from 4C verbs of the same type, *e.g.* [-dnᵊpt-]. Comparing the two stems, and examining the expected but unattested *[-dnbɛt-], reveals a possible reason for this difference.

The designated position of the jussive vowel is before the last consonant of the stem. Given that Wolane does not tolerate triconsonantal clusters, the realization of [ɛ] in [-nkɛs-] prevents such a structure from surfacing by separating the second consonant for the third. Now, the expected *[-dnbɛt-] also contains a triconsonantal cluster. Here, the realization of [ɛ] before the last stem consonant does not help resolve the cluster. The second and third consonants will still have to be separated, a task accomplished by the epenthetic [ᵊ]. This insertion correlates with the disappearance of the jussive /ɛ/. Indeed, unlike in the 3C case, once epenthesis is performed in 4C verbs, there is no *need* to realize the position preceding the final stem consonant. I therefore propose the following principle:

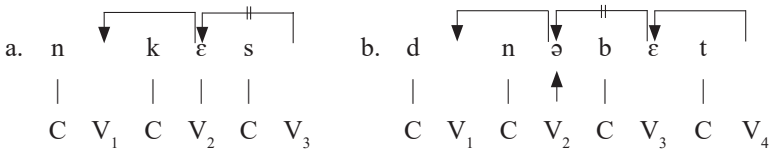
(10) Realization of jussive /ɛ/
The jussive /ɛ/ surfaces before the last stem consonant only if it is needed for syllabic purposes.

The jussive /ɛ/, a lexical vowel, behaves as if it were epenthetic. This is not unprecedented either within the language or cross-linguistically. Within Wolane, it is how Meyer describes the lexical [ɛ]s at the right edges of prefixes. Within Semitic, even stem vowels often syncopate despite being lexical (see for instance, the reconstruction of Semitic in Deutscher 2005). Such vowels are also apparent outside Semitic, for instance in Slavic, where they are called "yers" (as per the analysis in Scheer 2006).

In order to make the analysis explicit, let us examine the representation of alternating, lexical vowels. To this end, we return to the representational theory of Strict CV, already employed in the discussion of [ɛ]~[a] alternations above. In this approach, Vowel-zero alternations are dealt with using the notion of "government". A nucleus V_n that is associated with a vowel governs a preceding nucleus V_{n-1} if the latter is not lexically associated with a vowel. The realization of V_{n-1} is then unnecessary and will be inhibited. However, there is a possible exception to this generalization. If V_{n-1} itself is preceded by an empty nucleus V_{n-2}, then realizing V_{n-1} may be regarded as necessary, in order to govern V_{n-2}, even though V_{n-1} is itself potentially governed. V_{n-1} in such a configuration is called a "responsible nucleus" (*e.g.* Enguehard & Faust 2018). Alongside these considerations, in languages like Wolane, which allow for final clusters, it is usually claimed that the final empty nucleus can govern the preceding nucleus.

Consider now the jussive /ɛ/ in (11a), in the 3C jussive stem /nkɛs/. Its nucleus V_2 is potentially governed by the following V_3, but this government is annulled by the fact that V_2 is itself a responsible nucleus. /ɛ/ will be realized. Compare this configuration to that of the 4C jussive stem /dnbɛt/ in (11b). The position of /ɛ/, now V_3, is again governed by the final empty nucleus V_4. The preceding nucleus V_2 is a responsible nucleus, whose realization is necessary for the inhibition of the nucleus V_1 preceding V_2. V_3 is not a responsible nucleus, and it is governed. It is therefore unnecessary for syllabic purposes, and remains unrealized. Note, however, that this is not a property of all /ɛ/ vowels, and so must be encoded lexically. Ever since Larsen (1998), this is achieved by representing the segment as unassociated to its position.[10]

(11) 3R *vs.* 4R stems in the jussive verb

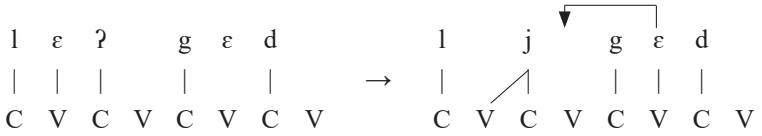


The triradical jussive form [l-igɛd] —see (3)— superficially contradicts the proposed logic. Here, /ɛ/ is realized even though it is not responsible: the preceding nucleus also seems to be realized. However, the problem is solved by considering that, as claimed in (6) above, [i] in this case is in fact /ij/. As repeated in (12) below, the form is derived from /lɛ-ʔgɛd/, which is transformed into /li-jgɛd/. This configuration leaves the nucleus after the /j/

10. This is also the treatment given to "yers" in Scheer's work (*e.g.* 2006).

in need of government, which is assured by the association of /ɛ/. If so, the nucleus associated to /ɛ/ is responsible in this configuration.

(12) /lɛʔgɛd/ => [lijgɛd] (=[ligɛd])



To summarize, the principle in (10) motivates not only the absence of the jussive vowel /ɛ/ from 4C verbs —it also confirms the analysis of [ligɛd] as /lijgɛd/. Encouragingly, it even explains the absence of the vowel /ɛ/ from 3C jussives in types B and C, respectively [-kʾist-] and [-daːbr-]. In both types, a hypothetical /ɛ/ before the last consonant is unnecessary, because it would follow a single consonant: */-kʾisɛt-/ and */-daːbɛr-/. Again, there is no syllabic need for the realization of /ɛ/, because Wolane allows for final biconsonantal clusters (as well as long vowels in closed syllables). The second asymmetry is thus resolved. But the parallel between 4C verbs and types B and C is more general than just the jussive vowel, as explained in the next subsection.

5.2 Types B and C are quadriradical verbs

It is a well-known stance that in Ethiosemitic, types other than A parallel quadriradical verbs (see, for instance, Voigt 1990 for Ge'ez). According to this view, these types are based on triradical roots which have been augmented by an additional element placed in the second root position. Thus, type B is augmented by a vocalic element /j/ (or /i/) in the second position, such that a basic triradical QTL is transformed into a quadriradical QjTL (see Lowenstamm 1986 for type B across Ethiosemitic). Goldenberg (1994) generalizes the claim beyond Ethiosemitic, asserting that throughout Semitic, all verbal types except for the most basic one (*e.g.* Qal and faˁal in Hebrew and Arabic) are derived by augmenting triradical roots to form quadriradical ones. For Goldenberg, there are as many verbal types as there are augmentation strategies. He stresses the importance of this view for the understanding of the logic behind the system as a whole, an issue I will return to below.

Examining type B in Wolane, one finds immediate support for the parallel between quadriradicals and types other than A (as Meyer also remarks, *ibid*: 56). Type B is characterized by a first vowel [eː] in the perfective and imperfective, but a vowel [i] in the jussive. As shown in (13), if the quadriradical template of 4C roots in (13a) are applied to a root with a second

element /i/ such as (13b), one expects a different effect in the perfective and imperfective than in the jussive. As shown in (13c), in the former /i/ is expected to merge with /ɛ/, while in the latter, no merger is expected. This yields the 3C pattern in type B verbs in (13d).

(13) Type B as quadriradical

	PERFECTIVE	IMPERFECTIVE	JUSSIVE
a. 4C template	QTɛLɛD-	-QTɛLD	-QTLɛD
b. hypothetic root √QiTL	/QiɛLɛD/	/QiɛLD/	/QiLɛD/
c. possible realization	[Qe:LɛD]	[Qe:LD]	[QiLD]
d. attested type B verb	[kʔ**e**:sɛt]	[kʔ**e**:st]	[kʔ**i**st]

In (13), I took special care to include the vowel /ɛ/ of the jussive in the template, even though it does not eventually surface (because of principle 10). This care is also due to Type B verbs like [me:la:] 'fill'. The analysis of this verb is analogous to both (13) and (8) above: its first vowel points to the existence of /i/ as a second radical, and its final vowel indicates that its root is /ʔ/-final. Indeed, as in √QTʔ in (8) above, this /ʔ/ disappears at the right stem edge if no vowels occur around it. If the jussive /ɛ/ were lexically absent from quadriradicals, one would expect the same outcome at the right edge, as in the imperfective *[me:l]. The attested jussive form, however, does include a final vowel [a:]. This vowel can only be explained if /ɛ/ is present even in quadriradicals. Since it is followed by a glottal stop, the vowel is lengthened (as in type A [bla:]). Presumably, as a result of this merger and the derived length, the vowel is not subject to the principle in (10). Verbs like [me:la:] therefore corroborate the existence of /ɛ/ even in quadriradical templates.

Moving on to type C verbs, their analysis in parallel with 4C verbs is equally revelatory. What can be the second element of a quadriradical root such that, when inserted into the templates in (14a), can give (14c)? We have seen an entity which, when preceding a vowel /ɛ/, yields [a:]. It is /ʔ/, as proposed in (14b). This explains the perfective and imperfective stems. In the jussive, however, the hypothetical /ʔ/ is found stem-medially between two consonants, a position in which it has not yet been encountered. One may assume that /CʔC/ is also realized as [Ca:C].

(14) Type C as quadriradical

	PERFECTIVE	IMPERFECTIVE	JUSSIVE
a. 4C template	QTɛLɛD-	-QTɛLD	-QTLɛD
b. hypothetic root √QʔTL	/QʔɛLɛD/	/QʔɛLD/	/QʔTɛD/
c. attested type C verb	[d**a**:βɛr]	[d**a**:br]	[d**a**:br]

Up to this point, following Meyer, I have chosen the symbol /ʔ/ for this "ghost" radical. Yet I have also expressed reserve with respect to this choice. This reserve was based primarily on the fact that elsewhere in the language, [ʔ] is simply epenthetic, inserted to avoid onsetless syllables. To this observation one may add the rule about /CʔC/ being realized as [Ca:C], which does not seem natural. A possible alternative is to assume that the radical under examination is not /ʔ/, but /a/. Under this view, this last realization is less problematic; however, raising (4c) becomes harder to explain. I leave this choice open here —either option is compatible with the spirit of the present analysis.[11,12]

Consider now the last gap, namely the absence of Meyer's 2C-a from type C. Rephrased in the terms of the present analysis, the unattested roots are quadriradicals whose second and fourth radicals are /ʔ/: namely *QʔLʔ. The reanalysis thus provides a rationale for their absence in the form of a co-occurrence restriction. We have seen that /ʔ/ is not a regular consonant: it is almost always elided. As represented in (15), one might claim that this special nature places it on a tier that is not shared by other consonants. As a result, the two /ʔ/ elements are in fact adjacent. This would result in a violation of the Obligatory Contour Principle (OCP, Leben 1973), which prohibits adjacent identical entities. Incidentally, the rationale of co-occurrence avoidance is even more plausible under the alternative view of /ʔ/ as /a/, since placing vowels and consonants on different tiers is less controversial.[13]

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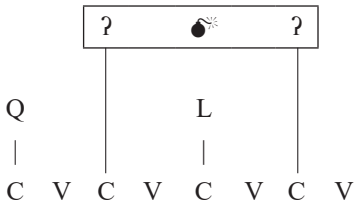
11. The present proposal differs from the analysis of Ge'ez in Voigt (1990) in equating verbs with historical gutturals, reanalyzed as /ʔ/ or /a/, and the second radical of type C, which Voigt analyzes as a null element. In Wolane, having a null element makes a wrong prediction for type C jussives: it is unclear how /QØTɛL/ can result in [Qa:TL].

12. Prunet (1996) focuses on Ethiosemitic systems with a radical /A/. Such a radical has also been proposed for Modern Hebrew in Faust 2005 and Enguehard & Faust 2018.

13. I have detected problems with such roots in other Semitic languages. In Enguehard & Faust 2018, we discuss √QaQa roots in Modern Hebrew. Verbs from these roots are not impossible, but when the two /a/s are adjacent on the vocalic tier, an epenthetic vowel, otherwise uncalled for, surfaces. Similarly, I (Faust 2018) show that in Christian Urmi Neo-Aramaic (Khan 2016), √QwQw roots are transformed into √QwQj.

(15) *Q?L?



The reanalysis of type C as quadriradical, combined with the analysis in (15), make one further prediction. A hypothetical root √ʔTL, augmented by a second radical /ʔ/, would yield a hypothetical √ʔʔTL: a [ʔ]-initial verb whose first vowel is [aː]. If √QʔTʔ is ruled out by the OCP, as in (15), then √ʔʔTL, with an even more blatant violation of this principle, is also predicted to be excluded. Indeed, no such verbs are attested.[14]

The last gap on the original list is now accounted for. Before I take a step back and summarize, I would like to point out another advantage of the analysis.

5.3 A note on 'urinate' (and type F)

Besides types B and C, Meyer's classification also includes types D and F (there is no type E). Type D uses the template /QoːTɛL/. It is amenable to the same analysis as types B and C, with the additional element being /u/. Type F is characterized by a vowel [u] after the first consonant. Only two verbs were identified in this type: [dufɛleː-] 'be blunt' and [kˀunɛtˀɛr-] 'pinch'. Meyer proposes that the vowel [u] originates in the labialized quality of the first or second consonant: the roots are √dfʷlj (Meyer's √dfʷle) and √kˀʷntr. These are therefore regular quadriradical roots, rather than a specific type. This view is further bolstered by the position of the [u] between the first two consonants, rather than fused with the first stem vowel, as it is in types B and C.

An interesting case is presented by the verb 'urinate', whose stems are presented in (16). Meyer (p. 63) notes the similarity with his type F on the one hand, and with his type C 2C-Ø verbs on the other, *e.g.* [zaːf, zif, zaːf].

(16) 'urinate'

PERFECTIVE	IMPERFECTIVE	JUSSIVE
[ʃumaːn]	[ʃumin]	[ʃumaːn]

14. The OCP can motivate yet another asymmetry of /ʔ/-initial verbs. In Wolane, there are two causative prefixes, /ʔɛ/ and /ʔɛt/. Meyer refers to these as the direct and indirect causatives. /ʔ/-initial verbs do not appear with the prefix /ʔɛ/. Instead, they form both their direct and indirect causatives with /ʔɛt/. /ʔɛʔɛgɛdɛ/ would be problematic for the same reason as in (15). Having said all of the above, it seems that the OCP violation only holds for /ʔ/ (or consonantally-mapped /a/): type B roots √jjTL and √QjTj do exist.

Meyer provides neither a root nor a type for this verb. The reason for this is clear: the [i]-[a] alternation is associated in his grammar to the number of consonants in the surface stem, which is always two. 'Urinate' involves three. Relatedly, because the only two verbs Meyer classifies as type F are quadriradical, in fact there seems to be no good reason to propose an independent verb type.

No such problems are posed by the present approach. Since type F does not exist, and its verbs are reanalyzed as quadriradical with a first or second labialized consonant, all one has to do is identify the third element of the root such that it would derive the [i]-[a] alternation in 'urinate'. As shown in (17), by assuming a quadriradical root with a second labialized consonant and a third /ʔ/, one derives the attested verb from general principles.

(17) 'urinate' as quadriradical

	PERFECTIVE	IMPERFECTIVE	JUSSIVE
a. 4C template	QTɛLɛD-	-QTɛLD	-QTLɛD
b. hypothetic root √QT^{w}ʔL	/QT^{w}ɛʔɛD/	/QT^{w}ɛʔD/	/QT^{w}ʔɛD/
c. expected realization	[QuTaːD]	[QuTiD]	[QuTaːD/
d. attested verb 'urinate'	[ʃumaːn]	[ʃumin]	[ʃumaːn]

The approach adopted here, which equates 4C verbs and verbs outside type A, thus manages not only to fill in and motivate the different gaps and asymmetries, but also to derive the three stems of a verb that otherwise remains unexplained. The next section assesses the proposal and contextualizes it within larger debates on Semitic root-and-pattern morphology.

6. Discussion

The preceding section subjected the Wolane verbal system to the approach in Voigt (1990), which was generalized in Goldenberg (1994). All types other than type A were shown to be quadriradical, *i.e.* involving four arbitrary entities. The resulting system is portrayed in (18). All verbs fall into one of two classes: triradical or quadriradical.

(18) System reanalyzed

		3R				4R		
		PERF	IMPERF	JUSS		PERF	IMPERF	JUSS
a. All C	QTL	nɛkɛs-	jˡ-nɛks	lɛ-nkɛs	QTLD	dˢnɛβɛtˀ-	jˡ-dnɛptˀ	lɛ-dnˢptˀ
b. /i/-medial	QiL	ʧˀeːtˀ-	jˡ-ʧˀeːtˀ	lɛ-ʧˀɪtˀ	QiLD	kˀ**e**ːsɛt-	jˡ-kˀ**e**ːst	lɛ-kˀ**i**st
c. /ʔ/-initial	ʔTL	ʔagɛd-	j-aːgd	l-igɛd	ʔiLD[15]	-ʔ**e**ːgɛd-	-ʔ**e**ːgd	-igd
d. /ʔ/-medial	QʔL	zaːf-	jˡ-zif	lɛ-zaːf	QʔLD	d**a**ːβɛr-	jˡ-d**a**ːbr	lɛ-d**a**ːbr
e. /ʔ/-final	QTʔ	bɛlaː-	jˡ-bɛl	lɛ-blɛ	QiLʔ	m**e**ːlaː-	jˡ-m**e**ːl	lɛ-m**il**ɛ

This system has several advantages over the depiction in Meyer's grammar. First, it exhibits no accidental gaps. In Meyer's system there are no 2C-a verbs in type C, no 2C-Ø verbs in type A, no roots with /ʔ/ in positions other than the initial position and no quadriradicals in types B and C; and none of these gaps is synchronically motivated. In the reanalysis presented here, these gaps were eliminated by tracing all 2C verbs to roots with weak consonants (including /ʔ/), thus shifting their position in the system. Second, the system in (18) presents no unmotivated asymmetries in vocalization. Unlike in Meyer's grammar, the seemingly exceptional imperfective realization in (1d) follows from a general rule of the language, and it is possible to find a rationale for the appearance or absence of jussive [ɛ]. Finally, and perhaps most importantly from the perspective of more general studies of Semitic verbal morphology, the present proposal completely eliminates types from the system. In fact, there is only one verbal type in Wolane. The vocalization is underlyingly identical in all verbs, and the only difference is the number of radicals. The only arbitrary information for each verb is its set of radicals. The arrangement with respect to the vowels and the quality of the vowels themselves follow language-wide principles that need not be memorized for each verb.

This cannot be said so easily of all other Semitic languages. In Modern Hebrew, for example, the distribution of roots within the different types is unpredictable, and different types have different vocalizations. Thus, the "root" in the traditional sense is simply not all that is arbitrary about verbal entries in Modern Hebrew. Such considerations, among others, lead Bat-El (2001, 2002 & 2003) to doubt the validity of the root unit in Modern Hebrew. Speakers, she claimed, store stems, not abstract sets of basic

15. This verb has not been discussed in the paper, but it is attested and included for purposes of symmetry. It lacks the prefixes because it is in fact the stem of an indirect causative formed with a prefix /ʔɛt/. The full stems are [ʔateːgɛd-, j-aːteːgd-, laːtigd] 'cause to be tied/imprisoned'. They are derived from /ʔɛt-ʔjɛgɛd, j-ʔɛt-ʔjɛgd, lɛ-ʔɛt-ʔjgd/ through the regular processes discussed in the paper.

elements. The elements of the "root" are but a residue, an artefact of the linguist's analysis, rather than a significant unit in the knowledge of speakers. Bat-El (1994) concludes that reconsideration of this unit in Semitic languages in general is "certainly opportune".

Yet Wolane is definitely a Semitic language. Unlike Modern Hebrew, the vocalizations of all of its verbs are underlyingly identical. Storing stems is therefore highly redundant in such a system. The reconsideration of the abstract unit that is the Semitic root may be as opportune as any reconsideration; Wolane seems to provide firm evidence as to the central role of such a unit in the organization of a Semitic verbal system.

A final lesson can perhaps be learned concerning the issue of abstractness. Meyer's approach is a hybrid one: although he does recognize roots, he classifies verbs according to their stems, much like Bat-El. Thus, roots are called biconsonantal because their stems involve two consonants; and verbs based on such roots are classified into the same verbal type as certain triconsonantal verbs due to a similarity in surface vowels. It is this concentration on surface entities (consonants and stems) rather than abstract entities (radicals, consonantal or vocalic, and templates), that leads to the gaps in Meyer's system. I conclude that such surface-oriented approaches may be harmful to the understanding of the architecture of the morphological system as a whole.

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4

A Descriptive Phonology of the Vowel System of Uvwiẹ

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Abstract

Extant literature on the vowel system of Uvwiẹ shows that the language contrasts 9 oral and 9 nasal vowels, and operates a full vowel harmony system defined by tongue root position. However, preliminary observation of current data from the language suggest otherwise. The present study therefore re-examines the vowel system of Uvwiẹ. It presents a descriptive phonological account of the vowel inventory and their putative behaviour within the phonological grammar of the language. Data for the study was drawn from the corpus documented in the appendix of the master's thesis *The Sound System of Uvwiẹ* (Ekiugbo 2016), and analysed within the descriptive framework. This study found amongst other things that the language contrasts 7 (oral) vowels, and that co-occurrence restriction on vowel distribution is partial. The oral vowels contrast with their nasal counterparts. The study also shows the different vowel processes and vowel behaviours attested in the language.

Keywords

phonemic inventory, Uvwiẹ, vowel harmony, vowel system.

Résumé

Les publications disponibles sur l'uvwiẹ considèrent que cette langue distingue 9 voyelles orales et 9 voyelles nasales, et que l'ensemble de ce système est soumis à un phénomène d'harmonie vocalique fondé sur la posi-

tion de la racine de la langue. Cependant, des données issues de la langue parlée suggère une autre répartition. En conséquence, le présent article propose un réexamen du système vocalique de l'uvwiẹ, tant au niveau de l'inventaire des unités que des règles phonologiques auxquelles ces mêmes unités se conforment. Cette étude a été développée selon les canons de la linguistique descriptive et ses résultats reposent sur l'utilisation du corpus contenu dans les annexes du mémoire de master intitulé *The Sound System of Uvwiẹ* (Ekiugbo 2016). Ladite étude démontre notamment que l'uvwiẹ distingue sept voyelles orales et que les restrictions portant sur la co-occurrence de ces voyelles n'opèrent que de façon limitée. Elle confirme également l'existence d'un contraste entre voyelles orales et nasales et elle illustre différents phénomènes mettant en jeu les voyelles dans la langue uvwiẹ.

Mots clés

harmonie vocalique, inventaire phonologique, système vocalique, uvwiẹ.

1. Background to the study

The goal of this study is to present a descriptive phonological analysis of the vowel system of Uvwiẹ. It seeks to examine which vocalic element may be a part of the phonemic inventory of the language and their behaviour within its phonological grammar. Basically, investigations on vowel systems tend to address the nature of vocalic elements and their distributional patterns, and to account for their inventory on either or both of two levels, phonetic and phonological; and to pursue these objectives, research largely relies on the insights provided by the phonetic features and their participation in determining the communicative salience of segments and prosody within a given language. The present study engages with this concern with respect to Uvwiẹ, a South-Western Edoid language (Elugbe 1989) spoken in Delta State, Nigeria. The language is spoken by an estimated population of 19,800 people as per the year 2000 (Lewis *et al.* 2013).

The data for this study were drawn from wordlists and sentential constructs collected from primary and secondary sources and documented in Ekiugbo (2016). The primary data were elicited from two adult L1 speakers (a male and a female) of the language using the Ibadan 400 wordlists[1] and a supplementary 300 wordlists. The secondary data, on the other hand, were extracted from previous works on the language (Omamor 1973 & 1988;

1. The Ibadan wordlists is an expanded version of Swadesh wordlists. The expansion "was necessitated by the need for more penetrating pre-historical investigations among languages already proved to be genetically related, such as the Benue-Congo language" (Lewis 2015: 35). The compilation of the list was done in 1966 by experts at the University of Ibadan, Nigeria, hence the name.

Diffrẹ-Odiete 2014; Evuarhere 2015), but were crosschecked with a native speaker. Thus, all examples used may be considered as being of first-hand origin. The descriptive approach is employed in the analysis of the data. The paper is organized into 2 main sections, namely empirical review and data analysis respectively.

2. Empirical review

A review of existing studies on the vowel system of Uvwiẹ is given in this section. Omamor (1973) is the first linguistic source on Uvwiẹ language. This study was a follow-up to Hoffman's (1973) work on Okpe, an immediate sister language of Uvwiẹ. In Hoffman (1973), it is shown that Okpe has more underlying vowels —9 units: [i, ɪ, e, ɛ, a, ɔ, o, ʊ, u]— than is observed on the surface —7 units: [i, e, ɛ, a, ɔ, o, u]. Accordingly, it is argued in the study that although the vowels /ɪ, ʊ/ are not phonetically realized in Okpe, they are however attested phonemically. According to Hoffmann (1973: 101), "auditorily, no phonetic difference could be detected [between ʊ and o], and their phonetic identity was further supported by the native-speaker judgement that the two verbs só 'steal!' and só 'sing!' spoken in isolation are identical". Thus, a case of absolute neutralisation is noted in Okpe (see also Kenstowicz & Kisseberth 1979; Pulleyblank & Allen 2013). Hoffman's argument for a 9-vowel system is drawn from the phenomena of vowel harmony, glide formation, vowel elision and phonemic contrast.

Omamor (1973) sought to investigate the Uvwiẹ case to see if it is similar to that reported for Okpe by Hoffman (1973). Her findings can be summed up in the following statements:

1. Auditorily, there are 7 vowel qualities in Uvwiẹ, namely [i, e, ɛ, a, ɔ, o, u]. However, there is some acoustic evidence to posit that there are 9 phonemic vowel qualities, viz. /i, ɪ, e, ɛ, a, ɔ, o, ʊ, u/.

2. There are 9 underlying vowels in the language.

3. Vowels occurring in non-derived lexical formatives are constrained.

Her findings leaned on two pieces of evidence. The first evidence is the behaviour of 'e' and 'o' as non-high vowels in some instances and as high vowels in other instances. She demonstrated this dual behaviour of 'e' and 'o' drawing upon evidence from the tongue root harmony patterns exhibited by the language in the marking of past tense, verbal noun, future tense, and habitual, and argued that the language exhibits a full tongue root harmony system. Tongue root harmony is a common feature of Volta-Congo languages (Casali 1995). The vowels in these languages can be divided into two sets (see example in Figure 1), such that all the vowels occurring within the root of simple non-derived lexical formatives as well

as the affixes which can co-occur with such root morpheme "must all be drawn from the same set" (*ibid.*: 109).

Set 1: [+ATR]		Set 2: [-ATR]	
i	u	ɪ	ʊ
e	o	ɛ	ɔ
ɐ		a	

Figure 1 — A representation of the harmonising sets of vowels in tongue-root harmony languages

Thus, the occurrence of vowels in non-derived lexical items and affixes in Uvwiẹ is constrained. Accordingly, instances of auditorily perceived [e, o] vowels co-occurring with [-ATR] vowels were taken to be underlyingly /ɪ, ʊ/. However, evidence for phonemic contrast, especially between e_1 and e_2, and between o_1 and o_2 was not provided to further substantiate the phonemicity of these sounds, unlike Hoffman's (1973) work.

Omamor's (1973) second evidence was drawn from acoustic measurement of formants. According to her, the "spectrograms of the vowels e_1 and o_1 on the one hand and e_2 and o_2 on the other were run in order to examine their formant frequency patterns in an attempt to see whether or not there is any acoustic justification for distinguishing the two sets of vowels" (*ibid.*: 130). She further asserts, *ibid*, that the "results clearly show that in Uvwiẹ there is some acoustic difference between e_1 and e_2 on the one hand and o_1 and o_2 on the other. They demonstrate that in the stem position, e_1 and e_2 and o_1 and o_2 have non-overlapping formant patterns".

Elugbe (1989: 76) reiterates Omamor's position and adds that there are also 9 phonemic nasal vowels in addition to the 9 phonemic oral vowels (see also Archangeli & Pulleyblank 1994: 181; Rolle 2013a: 265). Elugbe's assertion therefore suggests that the language may be understood as contrasting 18 vowel phonemes, namely, /i, ĩ, ɪ, ĩ, e, ẽ, ɛ, ɛ̃, a, ã, ɔ, ɔ̃, o, õ, ʊ, ʊ̃ u, ũ/.

The tongue root behaviour presented by Omamor (1973) is similar to that reported in some immediate sister languages such as Urhobo (see Aziza 2008; Rolle 2013b) and Okpe (see Hoffman 1973; Pulleyblank 1986). However, the Urhobo language is reported as having 7 oral vowels (and 7 nasal vowels) in its vowel system, while the Okpe vowel inventory case may best be described as "uncertain" (Pulleyblank & Allen 2013: 6; see also Hoffman 1973; Omamor 1973; Osume 2007: 14). A preliminary observation of Uvwiẹ data also shows that vowel co-occurrence in non-

derived lexical items is not as constrained as earlier reported, suggesting a possible collapse of the complete tongue root harmony system reported by Omamor (1973 & 1988) and Elugbe (1984) over time. In a recent study by Ikoyo-Eweto & Ekiugbo (2017), it was shown that there is no phonetic distinction between 'e_1' and 'e_2' and between 'o_1' and 'o_2' at the moment. A possible implication of this is that these forms may lose their underlying contrasts in the language (Casali 1995; Hickey 2004).

3. Data analysis

In this section, synchronic data are examined. The aim is to examine the phonemic vowels in Uvwiẹ and their behaviour. The section is divided into 3 subsections. In the first, the vowels that are part of the phonemic inventory of the language and the current nature of their possible co-occurrence restriction are examined. The second and third subsections focus on vowel nasality and phonetic vowel length respectively.

3.1 Vowel inventory and tongue root harmony in Uvwiẹ

The auditory impression of data from Uvwiẹ suggests that there are 7 phonetic oral vowels and 7 phonetic nasal vowels in the language. The 7 phonetic oral vowels are [i, e, ɛ, a, ɔ, o, u]. These vowels, it is observed, do contrast with one another as shown in the (near-)minimal pairs in examples (1-21)[2].

(1) /i, e/	a. fì	'leak (v.)'	fè	'be rich'
	b. ènè	'four'	ìné	'songs'
(2) /i, ɛ/	a. ʒì	'send'	ʒɛ̀	'trample'
	b. sìmè	'argue'	sɛ̀mé	'hear'
(3) /i, a/	a. fi	'leak'	fa	'flog'
	b. sì	'pull'	sà	'shoot (v.)'
(4) /e, ɛ/	a. ù̩ɾíé	'river'	ù̩ɾìɛ̀	'queue'
	b. ɟè	'stumble'	ɟɛ̀	'run'
(5) /e, a/	a. èfè	'riches'	àfé	'menstruation'
	b. g͡bè	'polish'	g͡bà	'tie'
(6) /ɛ, a/	a. túɛ́ró	'begin'	túáró	'blind'
	b. dɛ̀	'buy'	dà	'drink (v.)'

2. The data were not controlled for tone. However, no tone-vowel height interaction has been noted.

(7) /u, o/	a. ùdí	‘drink (n.)’	òdí	‘grass’
	b. ùdó	‘mortal’	òdò	‘fever’
(8) /u, ɔ/	a. kù	‘pour’	kɔ	‘sow’
	b. bùbù	‘many’	bɔ	‘lift (v.)’
(9) /u, a/	a. ètù	‘cap’	ètà	‘words’
	b. ùkó	‘cup’	àkò	‘tooth’
(10) /ɔ, o/	a. ɔ̀ká	‘corn’	òká	‘mark (n)’
	b. òkɔ́	‘canoe’	ùkó	‘cup’
(11) /a, o/	a. sà	‘shoot (v)’	aso	‘night’
	b. àɾé	‘woman’	òɾè	‘road’
(12) /a, ɔ/	a. là	‘jump (v.)’	lɔ̀	‘grind’
	b. àgá	‘chair’	ɔ̀gá	‘sickness’
(13) /i, u/	a. ik͡pé	‘ten’	ùk͡pè	‘bed’
	b. ùdí	‘drink (n.)’	ùdú	‘chest’
(14) /i, o/	a. ùdí	‘drink (n.)’	ùdó	‘mortal’
	b. ìdʒú	‘weeds’	òdʒù	‘wind’
(15) /i, ɔ/	a. ìbí	‘charcoal’	bɔ̀	‘lift’
	b. ùɻ̩ì	‘law’	òɻ̩ɔ̀	‘down’
(16) /e, u/	a. èté	‘snake’	ètù	‘cap’
	b. ɟè	‘stumble’	ɟù	‘blow (v.)’
(17) /e, o/	a. ùké	‘back (n.)’	ùkó	‘cup’
	b. èg͡bə̃̀	‘cheek’	òg͡bá	‘yard’
(18) /e, ɔ/	a. èɲè	‘breast’	ɔ̀ɲè	‘oppression’
	b. ɻ̩è	‘arrive’	ɻ̩ɔ̀	‘rain (v.)’
(19) /ɛ, u/	a. ɛ̀dɛ̀	‘day’	ídú	‘liver’
	b. ɾɛ̀	‘sell’	ɾù	‘act (v.)’
(20) /ɛ, o/	a. kɛ̀	‘give’	kò	‘sew’
	b. àvɛ́	‘and’	ɔ̀vò	‘one’

(21) /ɛ, ɔ/	a. kɛ̀	'give'	kɔ̀	'plant (v.)'
	b. ɔ̀lɛ́	'yam'	lɔ́	'grind'

As shown in the examples (1-21) above, there is a clear contrast between the 7 auditorily perceived vowels noted earlier. However, the vowels 'e' and 'o' have a dual behaviour. In Uvwiẹ, and in most languages which forbid hiatus, when the morphology or syntax of the language give rise to hiatus context, one of the two vowels occurring on either side of the boundary may be realized as a glide or gets deleted. The former (glide formation) is an exclusive preserve of high vowels in V_1 position, and the latter (vowel elision) for non-high vowels (Pulleyblank 1988; Casali 1996 & 1997; Orie & Pulleyblank 2002). This is clearly illustrated in example (22) below, in which the high vowels /i, u/ occurring in V_1 position are realised as their corresponding glide in a VV sequence, while in example (23), the non-high vowels /e, o, ɛ, ɔ, a/ are shown to undergo vowel elision in the same position.

(22)	a.	ùbì	#	úβ̩ó	[ùbjŭːβ̩ó]
		'seed'		'throat'	'Adam's apple'
	b.	ùdí	#	ɔ̀dʒádʒá	[ùdjôːdʒádʒá]
		'drink (n.)'		'peppery'	'alcohol'
	c.	tù	#	áró	[twăːró]
		'blind'		'eye'	'be blind'
	d.	ùbí	#	údú	[ùbjúdú]
		'seed'		'chest'	'heart'

(23)	a.	sìmè	#	èré	[sìmèré]
		‘argue’		‘thing’	‘argument’
	b.	sɔ̃	#	èmé	[sèmé]
		‘call’		‘word’	‘hear’
	c.	gwógwó	#	èmé	[gwógwêmé]
		‘announce’		‘word’	‘announcement’
	d.	lɔ́	#	íɻ́íbó	[líɻ́íbó]
		‘grind’		‘pepper’	‘to grind pepper’
	e.	dá	#	ùdí	[dû:dí]
		‘drink (v.)’		‘drink (n.)’	‘get drunk’
	f.	/ɟɛ/	+	/òmɛ́/	[ɟèmé]
		‘drive (v.)’		O1SG	‘drove me’
	g.	/èk͡pè/	+	/ɔ̀mè/	[èk͡pèmè]
		‘head’		POSS	‘my head’
	h.	/ɔ̀mɔ/	+	/òtété/	[ɔ̀mɔ̀tété]
		‘child’		diminutive	‘little child’

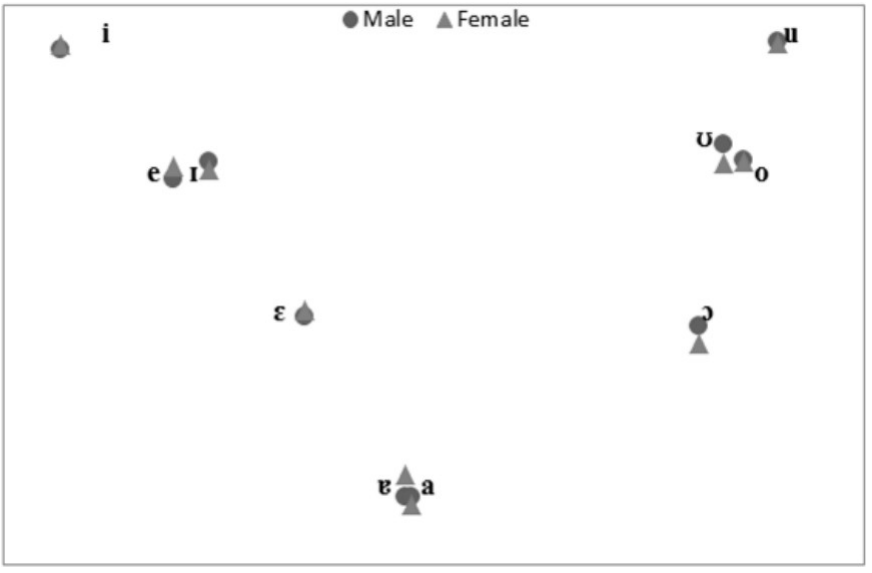

Figure 2 — Vowel plot with ellipsis showing the distribution of the normalized formant values for two Uvwiẹ (one male and one female) speakers (Ikoyo-Eweto & Ekiugbo 2017: 5).

Evident from (23a-e) above, the general case in hiatus resolution in Uvwiẹ is for V_2 to be retained while V_1 is deleted, where V_1 is a non-high vowel. Exceptions include cases where V_1 is a high vowel (22) and constructions involving verb + O1SG (23f), noun + possessive pronoun (23g), nouns + diminutive (23h).

Where V_1 is a high vowel, as shown above, it survives the elision process, in which case, it is realised as a non-syllabic glide. This suggests that only high vowels violate the obligatorily elision rule in VV sequence. However, there are some instances of auditorily perceived [e, o] which are also realized as glide as shown in (24).

(24)	a.	rè	#	àsè	[rjàsé]
		‘have’		‘innocence’	‘acquittal’
	b.	rè	#	ɛ̀ré	[rjɛ̀ré]
		‘eat’		‘food’	‘eating’
	c.	ɛ̀tó	#	ɔ̀xɔ́	[ɛ̀twɔ̂ːxɔ́]
		‘hair’		‘hen’	‘feather’

In (23a-c), *e* and *o* are elided when they occur as V_1 in a VV sequence. When *e* and *o* display such behaviour, they are referred to as e_1 and o_1. In example (24), *e* and *o* undergo glide formation, a phenomenon which is typical of high vowels. In such case, *e* and *o* are referred to as e_2 and o_2 respectively. Two possible explanations for this behaviour are proposed, namely:

(a) e_2 and o_2 are possibly underlying /ɪ, ʊ/.

(b) there is possibly a phonemic merger between /ɪ, ʊ/ and /e, o/ respectively.

In an earlier study, Omamor (1973 & 1988) assumed the first possibility (a), with evidence drawn from two phenomena —the strict co-occurrence restriction on lexical items and the acoustic distinction between /ɪ/ and /e/ and between /ʊ/ and /o/. However, the second possibility (b) is assumed in this study for three reasons. Firstly, the acoustic evidence by Ikoyo-Eweto & Ekiugbo (2017) suggests that there is a collapse of the acoustic distinction between /ɪ/ and /e/ and between /ʊ/ and /o/ in Uvwiẹ. According to them, although Omamor (1973) argues that there is a clear distinction between the frequency values of the first formants of /e, o/ and /ɪ, ʊ/ respectively, this distinction is no longer attested in the language. The evidence provided in their study clearly shows that there are acoustic overlaps between these vowels (see opposite Figure 2).

Following Stewart (1971: 200), it is assumed that the pattern of distributions of vowels especially e/ɪ and o/ʊ in the vowel plot with ellipsis above could result in loss of e/o or ɪ/ʊ as a result of crowding in the acoustic vowel space, such that these vowels become insufficiently distinct from each other. This is because languages tend to favour vowel systems in which there is a greater perceptual distance among the vowels in the system (Lindblom 1986). Thus, in Casali (1995: 119), it is posited that the loss of /ɪ, ʊ/ in Volta-Congo languages (including Uvwiẹ) results from the auditory similarity of these vowels to neighbouring vowels in the system.

Secondly, there is no evidence of underlying phonemic contrast between 'e_1'/'e_2' and between 'o_1'/'o_2'. A major principle underlying phonemic analysis is that some sounds cause changes in meaning when substituted for each other (Udoh 2003: 18). According to Sommerstein (1977: 16), "the basic notion of phonemic analysis is that of contrast, and it is on the basis of contrast that phonemic systems are set up for languages." This suggests that phonemicity is determined by contrast. Thus to be able to determine phonemes in any language, the first thing to do is to substitute one sound for another. The substituted sounds are distinctive only if the substitution results in a change of meaning. In the data bank employed for this study, (near-)minimal or suspicious pairs are not found for 'e_1'/'o_1' and 'e_2'/'o_2' respectively.

Also, there is an evidence suggesting collapse in the strict co-occurrence restriction on vowels within non-derived lexical formatives in the language. In the first instance, the choice of vowels in affixes and the third person suggests that there is some evidence to posit that there is co-occurrence restriction on the vowels of the language. Evidence for this is clearly shown in examples 25 and 26 below.

(25)	a. ò gúnù	'3SG died'
	b. ò k͡pérénù	'3SG swept'
	c. ɔ̀ rɔ̀mɔ̀nù	'3SG agreed'
(26)	a. ɔ̀ mɔ̂: dɛ́	'3SG will buy'
	b. màmá mɔ̂: dɛ́	'2PL will buy'
	c. ò mô: fé	'3SG will be rich'

The examples in 25 and 26 show respectively that the phonetic shape of the third person singular {O} and that of the future tense marker {mO} is determined by the vowel of the following lexical item. Clearly, it is the case that the language restricts the set of vowels that can co-occur. This vocalic co-occurrence restriction in the language was earlier noted in Omamor (1973 & 1988) and Elugbe (1984). In their analyses, they demonstrated that

there is full vowel harmony in the language drawing upon evidence from gerunds, tense marking, verbal nouns and subject-verb concord. Omamor (1973) also shows the ambivalent behaviour of /a/ within the harmony system. According to her, "the vowel /a/ is said to be common to the two sets of harmonising vowels" (Omamor 1988: 52).

It is assumed in this study that the ambivalent behaviour of /a/ noted in Omamor (1988) comes as a result of the lack of symmetry in the vowel inventory of the Uvwiẹ language. The implication of this is that the vowel /a/ does not have a harmonic [+ATR] counterpart. Hence, only /a/ violates the neat harmony system in the language, especially where /ɐ/, which is the [+ATR] counterpart of /a/, has merged with /a/ (Williamson 1983). There are a number of studies on vowel harmony. These studies have helped to shape our understanding of the range of patterns in harmony. One such pattern observable in most Edoid language is the relationship between vowel inventory reduction and collapsing vowel harmony. It could be observed that inventory reduction resulting in increasing the level of asymmetry between set 1 and set 2 vowels in tongue root harmony can lead to a collapse of the harmony system of a language. This is evident in the diachronic pattern of vowel reduction in Edoid languages as shown in the table below.

Table 1 — Relationship between vowel inventory asymmetry and the collapse of tongue root harmony in Edoid languages

a.	Complete harmony system, with no ambivalent vowel. *E.g.* Degema (Fulop *et al.* 1998)	i/ɪ	u/ʊ
		e/ɛ	o/ɔ
		ɐ/a	
b.	Complete harmony system with only /a/ exhibiting ambivalent behaviour. *E.g.* Okpe (Hoffman 1973)	i, ĩ/ɪ, ĭ	u, ũ/ʊ, ŭ
		e, ẽ/ɛ, ɛ̃	o, õ/ɔ, ɔ̃
		_ _/a, ã	
c.	Partial tongue root harmony system. *E.g.* Urhobo (Aziza 2008)	i, ĩ/_ _	u, ũ/_ _
		e, ẽ/ɛ, ɛ̃	o, õ/ɔ, ɔ̃
		_ _/a, ã	
d.	Total loss of tongue root harmony system. *E.g.* Edo, Esan (Omozuwa 2010; Osiruemu 2011).	i, ĩ/_ _	u, ũ/_ _
		e, _/ɛ, ɛ̃	o, _/ɔ, ɔ̃
		_ _/a, ã	

In the table above, four harmonizing patterns are noted, particularly in Edoid languages. Firstly, there is the complete harmony system which is attested when there is symmetry between set-1 and set-2 vowels, such that each vowel in a given set has a corresponding counterpart in the other class. Secondly, there is the partly complete harmony system in which /a/ can co-occur with both sets. This pattern, though universal, has some correlation with vowel systems in which only /a, (ã)/ lack counterparts in the other set. The third and fourth cases, the partial harmony system and the collapsed harmony system have higher level of asymmetry between the two classes of vowels. Implicitly, reduced systems such as the third (c) and fourth (d) cases noted in this study (see Table 1 above) will have freer occurrence of vowels from both classes as is the case with Uvwiẹ currently.

(27)
a. [ɛ̀mɛ́] 'word'
b. [ɛ̀ɾɛ̀] 'food'
c. [twaro] 'blind'
d. [àdéɾá] 'junction'
e. [èk͡pá] 'load (n.)'
f. [àsò] 'night'
g. [èɾàɣá] 'snail'
h. [tʰɔ́nɪ́] 'choose'
i. [ùkʰɔ́ɔ̃́] 'egg'
j. [ìsɔ̃́] 'excreta'

In (27) above, it is shown that vowels from set 1 and set 2 can co-occur in Uvwiẹ non-derived lexical formatives. Explicit from this free-occurrence noted in the example above, it could be argued that the type of vowel harmony system attested in Uvwiẹ is a partial harmony system (c), given that only affixes and the third person show alternations in conformity with the tongue's root specification (25, 26).

The position assumed in this study therefore is that the vowels */ɪ, ʊ/ have merged with /e, o/. The dual behaviour of /e, o/ noted in this study only shows this (cf. Casali 1995). Basically, studies on diachronic patterns of vowel inventory reduction seek to show which vowel shifts, where they go and in some cases, the motivation for the shifts (Lindau 1975; Archangeli & Pulleyblank 1994; Casali 1995; Hickey 2004). In the Edoid cases reported in Elugbe (1989) and Archangeli & Pulleyblank (1994: 180), the available studies show that only 3 of the 10 Proto-Edoid vowels are subject to shift. These vowels are the [-ATR] high vowels /ɪ, ʊ/ and the [+ATR] low vowel /ɐ/. They further note that the directions of the shifts are restricted depending on the segment undergoing the change [and the language] (Figure 3).

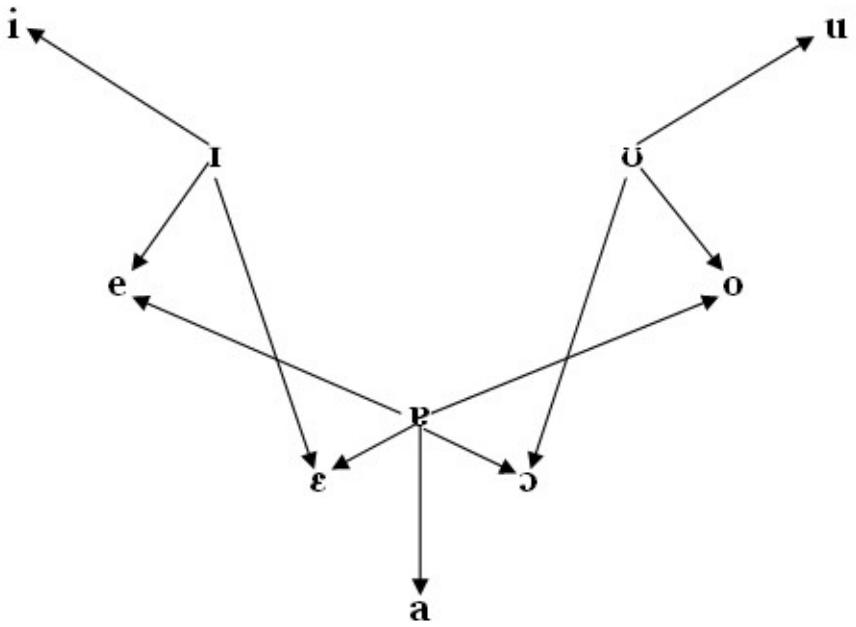

Figure 3 — Vowel reduction routes in Edoid
(adapted from Archangeli & Pulleyblank 1994: 180)

The [-ATR] high front vowel /ɪ/ may merge with /i/, /e/ or /ɛ/; the [-ATR] high back vowel / ʊ/may merge with /u/, /o/ or /ɔ/; while the [+ATR] low vowel /ɐ/ may merge with /e/, /ɛ/, /a/, /ɔ/ or /o/ depending on the language. In an earlier study, Lindau (1975) drew insight from acoustic perturbation theory to show how an earlier 9-vowel system is reduced to a 7-vowel system. She identified two common patterns of vowel merging, namely /ɪ/ merging with /e/ for acoustic reasons, and /ʊ/ merging with /o/ for reasons of structural pressure, which is the case currently reported for Uvwiẹ in this study.

3.2 Vowel nasality in Uvwiẹ

Both nasalized and nasal vowels are attested in Uvwiẹ. In the first, the vowels acquire the nasal feature from the preceding nasal consonant. Thus, when preceded by a nasal consonant, vowels in Uvwiẹ are realized with nasal colouration. This is exemplified in (28). In the second category, there is no nasal consonant in the environment of the vowels. Furthermore, these vowels contrast with their oral counterparts as shown in (29).

(28) a. [ɛ̰́ɲɛ́] ‘breast’
b. [ɛ̀mɛ̃́] ‘word’
c. [ɲà̰] ‘cook (v.)’
d. [fɔ̀tʰòmɔ̃́] ‘(be) silent’
e. [ɾɔ̀mɔ̰̀] ‘agree’

(29)

a. /i, ĩ/	ìβ̩ò̩rì	‘lake’	ìβ̩ò̩ɾ̃ì	‘pus’
b. /e, ẽ/	sè	‘call (v.)’	sɛ̰̀	‘deny’
c. /ɛ,ɛ̃/	kɛ̀	‘give’	úkɛ̃́	‘egg’
d. /a, ã/	sà	‘shoot (v.)’	sã́	‘different’
e. /ɔ, ɔ̃/	ɛ̀wɔ̀	town	ìwɔ̃́	‘housefly’
f. /o, õ/	òdò	‘fever’	òdõ̰̀	‘noise’
g. /u, ũ/	ékp͡ù	‘bag’	ɛ̀kṹ	‘waist’

Contrastive nasal vowels have been reported in many West African languages (Rolle 2013a). In some of these studies, vocalic nasality is often treated as an inherent property of the segment. There is however some evidence in Uvwiẹ to posit that contrastive vocalic nasality is not inherent. This is because when a nasal vowel is deleted, the nasal feature is not deleted with it. Instead, it appears on the neighbouring vowel, a phenomenon which is typical of suprasegmental features. This is exemplified below.

(30)

a.	ukɛ̃	#	ɔxɔ/	[ukʰɔ̃xɔ]
	‘egg’		‘hen’	‘egg (of hen)’
b.	gbɛ̃	#	odĩnɛ̃	[gbõdĩnɛ̃]
	‘clear’		‘grass + the’	‘clear the grass’
c.	tɔ̰̀	#	ùkp͡òtɔ́/	[tṹkp͡òtɔ́]
	‘dig’		‘hole’	‘bore a hole’

As shown in example (30) above, nasality is not a property of the vowel. It is autonomous with regard to the segment, *i.e.* it is a suprasegmental feature in Uvwiẹ. One of the assumptions underlying autonomous representations of some phonological features is that given their autonomy, when a segment or the inherent feature of a segment is deleted or modified, the autonomous feature may not be affected. Contrastive vowel nasality in Uvwiẹ is therefore autonomous with regard to the segment. Another evidence for this is the sort of restriction on nasal vowels in Uvwiẹ. Nasal vowels are restricted in their distribution. For instance, while oral vowels may occur in any position in a word, nasal vowels only occur in word medial or word final position, but not in initial onsetless position as shown below.

Table 2 — Distribution of oral and nasal vowels in Uvwiẹ

	Oral vowel	Nasal vowel
i	/ìbí/ ‘charcoal’	/òg͡bḛ́ḭ̀/ ‘tortoise’
	/g͡bìg͡bé/ ‘dance’	/ìsòrḭ̀/ ‘five’
e	/ètú/ ‘cap’	/sḛ̀/ ‘deny’
	/ùk͡pèɾè/ ‘broom’	/ɔjḛ̀dá̰/ ‘witch’
ɛ	/kɛ́kɛ́tɛ́/ ‘donkey’	/ɔ́βɻìíỹɛ̃́mé/ ‘enemy’
	/ɛɾè/ ‘food’	/ɛwɛ̃̀/ ‘zeal’
a	/àgá/ ‘chair’	/sá̰/ ‘different’
	/làlàʒà/ ‘pineapple’	/ɔjḛ̀dá̰/ ‘witch’
ɔ	/ɔxɔ́/ ‘hen’	/ìwɔ̃́/ ‘housefly’
	/ʃɔ̀rɔ̀/ ‘crawl’	/ùkɔ̃̀xɔ̃́/ ‘egg’
o	/òlòlò/ ‘bottle’	/òdɔ̃̀/ ‘noise’
u	/ùg͡bó/ ‘mountain’	/èwṹ/ ‘cloth’
	/pùpùɾù/ ‘be slow’	/lák͡pèṹ/ ‘jump up (v.)’

3.3 Vowel length in Uvwiẹ

It is reported in Ikoyo-Eweto & Ekiugbo (2017) that the vowels in Uvwiẹ can have three degrees of phonetic length. These are long, short and extra-short. It is assumed in this study that the long and extra-short lengths are derived from the short length depending on the context. Thus although vowel length variation in Uvwiẹ is not phonemic in the language, it however plays a phonetic role, given that length variation is context-induced. For instance, extra-short vowels occur only in initial onsetless syllable, and bear a low tone. Thus, there is a significant reduction in vowel duration in this context as shown in (31) and Figure 4.

(31) a. [ɛ̀̆ɣẁoɻ̆è] ‘sponge’
b. [ɛ̀̆ɲḛ́] ‘breast’
c. [ɛ̀̆dɛ́] ‘day’
d. [ɔ̀̆ɾàmà̰kʰó] ‘dog’
e. [ù̆k͡pèɹɛ́] ‘broom’

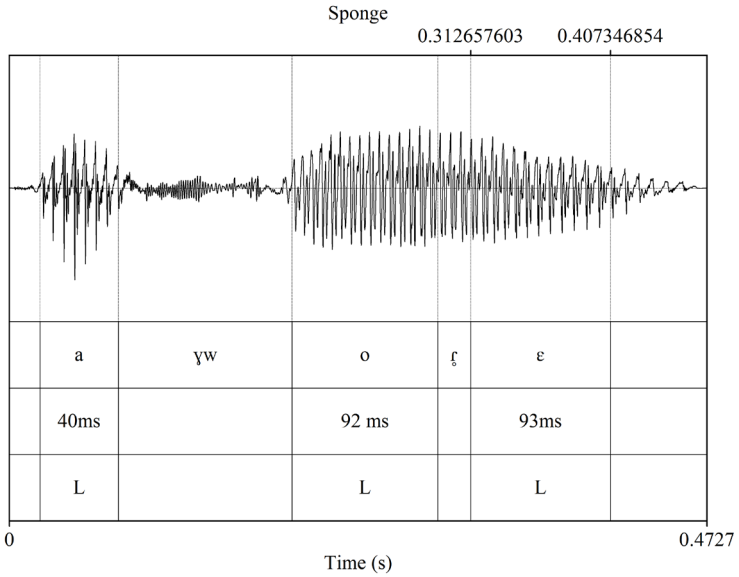

Figure 4 — A graphic display of the speech waveform of [ǎɣwòo̩ɾ̥ɛ̀] 'sponge' showing the duration of the vowels vis-à-vis the tone borne

In Figure 4, it can be observed that the duration of the low-toned vowel of the initial onsetless syllable is significantly reduced when compared with the mid-low vowels /ɛ/ in word final position and /o/ in word medial position.

In instances of perceivable long vowels, the inducing context is the gliding tones. In syllables which bear any of the derived contour tones —rising or falling, the vowels of such syllables are relatively long. Thus in the graphic displayed in Figure 5 below, it can be observed that [â] is relatively longer than the other vowels in the speech stream, which bear only register tones. Other examples are shown in (32).

(32) a. [fjî:dɔnɔ̀] 'spray money[3]'
b. [ùkwĕ:g͡bé] 'story'
c. [k͡pɛ̆̌:] 'peel'
d. [ùdû:mɛ́] 'my chest'
e. [èsɔ̂:mɛ́] 'my ears'

3. A gifting act in which the individual notes of currency at one's disposal are dispensed on performers or celebrants in an event.

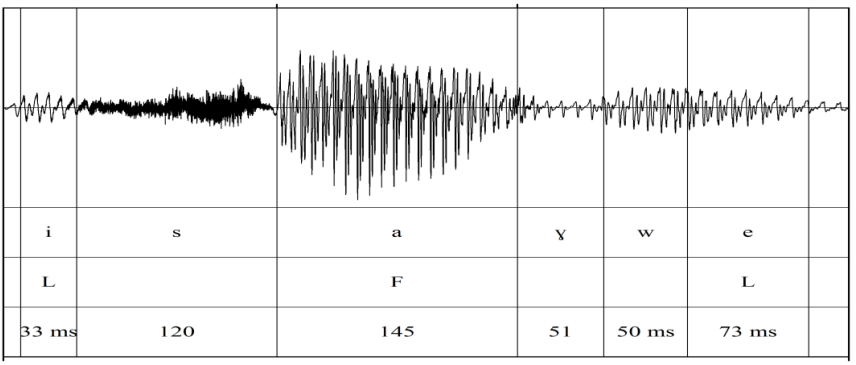

Figure 5 — A graphic display of the speech waveform of [isâɣwè] 'groundnut' showing the duration of the vowels vis-à-vis the tone borne

4. Conclusion

This study was aimed at presenting a descriptive phonological analysis of the vowel system of Uvwiẹ. It is proposed that Uvwiẹ language has 7 vowels rather than 9, *contra* Omamor (1973 & 1988) and Elugbe (1989). The two vowels at issue are those transcribed as either /e_2, o_2/ or /ɪ, ʊ/. The position assumed in this study is that the vowels in question which were identified in previous studies as being part of the inventory of the language have merged with the vowels /e, o/ respectively. Evidence for this was drawn from the result of the formant pattern of the vowel as reported in Ikoyo-Eweto & Ekiugbo (2017) as well as (near-)minimal pairs and the pattern of vowel harmony system attested in the language.

The study further noted the behaviours of the vowels within the phonological grammar of the language, namely vowel elision, glide formation, nasal assimilation, nasal stability, vowel lengthening and vowel reduction. It is argued that the phonological grammar of the language forbids hiatus context. Thus, where the morphology of the language gives rise to one, vowel elision or glide formation apply to resolve such. It is also noted, inter alia, that oral vowels contrast with their nasal counterparts. The behaviour of contrastive nasal vowels suggests that the nasal feature is not an inherent property of the vowel; rather it is autonomous with regard to the segment.

Abbreviations

1SG	first-person singular
n.	noun
O	object
POSS	possessive
v.	verb

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Comptes rendus de lecture

Book reviews

Viktoria Kempf, 2017, *Verbal Serialisation in Bezen (Southern Jukunoid)*, Cologne, Rüdiger Köppe Verlag, 137 p.

By James Essegbey
University of Florida

Verbal serialisation in Bezen (Southern Jukunoid) by Viktoria Kempf is a 137-page book consisting of five chapters. There is also a table of contents and a preface, at the beginning, and a one-page summary both in English and German, at the end of the book. Chapter 1 begins with an introduction which covers typological information and classification of Bezen. The language has only 450 speakers, and data for the book were collected within the scope of a DoBeS project entitled "Documentation of Bezen" that was funded by the Volkswagen Foundation. Kempf reports that the texts used for the book are monologues and ceremonial texts, among others, all of which contain serial verbal constructions (SVCs). She does not specify whether she also elicited SVCs. The chapter also gives an overview of SVCs in Southern Jukunoid, to which Bezen belongs, Central Jukunoid, and discussions of SVCs in other parts of Africa and beyond. Kempf also lays out her theoretical assumptions, which is Dixon's basic linguistic theory (BLT). She characterizes it as "a useful tool for students and junior researchers, capturing the status quo of descriptive linguistics, designed to enable them to conduct descriptive and typological studies". I wonder why she thinks only "junior" researchers use BLT.

Chapter 2 covers the verb and verb phrase in Bezen, beginning with the phonology and morphology of verbs. Topics discussed include syllable structure, vowel harmony, and tone, on the one hand, and some derivational processes such as repetition, argument-structure changing tonal derivation, and verb-to-adverb derivation, on the other. Turning to the verb phrase, Kempf points out that tense is a marginal category in Bezen. She therefore discusses aspecto-modal categories, of which the aorist, perfective, and imperfective belong to the realis, and the obligative/imperative, adhortative, and future belong to the irrealis. Grammaticalisation accounts are proposed for the morphemes and, in some cases, alternative explanations are also adduced. For instance, following Heine and Reh's (1984) proposal, Kempf suggests that the perfective enclitic *=mɨ́* is grammaticalised from the verb meaning "to finish". However, she suggests that an argumentation put forward by Kießling (which he communicated to her personally) that advocates that both the perfective affix and the verb derive from the same root "also seems plausible" (p. 29). Deictic prefixes and three types of negation are also discussed in this chapter.

Chapter 3 covers clause types. Here, Kempf discusses simple sentences, which include intransitive and various types of transitive clauses, and subordination, which includes complement and relative clauses, and peripheral

clauses like temporal, conditional, and purpose clauses. Kempf also discusses clause coordination, and shows that Bezen has asyndetic juxtaposition as well as coordinating conjunctions. Kempf classifies verbs using categories that are not always consistent. For instance, she identifies a class of "inchoative-stative verbs", which include verbs like *ámān* "be sour" and *ōwūm* "be dry". I support the characterisation of these lexical items as verbs, although there is no consensus on the analysis of this class of verbs in many African languages; some have chosen to analyse them as adjectives, presumably because they are translated with adjectives in standard average European (SAE) languages like English. The problem, however, as I have already stated, is that Kempf is not always consistent with the characterisation. Consider the example below which she gives as "inchoative-stative[1] intransitive verb *āŋɣāg* "be good" (p. 52).

(1) *bēsɨm = nɨ́* *āŋɣāg*
Cornbeer = DEF be.good
"The cornbeer is good." (ex. 71)

On the following page, just a few lines after the example, Kempf writes about "a stative intransitive verb such as *āŋɣāg* 'be good'" (p. 53). It is possible that Kempf intends to use the terms (*i.e.* "inchoative-stative intransitive verb" and "stative intransitive verb") interchangeably although she does not state so explicitly. At any rate, such an approach could be problematic for the reason I discuss in the next paragraph.

Kempf distinguishes the "inchoative-statives" (see above) from "process verbs that encode patient in subject position" (p. 52). Examples of these latter verbs are *āgàn* "rot" and *āmɨ̀* "swell". Looking at the verbs, one is tempted to conclude that the distinction between process verbs and inchoative-stative verbs may not be so much the inherent aspect of these verbs as their translation. In other words, the process verbs are translated directly with verbs in SAE languages and, unlike the inchoative-statives, do not require to be translated with "be" + an adjective (*i.e.* "rot" *versus* "be good"). One thing that the reader would like to know is whether both classes of verbs occur in the progressive and, if so, how these progressive forms translate into English. If they do, and if they all express |entry into a state|, then an alternative analysis would be to characterise them all as inchoatives. Stativity would then depend on the aspectual morpheme with which the verb occurs.

Kempf also decides to divide the verbs based on the "semantic roles of the NP in subject function" (p. 52). She writes that "one subgroup requires

1. In this quote and the following, underlining is mine.

agents and another requires patients in subject position." Using semantic roles as a basis to distinguish verbs is problematic. This is because verbs like *ēhìŋ* "go" and *ājnìn* "leave" that are said to be "verbs [that encode] agent in subject position" (p. 52) can also take inanimate entities as subject. The agent role is defined as involving "conscious acts with **volition**[2] […]". Inanimate entities do not engage in volitional acts. Kempf then writes: "Depending on whether one is willing to ascribe volition […] to animals, *ōgbɔ́ŋ* "bark" and *ōfɔ̀k* "scuff" could be included [in the class of intransitive verbs that take agentive subject]." (p. 52). That gives the impression that it is not the language that is leading the description but the analyst's position on these issues.

Chapter 4, with 56 pages, is the longest, and is devoted to the different kinds of SVCs in Bezen. Kempf distinguishes between symmetrical SVCs (SSVCs) and asymmetrical SVCs (ASVCs). The former have an open class of verbs while the non-initial verb in the latter is supposed to belong to a closed class. Various subtypes of ASVCs are discussed, namely cause-effect, aspect, habilitative, manner/quantity, argument introducing, comparison and motion. At the beginning of the book, Kempf states that while she consults previous researchers' definition and categorization of SVCs, "the final goal is to find criteria and properties that are specific to the Bezen language" (p. 1). I am not sure that this goal was accomplished fully. This is most clearly seen in her analysis of what she calls "switch-subject SVCs". Consider that a general property of SVCs is given thus: "while each verb might be accompanied by its own object, the subject is shared by all" (p. 75). Yet, in switch-subject (or switch-function) SVCs, "the verbs share the direct object of V1, which plays the subject role for V2." From a purely theoretical angle, I do not think a construction that has more than one subject should be considered an SVC, because SVCs are supposed to be monoclausal. Having said that, empirically, I do not agree with Kempf that the construction she calls switch-function SVC is actually what she says it is. There appears to be a confusion between semantic roles and grammatical function. The object of V1 could be the theme of V2 without necessarily being its grammatical subject. An example that is given translates as "you should call the father to come", with the two verbs *ègbén* "OBL\call" and *āwū* "come" (p. 76). Although the NP before *āwū* is a theme and can occur in an intransitive clause as the subject of the verb, there is no morphosyntactic evidence to support the claim that it is a grammatical subject in this specific construction.

While I do not agree with the distinctions that Kempf makes above because I do not think the Bezen data support them, there are other potential distinctions that Kempf does not explore. For instance, consider the SVC below:

2. Kempf takes this quote (which I have abbreviated) from Payne 2008, and points out that the bold sequence is in the original.

(2) *m-ōkún ām̄n bímí á biní = ní = mí*
1SG-pour fill water loc pot = DEF = PFV
"I have filled the pot with water." (ex. 107, p. 74)

This type of SVC is of the V V kind, and not of the V NP V one exemplified by the type that Kempf describes as switch-subject or switch-function SVC. In fact, a close look at the data shows that Bezen has V V as well as V NP V structures. Also, the V NP V sentences do not always qualify to be characterised as switch-function SVCs. For instance, Kempf has an example that translates literally as "go hold tree climb" where "tree" is shared by both "hold" and "climb" (ex. 120b, p. 81). Others have tended to analyse V V structures separately from V NP V ones (see *e.g.*, Ihionu 1992 for Igbo). It would be interesting to know if the morphosyntactic restrictions on the two constructions are the same, and what determines the realisation of an event as the one or the other.

The problems that I have pointed out notwithstanding, *Verbal serialisation in Bezen* is an important contribution to the perennial debate about SVCs. It adds data to our knowledge of the phenomenon and raises interesting questions to ponder and research further. It is also a valuable contribution to the documentation of an endangered language in a highly linguistically heterogeneous area.

Abbreviations

1SG	first-person singular	PFV	perfective
ASVC	asymmetrical serial verb construction	SAE	standard average European
BLT	basic linguistic theory	SSVC	symmetrical serial verb construction
DEF	definite	SVC	serial verb construction
LOC	locative	V	verb
NP	noun phrase		

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Konstantin POZDNIAKOV, 2018, *The Numeral System of Proto-Niger-Congo: A Step-by-Step Reconstruction,* Berlin, Language Science Press (Niger-Congo Comparative Studies 2), 418 p.

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This book, which the author humbly describes as an "experimental project", aims at providing a "quasi-reconstruction" of a core set of Proto-Niger-Congo (PNC) numerals, including the lexical items for 1 through 10, 20, 100, and 1,000. Starting from a seemingly easy question —what is the most probable PNC root for "two"?—, Pozdniakov ends up with a major contribution to comparative Niger-Congo (NC) studies, comparing data for 1,000 languages from 2,200 sources which he presents in 360 tables plus five appendices. He uses a "step-by-step reconstruction" approach, first reconstructing numerals within groups and branches such as Lower Delta-Cross or Bantu, using data from the literature on single languages as well as the RefLex Database and Chan's (1998-2019) online database on Numeral Systems of the World's Languages.[1] These reconstructed forms then serve as a basis for reconstructing numeral forms for proto-language families (*e.g.* Benue-Congo, Kwa, or Mande), which are then ultimately used in deriving the PNC numeral forms.

Pozdniakov shows that the most stable numerals across NC are 3 and 4 which synchronically have reflexes in almost all NC families. In contrast, 2 is surprisingly varied across families, a fact that is relevant for those using the Swadesh list, which only contains the numeral 2, for their reconstructions. Large numerals such as 100 and 1,000, however, do not seem to be reconstructable since they were likely absent in PNC and developed only later due to contact with Arabic and European languages. The author also concludes that there are more conservative NC branches such as Gur, Adamawa, and Kwa that have retained more PNC numeral reflexes, while West-African branches and Kordofanian languages have replaced many numeral terms.

Summary

The book is divided into six chapters (totaling 314 pages) and five appendices (62 pages). Chapter 1 provides a very brief introduction, summarizing the state of the art in the reconstruction of NC families. Pozdniakov points out that comparative NC studies is a young discipline with specialists for single branches and families, but not for NC overall. He sees the reason for this in the fact that, for a long time, there were not enough

1. ULR: https//mpi-lingweb.shh.mpg.de/numeral (last access: 27 November 2019).

data available, while, since the 1990s, an exponential increase in language data has made it difficult to absorb all relevant literature. Only Bantoid and Benue-Congo languages have been fairly well reconstructed, leaving probably about 10 other proto-languages that still await reconstruction. The author also touches upon issues of reconstruction, explaining that the reconstruction of numerals is in fact a "pseudo-" or "quasi-reconstruction" (p. 8) since it cannot take into account regular sound correspondences. He lays out in more detail the sources used for his research, both databases and literature on single languages before outlining the structure of the book.

Chapter 2 addresses potential interference of noun class morphology and phonology in the reconstruction of NC numerals. First, Pozdniakov elaborates on default class marking in enumeratives (*i.e.* counting forms rather than cardinal numerals that typically agree with the head noun when counting concrete items). He shows how numerals can be grouped differently across languages based on which numerals in the system receive the same class marking in enumeratives. For instance, the largest group in Benue-Congo is 1, 2-5, 6, 7-8, 9, 10. He also describes noun class phenomena in reduplicated numeral forms, especially 8, which show different types of morphosyntactic behavior: (i) the original noun class affix is retained in both constituents; (ii) a noun class affix is only found in the first constituent, but omitted in second; and (iii) the noun class affix of the first constituent differs from the source-form. Finally, the author discusses cases where noun classes and pluralization serve as a means to form (higher) numerals such as in Efik *í-bá* '2' to *à-bà* '40'. All findings are nicely illustrated with ample examples from different language families.

Chapter 3 deals with issues in detecting alignments by analogy: NC numerals are often formally aligned through processes of analogy, resulting in similar forms containing common phonetic elements. These are, however, not easily distinguishable from phonetic similarities that arise from morphological changes, *e.g.* frozen suffixes that are merged with the stem (as in Wolof). Pozdniakov clearly exemplifies different cases of phonetic similarities in Adamawa and the difficulty in deciding from where they arise etymologically and/or morphologically. He states that systematic alignment by analogy is found in Adamawa, Atlantic, Dogon, Gur, Kordofanian, Kwa and Ubangi. In Benue-Congo, Ijo, Kru, Mande and Mel, though, only single languages show cases of analogical groupings. Then he describes which (sequences of) numerals are phonetically aligned, finding that cases of alignment across several branches of NC include a final velar *-k* in different groupings of numerals involving 2-5 (Adamawa, Atlantic, Gur and Kordofanian) and final non-dental consonants in 4 be-

coming dental as an irregular change (Adamawa, Atlantic, Benue-Congo, Gbaya, Kordofanian).

Chapter 4 is the largest chapter of the book with 200 pages. It provides a step-by-step reconstruction of the "basic numerals" 1-10, 20, 100, and 1,000 in groups and branches of NC, sorted by twelve major families: Benue-Congo, Kwa, Ijo, Kru, Kordofanian, Adamawa, Ubangi, Dogon and Bangime, Gur, Mande, Mel, and Atlantic. Pozdniakov presents a wealth of data in tables which often transparently reflect the underlying mathematical structure of complex numerals. For instance, the expression of 9 in Bantoid stems (Table 4.11) can be underlyingly 5 + 4, 8 + 1, or 10 - 1 or a basic (monomorphemic) term.

Chapter 5 uses the reconstructed numeral forms of proto-languages established in chapter 4 to reconstruct the PNC numerals. This chapter devotes a section to each numeral from 1 through 10 and another one to large numerals including 20, 100, and 1,000. Pozdniakov's reconstructed forms are summarized in Table 5.41 (p. 293) and repeated here:

1	ku-(n)-di (> ni/-in), do, gbo/kpo	7	5 + 2
2	ba-di	8	na(i)nai (> 4 redupl.)
3	tat/tath	9	5 + 4
4	na(h)i	10	pu/fu
5	tan, nu(n)	20	> person
6	5 + 1		

Chapter 6 investigates to what degree the reconstructed PNC numerals 1 through 5, 8, and 10 are reflected in the major families. Families such as Adamawa, Gur and Kwa show 8-9 reflexes of PNC in this sample, while Kordofanian has as little as 2.

The book is supplemented by five appendices which include A. the groupings of numerals by noun class in 254 Benue-Congo languages, B. the statistical treatment of these groupings, C. a list of alignments by analogy, D. the numerals for 1 in the Cross languages, and E. the main sources for the 1,000 NC languages cited.

Evaluation

Despite the clear value of this book, there are a few major shortcomings pertaining to (i) the notion of "numeral systems", (ii) the overall reconstruction, (iii) formal and terminological issues, and (iv) the structure of the book.

(i) The very premise of choosing numerals for reconstructing PNC is problematic if one follows Pozdniakov's argumentation. According to him, "the core group of numerals must have existed in Niger-Congo" and numerals "represent a relatively compact lexical-semantic group with minimal potential for semantic shifts" (p. 6). However, the assumption that a "core" set of numerals must have existed in NC as well as the way to determine which numerals belong to this set remain unaccounted for. There is no evidence given that numerals may not just be later innovations that may have spread areally, *e.g.* after colonial contact. Also, the assumption that numerals constitute a lexical-semantic group with minimal potential for shift has been shown to be wrong (Comrie 2005; Güldemann 2018: 75).

Using numerals for reconstruction may be preferred over single lexical items due to their paradigmaticity (Güldemann 2018: 74f.) Nevertheless, the way Pozdniakov is using numerals in his step-by-step reconstruction is in fact a comparison of single lexical items rather than paradigms since he does not relate numerals within holistic systems. As such, the benefits of using paradigms in reconstruction are void and the aspiration to reconstruct numeral systems as reflected in the title and repeated elsewhere in the book is misleading. The author does not take any literature on the theory and/or typology of numeral systems into account. Especially Greenberg (1978; 2000) and Hurford (1975) would have helped him treat numerals within a system, providing basic concepts such as distinguishing "bases" and "atoms" (both monomorphemic numerals) from complex numerals. So, in the end, we do not know if PNC —or any other NC proto-language— had a decimal or vigesimal, or a (secondary) quinal (base 5) system. There is no systematic and explicit discussion about which numerals are expected to be monomorphemic, which ones are expected to be morphologically complex, and what arithmetic operations are used to form complex numerals, let alone how these underlying operations are linguistically encoded or whether NC languages follow similar ordering principles, *e.g.* if higher numeric constituents precede lower ones. While Pozdniakov sporadically presents fascinating data on complex numerals, their analysis does not exceed the level of impressionistic comments such as the fact that a "primary term for '400' […] developed in Eastern Kru [and] served as the basis for a rare pattern for 'thousand' [...] (400*2+200)" (p. 142). This pattern seems, however, more widespread in vigesimal systems, for instance also in Ikaan (though Pozdniakov does not provide the data for 1,000, see Borchardt 2011 and Chan's online database Numeral Systems of the World's Languages). At the same time, subtraction operations, which are thought to be typologically rare, seem to occur in a range of NC languages but their distribution, frequency, and role in proto-languages remain unclear.

In addition, the author uses the term "basic numerals" with a bias towards decimal systems, including the numbers 1-10, 20, 100, and 1,000, without explaining his concept of "basic". At least conceptually and morphologically, many of these numerals are complex in many NC languages, *e.g.* 6 (5 + 1), 8 (4 redupl.), 9 (10 - 1), 20 (10 x 2), or 100 (20 x 5). On the other hand, not all potentially monomorphemic numerals are included in this set, which lacks at least 400, *i.e.* the equivalent of 100 in vigesimal systems.

(ii) My main point of criticism pertaining to the present study concerns the methodology. First, though Pozdniakov is aware of the limits of his undertaking (p. 8, 313), he does not engage with the problems related to the fact of using only a small subset of thirteen lexical items without regular sound correspondences for his reconstruction. He justifies this approach by rightfully pointing out that as comparative NC studies are just emerging, most NC branches and families have not yet been reconstructed, and the numeral comparison is a mere starting point. His results, however, remain quite speculative and future work will need to show how valid they are.

Second, the author does not make clear how exactly he arrives at his reconstructed forms on the basis of a list of other forms. Even the attempt to address this issue, hidden in 4.1.2.1 on the reconstruction of numerals in Cross (Benue-Congo) languages which is supplemented with all synchronic numeral forms in single languages in Appendix D, does not shed light on the methodology used, since it only provides the data and the reconstructed form, but not the steps in-between. What are the criteria for choosing one reconstructed form over another, *e.g.* frequency, natural direction of phonological shift (which in itself would deserve an explanation), potential hierarchies amongst the branches and families? This issue is rendered more acute by the fact that, as the author emphasizes himself at several points, many single numerals and/or families are highly divergent in their forms. As such, determining reconstructed forms is not a trivial task.

Third, the units of reconstruction are not clear. Pozdniakov compares language data within assumed groups and branches of NC. The phylogenetic classification of NC is, however, by no means uncontroversial and there are many issues pertaining to the internal clustering of NC, *e.g.* lexical similarities may not be based on genealogical inheritance but on language contact (Güldemann 2018: 107ff., Williamson & Blench 2000). Therefore, it would have been desirable if the author had included a discussion of the classification he chose and what implications this might have for the reconstruction of numerals. A map with the geographic distribution of his assumed NC families and branches would have been of great help, especially for the reader who is not familiar with NC or certain geographical areas.

(iii) The book under review further displays some formal and terminological problems. One significant issue is that numeral terms are all treated the same way, without taking into account the fact that they may belong to different parts of speech. Even within single languages, numerals are known to be distributed over various morphosyntactic categories. They can be adjectives, nouns, or form a word class on their own, they can agree with a head noun or be invariable. The morphosyntactic properties of a numeral, which are not discussed at all in this book, are crucial for understanding the grouping of numerals by noun class. This is the topic of chapter 2, the findings of which, however, remain unexplained. Morphosyntactic properties may correlate with the conceptual composition of numerals. For instance, bases and/or higher numerals are often nouns (Hurford 1987, Zweig 2006), lower simple numerals are more likely to require a default agreement marker while complex numerals make agreement marking more complicated so that it might be dropped entirely. Finally, formal differences between numerals can also arise from semantic differences. It should not come as a surprise that 1 often forms a group on its own in contrast to inherently plural numerals. Also numerals that are etymologically derived from a noun such as "hand" (for 5) or "sack" (for 20) may naturally fall into a different class.

Another problem related to the investigation of "noun classes" in numerals is the lack of distinction between noun class and agreement class, again linked with the fact that numeral nouns are not clearly contrasted with other parts of speech. Under this approach, real noun classes — see Güldemann (2000) on the terminological distinction— are therefore lumped together with agreement classes. It further remains unclear which numerals in a system do not take agreement prefixes, but are invariable. For instance, Pozdniakov classifies the Gyele system as 1-4, 6 forming one group, 5, 8, and 10 having no marking, and 7 as well as 9 forming their own group. With a more fine-grained distinction, the grouping of Gyele numerals (Grimm 2015) would differ substantially from Pozdniakov's view: it would instead reveal that 1 and 6-9 are invariable enumeratives without agreement marking, 2-5 take the default agreement marker of class 8, and 10 takes a real noun class marker (since it is a noun) from class 5. Related to this issue, it would have been more informative to include agreement and noun class information in the noun class groupings of Appendix A, *e.g.*, to which particular agreement class the numerals belong.

(iv) Finally, the structure of the book as well as the argumentation within chapters is at times hard to follow. There are, for instance, inconsistencies within the organization of chapter 4 where some language families are discussed by branches and others by numerals. Crucial information is

sometimes buried in subsections whose title does not relate to the content, *e.g.* a discussion of methods of "reconstruction" is hidden in 1.2.2 "Monograph structure". Or differences in numeral bases (decimal *vs.* vigesimal systems) are mentioned in passing in 2.2 "Noun classes in derived (reduplicated) numerals" in the subsection on Atlantic languages (p. 26). Also, the reader often has to draw their own conclusions from the presented data with no explanation. An extreme case is found on p. 191-193 where single sections consist only of tables. Additional sections and adequate titles as well as more detailed explanations may have helped to streamline the structure and make it easier to follow.

Despite my criticism, I want to emphasize that this book constitutes a huge contribution to the field of NC studies in that it pulls together an impressive amount of data shown by numerous examples, case studies, and tables. Pozdniakov demonstrates the potential of huge data collections, which is very encouraging for those compiling databases and those who feel inspired to use them. All in all, the author provides a reference book that is valuable for those interested in the history of Niger-Congo or single sub-families and/or numeral expressions, since it puts together numeral data from basically all available sources. At the same time, Pozdniakov sets high standards for academic discourse in carefully and respectfully evaluating others' analyses of the reconstruction of numerals.

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Valentina Schiattarella, 2017, *Berber Texts from Siwa (Egypt) – Including a Grammatical Sketch*, Cologne, Rüdiger Köppe (Berber Studies 46), 200 p.

par Daniela Merolla
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La collecte de textes oraux, bien développée dans le champ des études berbères, se focalise habituellement sur les régions berbérophones de l'Algérie et du Maroc. Les études existantes sur le berbère de l'oasis de Siwa en Égypte —notamment Vycichl (2005)— présentent des aspects grammaticaux spécifiques ou généraux avec quelques textes dont les plus récents, recueillis parmi des hommes, apparaissent dans le volume sur le contact linguistique de Souag (2013). Cela renforce l'intérêt de l'ouvrage de Schiattarella sur le berbère de Siwa, qui vient renforcer la remarquable série des études berbères publiée chez Rüdiger Köppe, sous la direction de Harry Stroomer. Les 18 textes (contes, devinettes et descriptions ethnographiques) sont introduits par une présentation générale de 10 pages et une première étude grammaticale de 40 pages environ. Comme indiqué dans la préface de feu Lionel Galand, linguiste et berbériste décédé en octobre 2017, l'intérêt du travail de Schiattarella dépasse son évident aspect linguistique, du fait que l'auteur y publie des récits récemment recueillis dans un domaine linguistique pour lequel on ne possède qu'un nombre limité de textes de littérature orale (voir l'aperçu p. 20).

Dans la première partie, Schiattarella propose une présentation succincte de la communauté de l'oasis de Siwa, de son histoire et de son économie essentiellement agricole, indiquant que l'augmentation de la population semble provenir non seulement des naissances, mais également de la présence d'Égyptiens venant de l'extérieur de l'oasis. C'est une indication de l'intégration croissante de Siwa dans le monde national égyptien avec des conséquences pour le maintien de la langue. La majorité de la population est bilingue, voire multilingue : en fait, en plus du berbère et de l'arabe standard, le bédouin et l'arabe du Caire sont également parlés. Les pressions sociales, économiques et politiques sur la langue berbère proviennent d'un ensemble de facteurs tels que l'enseignement scolaire en arabe, l'immigration, l'émigration des jeunes hommes au Caire et à Alexandrie et enfin, le manque de politiques visant à préserver le berbère. Dans une telle situation, selon Schiattarella (p. 19), la transmission de la langue berbère est menacée dans le cas des mariages entre berbérophones et arabophones, l'arabe étant généralement préféré comme langue de la famille et seul enseigné aux enfants.

La seconde partie fournit une description synchronique claire des structures grammaticales de Siwa, fondée sur un corpus de textes recueillis par

Schiattarella lors de 4 séjours effectués à Siwa et El Gaṛa (p. 69). La description adhère à l'ordre traditionnel, allant de la phonologie à la morphologie (démonstratifs, adjectifs, morphologie nominale, morphologie verbale, adverbes), puis à la syntaxe (coordination et subordination). Ces données sont certainement intéressantes pour les linguistes, car elles permettent une comparaison avec d'autres variantes berbères. Les 5 derniers textes de la collection sont présentés sous forme de glose et de traduction interlinéaire, ce qui met en évidence la tension bien connue entre traduction littérale et traduction libre. Comme dans le reste du volume, Schiattarella a choisi de présenter les récits dans une traduction plutôt littérale, avec l'avantage indubitable de maintenir la structure syntaxique aussi loin que possible, mais avec une perte de la fluidité du discours et de sa « littérarité ».

La présentation des textes oraux est simple et concise, mais offre les données de référence essentielles sur la situation narrative et sur l'utilisation des formules d'ouverture et de clôture qui caractérisent la récitation de contes en berbère (p. 22). Le premier texte ethnographique est d'un intérêt particulier car il présente au lecteur la perception du monde de la narration orale comme appartenant au passé, selon les mots d'une jeune conteuse de 25 ans qui commence l'entretien en disant : « Parlons des vieilles femmes du passé et comment elles racontent des histoires aux jeunes enfants qui se sont assis » (traduction libre, p. 71). Cette même conteuse compare ensuite les conteuses à la télévision et à l'école, pour exprimer les fonctions de divertissement et d'éducation dans l'art du conte, ce qui manifeste également une distance culturelle par rapport au monde de l'oralité « classique ». Ensuite, les récits des conteurs et conteuses les plus expérimentés (indiqués p. 23-24) montrent une structure narrative cohérente et une progression des épisodes bien articulée. L'utilisation du dialogue est particulièrement intense en comparaison, par exemple, avec les récits berbères kabyles de l'Algérie. Nous reconnaissons également plusieurs thèmes et motifs de la narration berbère nord-africaine, tels que celui de la sœur cadette qui part à la recherche de ses 7 frères et de la ruse des protagonistes pour s'opposer aux ogres et aux ogresses.

En conclusion, le lecteur peut remercier Schiattarella pour ce volume qui illustre non seulement la grammaire de la langue de Siwa mais aussi une pratique narrative berbère toujours vivante et encore à explorer.

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Noël Bernard Biagui, 2017, *Description générale du créole afro-portugais de Ziguinchor (Sénégal)*, Paris, éd. Karthala, 394 p.

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With this volume, Noël Bernard Biagui, a native speaker of the Afro-Portuguese creole of Ziguinchor (ZC), has produced an admirable piece of scholarship, brought to a successful conclusion despite multiple challenges, among which the author's considerable financial hardships during his student years (see p. 317). Born and raised in the Casamance ZC-speaking village of Sindone (southern Senegal), and later educated in provincial Ziguinchor (where ZC is actively spoken in several neighborhoods) and then metropolitan Dakar, Biagui offers a volume that greatly advances our knowledge of a creole that until now had never been described in any depth.[1]

In his introduction, Biagui makes clear the book's main objective: "to provide a linguistic description that is as precise as possible, by concentrating on the creole's phonology, morphology and syntax" (p. 11, my translation). To that end, the author provides a detailed structural description that is as straightforward and non-theoretical as possible, thereby sidestepping well-known and much-debated hypotheses about creole formation. Biagui does, however, state that, in order to meet his main objective, he has chosen a maximally atheoretical framework whose *méthode de base* one may call "functionalist-structuralist". Given that approach, it should not surprise that Biagui's *Description générale du créole afro-portugais de Ziguinchor (Sénégal)* has the look and "feel" of a traditional descriptive grammar —one that is as rich in grammatical observations as it is in fascinating primary data.

In addition to an Introduction (p. 15-20) and a Conclusion (p. 317-394), the volume is divided into two main sections: (i) phonology (p. 23-92), and (ii) morphosyntax (p. 99-314). The first begins with a 5-page examination of intonation and stress-related matters. Here the author *inter alia* addresses the question as to whether ZC is a tonal language, similar to what Doneux & Rougé (1988) had proposed for Guinea Bissau creole. While Châtaigner (1963) and later also Doneux (1979) had characterized ZG as "tonal", Biagui argues that his data (and native intuition) do not support such claims (p. 26). Instead, he argues that vowel length rather than tone (height) is the most salient feature associated with ZC's stress system.

1. Châtaigner 1963, a mere 25-page paper, used to be the most important study dedicated solely to Casamance creole.

Section 2 follows with a discussion of various orthographic transcriptions that have been employed for the creole over the years, and how the author in the volume under review partially leans on the official orthography for Manjaaku, another Senegalese language, whose recent codification in 2005 provides a model for standardization of other local languages in Senegal. From the start, Biagui excels at providing clear data samples, often presented in easy-to-read and attractively formatted tables. In this way, readers can quickly obtain an overview of phonemes and allophones, and link them to their corresponding graphemes. Although the book is, in essence, a synchronic account of ZC, Biagui's occasional comments about diachronic matters help readers grasp interesting and relevant points about the origins and nature of the creole. For instance, in his presentation of Casamance creole vowels, the author explains that the system consists of 8 phonemes, but that 3 of them (/ɛ/, /ɐ/, /ɔ/) have limited use in that they occur only in words of African (rather than Portuguese) origin.

Section 4 offers a wide range of similar *tableaux*, detailing the 29 phonemes that belong to the articulatory system. Here even a precursory look at the inventory reveals that sub-Saharan stratal influence makes itself felt. One notes, for instance, labial and velar prenasal phonemes such as "mp, mb, ŋk, ŋg" —non-existent in the creole's lexifier (Portuguese) but common in sub-Saharan languages. Contact-induced transfer of such prenasals is, of course, not unique to this creole, as it has also been observed across the Atlantic, where Palenquero, for instance, features similar, albeit Kikongo-derived sounds (in Palenquero, prenasals are, however, allophonic rather than phonemic, since words like *ngato* / *gato* < Span. *gato* 'cat' are in free variation, as shown in Schwegler 1998, p. 264; 2013a, p. 184; 2013b).

A significant merit of Biagui's work is that, in addition to providing qualitative descriptions of key features, it also offers relevant quantitative information. Nowhere is this better illustrated than in Section 6 (p. 99-139). There readers find figures such as Table 57, which lists the relative frequency of suffixes like *-ada*, *-eru* ~ *edu*, *-dor*, as found in Biagui's corpus of fieldwork-based data. These data are then discussed in greater depth in subsequent comments by the author, who informs us about matters such as the relative morphological integration of a given morpheme in everyday Casamance creole (see *e.g.*, p. 129, Figure 4). Also useful is the occasional inclusion of etymologies that may not be readily apparent to readers unfamiliar with Portuguese. This is the case, for instance, with the creole predicate negative marker *ka* 'not' (preverbal), derived from Portuguese *nunca* 'never' (p. 190).

In this context I should also mention that Biagui excels at contextualizing his data with relevant language-external information. He does so, for in-

stance, in his succinct introductory Section 3 (p. 19-20), where we learn that Casamance creole at present has over 10,000 speakers, but that since Senegal's independence from France in 1960, Wolof has progressively replaced the creole as Casamance's principal vehicular language. Interestingly, the creole does, however, retain a high level of prestige and use within certain religious contexts (church functions, etc.).

At the end of his book, Biagui includes a series of annexes. These consist of transcriptions of primary data gathered by him. Among these are a song entitled *Woca ku mundu sá baŋ mel pa mi* (p. 333-336), 10 Casamance proverbs (p. 337-340), and a fable: *Lobu ku miñjer beja* (the hyena and the old lady, p. 341-355). These are each accompanied by word-for-word glosses and French translations; these 3 texts are, furthermore, transcribed in syllabified versions, which are then quantitatively analyzed in various tables on p. 335-336, 339-340 and 355. C(C)V syllables, for instance, are shown (Section 5.3.1, p. 86, Table 44) to make up 73% of all syllabic configurations. Similarly, the average number of syllables per word in Casamance creole is calculated to be 1,67 for various texts (p. 356), which is slightly greater than that of Cape Verdean creole (1,61). The annexes are rounded out by two fairly voluminous lists: "5. Liste des adjectifs qualificatifs du corpus" (p. 357-371), and "6. Liste des idéophones" (p. 372-373).

As mentioned above, this detailed grammatical treatise of almost 400 pages has many merits, and in terms of overall presentation serves as a model of clarity. It is ambitious in numerous respects, and, I hope, will eventually undergo a second edition so as to further amplify the data and findings. In a future edition, the author may wish to provide more information about the precise nature and extent of his corpus. On p. 164, Biagui reveals that it contains 3,200 items in total, and that verbs represent 1/3 of the total (*i.e.* 1,225 verbs). The author also makes other occasional references to his database (see the above-mentioned annexes), but there is no section in the book where the readers could obtain relevant information about it, including where, when, and how were the data obtained, what is the age/gender distribution of the informants, and so forth. Also useful in a future edition would be an index at the end of the volume so that readers could locate certain topics more easily. For instance, negation and negative particles are hard to locate, as they are not listed anywhere in the section on adverbs (p. 261-270).[2]

Finally, two more comments for possible additions in a future edition: since most creolists (and others interested in creole societies worldwide) probably have never had the opportunity to visit the Casamance region *in persona*, the addition of photographs of speakers and/or typical social and

2. There is a very short section on verbal negation on p. 190-191 and 193-194, but locating it is a bit of a challenge in the absence of an index.

geographic contexts in which the creole is spoken would be very welcome. Such photographs would make the creole become "visibly more alive". Another much-appreciated addition could be a web link with recordings of speech samples.[3] This may invite others to study the fascinating minority language that Biagui so skillfully describes for us.

In sum: the book as a whole deserves our careful reading, and the author our admiration for the successful completion of an extraordinarily challenging task under difficult circumstances. One could even go so far as to say that Biagui's *Description générale du créole afro-portugais de Ziguinchor (Sénégal)* ranks among the very best grammars produced of an Afro-Portuguese creole.

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3. In the APiCS Online, Biagui and Quint (2013) make available short recordings of the creole.

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En couverture : Partie d'awélé dans le nord-est de l'île de Santiago (Cap-Vert, 2010, photo Nicolas Quint).

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