Reconstructing the development of the Bantu Final Vowels

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So-called Final Vowel (FV) morphemes are an integral part of the verbal inflectional morphology of most Bantu languages, though relatively little attention has been paid to their historical development in the context of the overall Bantu verbal system. A small set of FVs is reconstructed as appearing at the end of verbs and, along with other morphemes, they play a role in encoding tense, aspect, mood, and polarity. This chapter reconsiders the reconstruction of the Bantu FV system, with the goal of arriving at a better understanding of what the situation may have been like in Proto-Bantu (PB) with respect to these morphemes and how a system of inflectional marking of this kind could have developed. Data is drawn from languages of the northwestern Bantu area which have not previously been systematically examined with respect to reconstruction of the FVs. On the basis of data from these languages, it appears that the right edge of the Bantu verb was a more active site for the formation of new morphology than suggested by previous studies and that the standard reconstructions of the FVs may represent a simplification of a more complex PB situation.

1. Introduction

Relatively little attention has been paid to the historical development of so-called Final Vowels (FVs) in the context of the overall Bantu verbal system, although they are an integral part of verbal inflectional morphology in most present-day Bantu languages.[1] The sentence in

[1] In this chapter, single vowel morphemes associated with the Final position in the Bantu verb template proposed by Meeussen (1967: 108–111) (see Figure 1) will be referred to using the capitalized term Final Vowel (FV). This is in opposition to vowels that happen to appear at the end of a verb, which will be referred to using non-technical formulations as the "last vowel" of a stem or the "vowel at the end" of a verb. In some cases, these vowels may also be morphological Final Vowels but

(1), from Chewa (N31), illustrates the use of two FVs. The main clause verb *fún* 'want' appears with the FV *-a*, which generally has a kind of default status in the verbal system, and the subordinate clause verb *b* 'steal' appears with the FV *-e*, which is associated with subjunctive contexts.

(1) Chewa (Mchombo 2004: 28)

A-nyaní	*a-ku-fún-á*	*kutí*	*mi-kángó*	*i-dzá-b-é*	*mi-kánda.*
2-baboon	SP_2-PRS-want-FV	that	4-lion	SP_4-FUT-steal-SBJV	4-bead

'The baboons want the lions to steal (at a future date) some beads.'

Meeussen (1967: 110) places these FV morphemes in the Final position of the Proto-Bantu (PB) verb form, which is treated as containing both morphemes consisting of a single vowel and longer morphemes, such as the Perfective *-ile.[2] He proposes three possible FVs, *-a (appearing "in most forms"), *-e ("subjunctive"), and, tentatively, *-ɪ ("negative"), with no attempt to reconstruct their tones (but see Meeussen 1962, 2014 with regard to the tones of the subjunctive). The first two of these are still proposed as PB reconstructions in more recent work such as Nurse (2008: 261–262), who further reconstructs *-à with a low tone and *-é with a high tone, alongside a possible *-ɪ, associated with past tense encoding rather than negation, whose tone remains uncertain (Nurse 2008: 268). In the reconstructed verbal system, the Final position (see Figure 1) must be filled by some morpheme.[3]

The presence of FVs in Bantu raises a number of questions beyond their basic reconstruction that have yet to be answered or, in some cases, seriously considered (or reconsidered) from a historical perspective. For instance, what was their original source and how did

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are referred to in this way when the focus is the phonological form of the verb rather than its morphological structure. When referring to specific forms, a hyphen will precede vowels when they are being treated as morphemes (e.g., *-a*). Otherwise, they will appear without a hyphen (e.g., *a*). Language-specific and Bantu-specific morphological categories will be referred to using capitalized terms, while general linguistic categories will be referred to using all lower-case letters. Transcription conventions, including those for tone, generally follow those found in the original sources, with minor adjustments made in some cases as indicated.

[2] See Bastin (1983) for a detailed comparative study of the Perfective, and Nurse (2008: 266–267) for more recent discussion. Its reconstruction as *-ile follows Nurse (2008).

[3] Meeussen (1967) does not explicitly state that the Final slot is obligatory. However, this is implicit in the reconstructed verbal tense system, where all proposed forms are reconstructed with a Final suffix (Meeussen 1967: 111–114).

they become an integral part of the expression of the tense, aspect, mood, and polarity marking system found in the Bantu verb? How did they develop their hybrid phonological and morphosyntactic function where they simultaneously play a role in ensuring that verbs adhere to a specific set of prosodic constraints while also taking part in the encoding of verbal semantics? What processes led to the development of the "default" FV *-a, whose semantics appears to be best defined in negative rather than positive terms?

The purpose of this chapter is to reconsider the reconstruction of the Bantu FV system, with the goal of arriving at a better understanding of what the situation may have been like in PB with respect to these morphemes and how a system of inflectional marking of this kind could have developed. The primary data to be examined will be drawn from a survey of languages of the northwestern Bantu area, in particular Zone A and to a lesser extent Zone B, which do not appear to have previously been systematically examined with respect to understanding the origins of the FVs.[4] While no definitive conclusions regarding the reconstruction of FVs will be reached here, the discussion is intended to serve as a guide for further research in this area. It will be argued, in particular, that the reconstruction of the Bantu FVs is much less straightforward than might be suggested by data from languages like Chichewa, as seen in (1), which may very well represent a significant simplification of the PB situation. Instead, the picture that emerges from this study is one where the right edge of the verb is a more active site for the formation of new morphology than suggested by previous studies and where verb roots show greater diversity in their shape than what is implied by the standard reconstructions.

For purposes of reference, a schematic representation of the segmental structure of what will be referred to here as the canonical Bantu verb, based on the adaptation that Güldemann (2003: 184) gives of Meeussen (1967: 108–111), is presented in Figure 1. Verbal positions are assigned a number with respect to the verb root (which is numbered zero), a label, and a list of grammatical functions which morphemes in that slot typically encode. Parentheses indicate that a morpheme does not appear in that position in all tense, aspect, mood, and polarity configurations, while those positions appearing without

[4] A full survey would require a more thorough consideration of Zone B as well as Zone C, though this was not possible for the present chapter due to constraints of time.

parentheses are generally always occupied by an affix. Slots that can contain more than one element are noted with an asterisk. Forms in attested languages deviate from this canonical form in various ways, and northwestern Bantu languages can be especially divergent (Nurse & Philippson 2003: 5). Nurse (2008: Chapter 6) provides thorough discussion of issues surrounding the reconstruction of Bantu verbal structures; see also Nurse & Philippson (2006).

-4	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
(Pre-Initial) negation TAM† clause type†	Initial subject	(Post-Initial)* TAM negation clause type†	(Pre-Radical)* object	Radical root	(Pre-Final)* TAM valence	Final TAM	(Post-Final) participant negation‡ clause type‡

* = more than one element possible ‡ = local innovation

Figure 1: The Bantu verb template following Meeussen (1967: 108–111) and Güldemann (2003: 184)

In the present study, the most important slot in Figure 1 is Slot 2, labeled Final, though the elements in Slot 0 and Slot 1 are also relevant due to their potential for interaction with FVs in Slot 2. Those three slots together also comprise a unit often referred to as the verb stem in comparative Bantu studies, which can have properties that suggest it should be treated as a subconstituent of the larger Bantu verbal structure (e.g., Hyman 1993). Of particular relevance in the present context are two aspects of verb stem phonology. First, the verb stem is often the domain of prosodic phenomena which result in reduced vowel contrasts after the stem-initial vowel (e.g., Hyman 2003a: 45–47). Since these can impact FVs, they are obviously relevant to their reconstruction. Second, the verb stem has a canonical shape of CVC-(VC-)*-V. That is, it is based on a CVC root followed by one or more -VC suffixes and an FV (see Good 2016: 139–141 for an overview). While this is not an exceptionless pattern, it is dominant enough to be relevant for understanding the development of the Bantu verb, as will become clearer in the discussion below of languages like Nen (A44) (§4.5) and Kpa (A53) (§4.6), among others.

In §2, further information is provided regarding the comparative Bantu data that is relevant to this study, as well as brief consideration of the connection between Bantu FVs and similar phenomena in other Niger-Congo languages. In §3, an overview of the key descriptive features covered in the survey that forms the core of this chapter is provided. In §4, data is presented on the stem-final verb morphology

found in a sample of northwestern Bantu languages. In §5 some conclusions are drawn regarding the possible PB FV system and its morphological development.

2. Final Vowels in Bantu and Niger-Congo

This study is based on a sample of fifteen languages which were chosen by reference to Guthrie's classificatory system, focusing on languages of zones A and B. This sampling choice was made on the assumption that it would provide sufficient representation of FV patterns in northwestern Bantu languages to allow for an informed reappraisal of what the PB situation may have been. This approach is in line with a treatment of PB as the reconstructed language associated roughly with Node 1 of the phylogenetic tree presented in Grollemund et al. (2015: 2). This essentially includes all languages traditionally classified as Narrow Bantu plus the Jarawan Bantu languages (see Gerhardt 1982 for discussion of this latter group). However, as will be discussed in §5, the results of this survey can be interpreted as suggesting that the reconstructed FV system proposed by Meeussen (1967: 110) may be better associated with a later stage corresponding roughly to their Node 2. Bostoen & Guérois (this volume) come to a similar conclusion for the long passive form *-ɪbʊ, though they place the innovation of this form at Node 3.

The Bantu FVs have not been the subject of extensive comparative study. The most recent work that is comparable in scope to the present chapter is Grégoire (1979), which focused on aspects of FV realization in languages from the center of the Bantu domain and specifically excluded the northwestern Bantu languages of interest here. Grégoire (1979) did not explicitly consider the origins of the Bantu FV system. Nevertheless, its focus on patterns of FV alternation conditioned by factors other than tense, aspect, mood and polarity parallels this study's close examination of verb-final morphology that deviates from the reconstructed patterns. Unlike this chapter, Grégoire's (1979) investigation was not designed to reach specific conclusions regarding the general evolution of the PB FV system. However, the fact that it considers the possibility that the system could have developed from a simplification of more complex verb-final morphological patterns through processes of phonological reduction and analogy (Grégoire 1979: 169–170) is in line with proposals that will be made below in §5.2. Grégoire (1979) also

provides an overview of relevant work on the topic of the development of the FV to the point of publication (see also Van Eeden 1934 for consideration of earlier work).

Reconstruction of the verb complex in the larger Niger-Congo (NC) context is also an area that has yet to see extensive comparative study, with the partial exception of verbal extensions (Voeltz 1977; Hyman 2007), associated with Slot 1 in the schematic representation of the PB verb in Figure 1.[5] The broadest and most up-to-date comparative work on this topic is Nurse, Rose & Hewson (2016), which builds on work also presented in Nurse (2007) (see also Nurse & Watters this volume). They reconstruct a "Final Vowel" category for NC and suggest that it, "was originally used for a binary aspect contrast between perfective/factative and imperfective, both indicated by a single vowel" (Nurse, Rose & Hewson 2016: 21). They also tentatively suggest reconstructions of *-i for a vowel coding Factative and *-a for a vowel coding Imperfective. See Welmers (1973: 346–347) for discussion of the factative category. Their survey appears to have been designed to look for the existence of potential Finals in NC without explicitly considering whether these were obligatory or formed a compact and highly grammaticalized paradigm, as is the case for the reconstructed Bantu FVs.

To pick a relevant example, Nurse, Rose & Hewson (2016: 30–31) treat Bijogo (Segerer 2000; 2002) as making use of two Bantu-like FVs with forms *-ɛ*, with factative function, and *-i*, with perfective function. Bijogo is classified as part of the Atlantic subgroup of NC, and its verb structure shows striking parallels to what is reconstructed for Bantu despite being quite distant from Bantu both geographically and genealogically (Segerer 2002: 262), which is why it is chosen for comparison here. Bijogo verb forms like those in (2) show FV alternations comparable to those reconstructed for PB (Segerer 2000: 226).[6]

[5] The term *extension* in a Niger-Congo context refers to a verbal suffix attaching to a verb root or stem which derives a new verb stem.
[6] Segerer (2000: 226) categorizes the suffixes in (2) using the labels *inaccompli* and *accompli* for (2a) and (2b) respectively. I have translated them as imperfective and perfective following Nurse, Rose & Hewson (2016: 81).

(2)Bijogo (Segerer 2000: 226)

a. *i-booʈi i-tonʈ-i*
I-dog I-jump-IPFV
'Dogs are jumping.'

b. *i-booʈi i-tonʈ-ɛ*
I-dog I-jump-PFV
'Dogs jumped.'

The vowel alternations exemplified in (2) are reminiscent of the reconstructed Bantu pattern insofar as the last vowel of the verb changes depending on the tense and aspect of the verb. However, the overall Bijogo system differs from the reconstructed Bantu system in crucial ways. First, there is another suffix occupying the Final position, but which has a VC shape. Specifically, the Perfective can also be formed using an *-ak* suffix rather than *-ɛ*. Verbs can also lack suffixes entirely in the Perfective, Imperfective, and Infinitive forms. The variants that are found on a given verb appear to be lexically specified, rather than predictable based on other factors.[7]

Based on the summary of evidence for reconstructing an FV in NC provided in Nurse, Rose & Hewson (2016: 30–31), it appears that there is justification for reconstructing verb-final morphemes consisting of a single vowel that encoded aspect (and, perhaps, other categories) at some high level of NC. However, the reconstruction of a Bantu-like system where FVs form a small grammatical paradigm and are obligatory on all verb forms does not appear reasonable for NC as a whole.

A related concern from the perspective of NC is the shape of verb roots in Proto-NC. Given that most Bantu verb roots are reconstructed as ending in a consonant (Meeussen 1967: 86–92), FVs have a noteworthy prosodic function, alongside their morphological function. Specifically, they allow surfacing verbs to satisfy phonotactic constraints on syllable structure. PB syllable structure was quite restricted, and codas were not allowed (Hyman 2003a: 43). For roots with CVC shape, which Meeussen (1967: 86) labels the "normal type", the FV allows them to surface as CVCV, thereby satisfying syllable structure constraints.

[7] With respect to the survey of northwestern Bantu languages presented below, the Bijogo system is most similar to that of Kako (see §4.11), which has a system of verb-final morphology that is quite distinct from the standard reconstructions.

There does not appear to be much work explicitly on the topic of Proto-NC root structure that would help resolve which aspects of the Bantu situation are archaic and which are innovative, but see Pozdniakov (2016) for relevant discussion. For instance, if we assume that Proto-NC verb roots were predominantly CVC in shape, then we would model the development of the PB FVs as primarily involving processes through which vocalic morphemes already present in NC became obligatory. By contrast, if we assume Proto-NC verb roots were primarily CVCV shape or could be either CVC or CVCV in shape, then we need to understand how lexical vowels at the ends of verb stems interacted with the development of the FVs.

In the context of the present survey, this is not a completely abstract concern given that some languages, for instance Eton (see §4.8) and Gyele (see §4.9), show verb roots with CVCV shape where the last vowel is part of the lexical form of the verb root rather than representing a morphological FV. The historical source of these vowels is not obvious, and, if the Proto-NC picture were clearer, this would likely be of value for understanding the origin of such patterns in northwestern Bantu languages. While further consideration of verb stem structure and verb-final morphology in NC is outside of the scope of the present study, future work on Proto-NC verbal form is clearly important for arriving at a complete understanding of the development of the Bantu FVs.

3. Variation in stem-final morphology

3.1. Overview of major points of variation

In order to provide context for the survey presented in §4, a number of general observations about patterns found in the data are introduced in this section. In particular, significant points of variation that have been noted in this survey are: (i) the number of FVs described in a given language (§3.2), (ii) the nature of the morphosyntactic categories that are coded by the FVs (§3.3), (iii) the interaction of FVs with other kinds of verb suffixes, in particular extensions (i.e., verb-to-verb derivational suffixes) (§3.4), (iv) the presence of stems that are lexical exceptions to regular FV patterns (§3.5), and (v) the interaction between stem-final phonological processes and verb-final morphology, in particular stem-controlled vowel harmony and processes affecting environments where two consonants are underlyingly adjacent (§3.6).

The discussion in this section and in §4 looks at suffixes that play a role in encoding tense, mood, aspect, and polarity (TAMP), even in cases where the relevant morpheme is not vocalic, if relevant for understanding the development of FVs. It also looks at patterns in languages which may be indicative of earlier Final position verb morphology or of a proto-language stage before FVs had developed, even if there is no evidence for synchronically active FVs in a given language.

One point that will emerge from the discussion is that the nature of the FV systems found in the northwestern Bantu languages suggests that the right edge of the Bantu verb may have been a more active area for the formation of new morphology than indicated in the literature, which has tended to focus on the creation of new morphology in the Post-Initial slot (Güldemann 2003: 185). The issue of whether this is due to processes that have specifically affected northwestern Bantu languages or somehow revealing of the situation in PB will be discussed in §5.

3.2. Number of Final Vowels

An important point of variation found in the surveyed languages is the number of FVs found within a given language. As seen in §4 and discussed below in §3.6, it is not always straightforward to determine what morphemes should be classified as FVs in systems where the FV position is not as strongly grammaticalized as it is in languages adhering closely to canonical Bantu verb structure, as illustrated with Chewa in (1). However, even in languages where this problem does not arise, there is still significant variation from a comparative perspective. See also Nurse (2008: 47–50) for relevant overview discussion.

In the present survey, the language with the largest fairly clear-cut system of FVs is Kpe (A22) (see §4.3). It shows four segmental forms: *a*, *e*, *i*, and *ɛ*. The first three FVs appear on affirmative main clause verbs in different TAMP configurations, while the last is found only on Past Negative forms in relative clauses and content questions. The largest system of verb-final TAMP-encoding suffixes in the survey, including vocalic suffixes as well as other suffixal shapes, is found in Kako (see §4.11), which shows six such elements.

By contrast, there are also languages in the survey which show no evidence for FVs synchronically (even if verb stems may still end in a vowel), namely Yasa (A33a) (§4.4), Eton (A71) (§4.8), Gyeli (A801) (§4.9), and, possibly, Makaa (A83) (§4.10). These languages are all found in a region encompassing the southern part of Cameroon and northern Equatorial Guinea, suggesting a possible areal pattern, though verifying this would require a more systematic survey of this specific region.[8] Variation in the inventory of FVs raises important historical questions with respect to the PB situation and how it resulted in these diverging FV patterns. Perhaps the most interesting question is whether the current PB reconstructions, as presented in §1, represent a historical reduction of a more complex system in only one part of the family well after the initial Bantu divergence (see §5.2).

FVs can, of course, appear with different tones depending on the semantics of the verb forms in which they appear. Tone is not considered in any detail here, though it is clear that a full examination of the development of FVs will need to take tone into account. An important question regarding FVs and tone is whether the appearance of different tones on FVs with the same segmental shape should be taken to suggest that there was a historical collapse of oppositions among formerly distinct morphemes.[9] Of particular note from a historical perspective regarding tone and FVs is a general pattern seen across Bantu languages where the tone on non-initial syllables (or, in some cases, moras) in a verb stem is conditioned by the tone of the FV (see, e.g., Meeussen 1961, Odden & Bickmore 2014: 4).

3.3. Categories encoded by Final Vowels

It can be difficult to assign a clear-cut meaning to specific FVs. However, it is easier to characterize the kinds of categories that they encode, most typically in combination with other verbal markers such

[8] Nurse (2008: 47) points out that some Zone L languages also show FV loss. Pacchiarotti & Bostoen (2021) provide a detailed discussion of an areal pattern of vowel loss at the end of stems found in B80 languages and adjacent groups, while also referencing similar patterns of loss found in other northwestern Bantu languages. While this kind of loss does not specifically target the inflectional FVs that are the focus of this paper, it can obviously impact them due to their stem-final position.

[9] Also noteworthy in this context are observations by Grégoire (1979) of languages where the choice of FV can be partly conditioned by the tone of the root synchronically, as in Luba-Katanga (L33) (Grégoire 1979: 143), or historically, as in Herero (R31) (Grégoire 1979: 157–158).

as morphemes appearing in the Post-Initial position in Figure 1 (in addition to a tonal melody). Nurse (2008: 42–26) provides an overview of common categories coded on verbs in Bantu languages in general, and specifically describes FVs as having an important role in coding aspect, mood, and tense. In languages where an FV is obligatory, it necessarily plays a role in encoding other kinds of verbal categories even if only appearing in a "default" form of some kind, most typically as *-a* (though see §3.6 for discussion of harmonizing FVs).

In addition, in some Bantu languages, including two of those discussed in §4—namely, Nen (A44) (see §4.5) and Kako (A93) (see §4.11)—FVs have been described as having another, somewhat peculiar, function of encoding whether or not a stem is extended. That is, their form can be conditioned by whether or not a verb stem is longer than two syllables, most typically due to the fact that it appears with a verbal extension (i.e., a verb-to-verb derivational suffix), in the Pre-Final position in Figure 1. The presence of these extensions is not necessarily always synchronically transparent, and monosyllabic stems with long vowels can also behave like two-syllable stems with respect to this pattern. Grégoire (1979: 142–143) discusses this phenomenon and describes relevant patterns in a number of Bantu languages outside the northwestern area. As the survey presented in this chapter makes clear, it is also found in northwestern languages and, in at least one language, Kako (A90) (§4.11), the specific pattern involves a complex interplay between length and the final consonant of a stem.[10]

3.4. The interaction between Final Vowels and other suffixal morphemes

Another factor relevant to the realization of FVs involves their potential interaction with other verbal suffixes. As discussed just above in §3.3, the form of the FV can be impacted by the presence of verbal extensions, and this represents one kind of interaction with suffixes. A different kind of interaction involves cases where the form

[10] Another northwestern Bantu language showing this kind of pattern that is not looked at in detail here is Tiene (B81) (Ellington 1977), where the FV is partly phonologically conditioned, partly codes past tense, and partly codes that the stem is extended.

of a suffix that would be expected to precede an FV affects the FV's realization on the verb.

A pattern of this kind is found, for instance, in Punu (B43) (see §4.15). This language makes extensive use of a default FV *-a*, but the *-a* fails to appear in forms ending in *u*, which include Passive verbs, as seen in a pair such as *lab-a* 'see' vs. *lab-u* 'be seen'. In Bantu languages where verbs adhere more closely to the form depicted in Figure 1, one might expect, instead, a form like *lab-w-a* for the Passive of such a verb, where the appearance of an FV results in the vowel of the preceding suffix becoming a glide.[11]

A difficulty in interpreting such patterns is determining whether these alternations in the realization of FVs should be analyzed as morphologically or phonologically conditioned, an issue that also arises in §3.3, where alternations are connected to stem length. In particular, are alternations like the one found in Punu (B43) morphologically conditioned by the presence of a specific suffix (e.g., a Passive), or should they be seen as a generalization over stems ending in a specific sound which happens to be the same as the sound of a vocalic suffix (e.g., an *u*)? In Punu, synchronically, the phonological analysis captures the facts of language better, as will be described in §4.15. However, since stems ending in *u* which are not passives do not appear to be common, there is considerable overlap in the predictions of the morphological and phonological analyses, which is why the possibility of morphological conditioning is raised as an issue here. Moreover, given studies such as Hyman (2003b) and Good (2007), which demonstrate that morphophonological analogy has impacted Bantu verbal morphology, one cannot rule out the possibility that a synchronic phonological pattern has its roots in a morphological generalization.[12]

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[11] Van Eeden (1934: 372) argues that FV *-a must be a relatively recent development due to the nature of its interaction with the vowels found at the end of roots with shape CV. While this is not a generally held view, it emphasizes the potential interest of closely examining the interaction between FVs and other elements found towards the end of the verb stem.

[12] Grégoire (1979: 159) describes the case of Kwangali (K33) where a class of CVC stems behaves as if they are longer with respect to their choice of FV (see §3.3 for relevant discussion). These stems end in sounds such as *s* or *z*, which are historically linked to the presence of a Causative *-i in the stem. This suggests how a generalization initially tied to morphological structure could be reanalyzed as being phonologically conditioned.

In addition to Punu, other languages discussed in §4 where the realization of FVs is crucially dependent on stem-final morphology are Makaa (A83) (§4.10), Myene (§4.12), and Himba (B302) (§4.14).

3.5. Lexical exceptions

In some languages of the survey, certain verb roots are described as ending in an invariant vowel and constituting lexical exceptions to regular FV rules. Subminimal roots of shape CV seem especially likely to be exceptional in this way, and this is not limited to the northwestern Bantu area. In her study of FV patterns, Grégoire (1979: 146) notes, "*Dans le présent article, nous n'avons pas envisagé le cas des radicaux qui sont, en synchronie, de type -CV- ou de type -C-: leur comportement est toujours spécial et mériterait une étude distincte.*" [In the present article, we have not considered the case of radicals which are synchronically of type -CV- or of type -C-: Their behavior is always exceptional and merits a separate study. — my translation] Here, where available, information on such roots will be presented in some cases, especially if they are described as presenting behavior which is distinct from that of longer roots.

Examples of languages in this survey showing lexical exceptionality in FV patterns are Kpe (A22) (§4.3), Kako (A93) (§4.11), Myene (B11) (§4.12), and Punu (B43) (§4.15). Patterns of lexical exceptionality can overlap with cases of interaction between FVs and other suffixes, as discussed in §3.4, when the exceptionality is connected to specific root-final vowels which have the same form as a verbal suffix, such as *u* in the Punu case.

3.6. Phonological patterns that impact Final Vowels

A final issue that arises with respect to FVs in the surveyed languages is the role of phonological factors impacting the realization of stem-final morphology, including FVs. Of particular importance are patterns of reduction that result in surface realizations of stem-final morphology where more complex underlying patterns are neutralized. These are sometimes suggestive of possible diachronic sources for FVs from more heterogeneous sets of morphemes.

For instance, as will be discussed in §4.11, in Kako (A93), verbs can appear with a past tense suffix *-má*. This suffix appears at the end of

the verb where an FV might be expected. This is seen, for instance, in the verb form *ɓɛŋ-má* 'see-PST'. However, in verbs ending with certain consonants sequences, including *ɗy*, the *m* is dropped, producing a surface form like *kwaɗy-á* 'love-PST'. The form *á* is otherwise associated with a suffix marking Imperative verbs. This suggests a possible pathway for the development of the unusual "default" distribution of the FV *-a. Two etymologically distinct suffixes may merge in specfic phonological contexts, and this merged morphological form could, at a later stage, be generalized across all verbs. This will be discussed further in §5.2.

A more widespread phonological pattern is the presence of vowel harmony affecting FVs. Outside of the northwestern area, this is a significant topic in the discussion of Grégoire (1979). It is also relevant in the northwestern area as evidenced, for instance, by the FV patterns found in Gunu (A62) (see §4.7), a language which shows evidence for only a single FV whose form is predictable by vowel harmony rules. This is likely to represent a case where patterns of sound change resulted in the merger of distinctions between FVs which were historically morphologically separate.

In addition to Kako and Gunu, other languages of the survey where phonological patterns are relevant for understanding their FV systems are Akoose (A15b) (§4.2), Nen (A44) (§4.5), Kpa (A53) (§4.6), Eton (A71) (§4.8), Gyeli (A801) (§4.9) and Kota (B25) (§4.13).

4. Survey of Final Vowel patterns in northwestern Bantu languages

4.1. Introduction to the survey

As a step towards the reconstruction of the development of the Bantu FVs, this section reports on a survey of verb-final morphological patterns, with an emphasis on verb-final morphology that could be classified as an FV or serve as a possible historical source for an FV. A sample of languages across two of the Guthrie zones standardly associated with northwestern Bantu (i.e., zones A and B) was examined. Nurse (2008) was used as an initial guide in the selection of these languages, and other sources were located as needed with the goal of having one language for each of the nine high-level subdivisions of Zone A and the lower-numbered subdivisions of Zone

B. Two languages are discussed below from group A80. While the availability of a detailed description for one A80 language, i.e., Gyeli (see §4.9), made it ideal from the perspective of a survey like the one presented here, another language, Makaa (see §4.10), was found to show an interesting pattern involving the realization of an apparent reflex of an FV under particular tonal and syntactic conditions which seemed important to include in the discussion.

In some cases, the choice of a language within one of these subdivisions was relatively opportunistic by virtue of being based on a source that was readily available. In other cases, the choice was more or less dictated by the lack of any other appropriate and available source for the languages of that subdivision. While it seems likely that the FV patterns found in the survey provide a reasonable sense of the overall northwestern Bantu picture, it is almost certainly also the case that important comparative evidence could be uncovered by examining languages not considered here (see also §5.2). Moreover, as indicated in §2, the languages that were surveyed were chosen by reference to Guthrie's referential classificatory system rather than any particular genealogical proposal for the internal structure of the Bantu family, such as the one derived from phylogenetic analyses found in Grollemund et al. (2015). Future work in this area would likely benefit from the development of an expanded sample that takes such proposals into account, for instance, by the inclusion of Jarawan Bantu languages or by targeted sampling across groups which are not believed to form low-level genealogical units.

At the same time, it should be noted that this approach resulted in a sample that is relatively genealogically diverse in the context of northwestern Bantu. Akoose (A15b), Kpe (A22), Yasa (A33a) and Eton (A71), on the one hand, and Nen (A44), Kpa (A53), and Gunu (A62), on the other, are part of two distinct groupings, under Grollemund et al.'s (2015) Node 1. Kako (A93) and Makaa (A83) are part of another grouping placed under their Node 2.[13] Kota (B25) is part of a grouping under Node 3, while Myene (B11) and Himba (B302) and are placed in a low-level group under Node 4. Finally,

[13] One of the surveyed languages, Gyeli (A801), is not included Grollemund et al.'s (2015) study. However, two languages that are reported to be closely related to Gyeli by Grimm (2015: 108), Shiwa (A803) and Kwasio (A81), are part of that study. Both are placed within the same group as Kako (A93) and Makaa (A83) in Grollemund et al. (2015).

Punu (B43) and Nzebi (B52) are both placed under Grollemund et al.'s (2015) Node 6, a group also known as West-Coastal Bantu (see Pacchiarotti et al. 2019).

In the rest of this section, the basic descriptive facts of the FV patterns across the fifteen surveyed languages will be presented across Zones A and B, going from lower Guthrie numbers to higher numbers within each of the two zones. In §4.17, the overall results of the survey are summarized.

4.2. Akoose (A15b)

In Table 1, the basic TAMP forms of verbs in Akoose (A15b) are presented in schematic form, with "..." representing where the verb stem appears. The associated surfacing forms of the verb for 'wash', coded with a third singular (Class 1) subject marker appearing before the TAMP markers, are presented in Table 2 (Hedinger 2008: 100–101; see also Hedinger 1985).[14]

The Akoose system can be described with reference to two verbal aspects, Perfective and Imperfective, coded via suffixes, and two tenses, Past and Future, coded via prefixes. Both Affirmative and Negative verb forms are included. Verb forms not appearing with prefixes in the Affirmative forms or only a single *e-* prefix in Negative forms can have a Perfect or Present Imperfective interpretation, to which I have applied the label *Factative* here, adapting the term as used by Welmers (1973: 346–347).[15]

[14] The schematic representation of the Future Imperfective in Hedinger (2008: 100) represents the prefix as *dâ-*. The *d* appears to be a typographic error and, therefore, is not included here (see Hedinger 1985: 33). In the Negative forms, the appearance of the *e-* prefix overrides the appearance of the third person subject prefix *à* due to a vowel deletion rule (Hedinger 1985: 20). The presentation in Table 1 follows the source where an apostrophe is used to represent a glottal stop. The relationship between the proposed underlying forms for Akoose inflected verbs in Table 1 and surface forms is not always straightforward, and the reader is referred to Hedinger (2008) for a full treatment.

[15] Welmers (1973) uses this label to refer to verbal constructions associated with past tense semantics when applied to verbs expressing events and present tense semantics when applied to verbs expressing states. The use of that label here extends the term to apply to constructions where the same verb root is used but its temporal reference is connected to its aspectual encoding.

Table 1: Schematic representation of verbal forms in Akoose

	PFV	**IPFV**	**PFV.NEG**	**IPFV.NEG**
Past	*Ǹ-…-ˊ*	*…-ɛ́'-áá*	*e-nkêN-…-'ɛ́*	*e-…-ɛ'-aá*
Factative	*…-é*	*…-ɛ́'*	*e-…-e-'ɛ́*	*e-…-ɛ́'-'ɛ́*
Future	*â-…-ˊ*	*â-…-ɛ́'*	*ˆ-e-â-…-ˊ-'ɛ́*	*ˆ-e-â-…-ɛ́'-'ɛ́*

Table 2: Third singular subject forms of verb 'wash' in Akoose

	PFV	**IPFV**	**PFV.NEG**	**IPFV.NEG**
Past	*anwɔ́g*	*awɔ́gáá*	*enkênwɔ́gkɛ́*	*ewɔ́gaá*
Factative	*awɔ́gé*	*awɔ́gɛ́'*	*ewɔ́gɛɛ́*	*ewɔ́gɛ́ɛ́*
Future	*ă□wɔ́g*	*ă□wɔ́gɛ́'*	*êwɔ́gkɛ́*	*êwɔ́gɛ́ɛ́*

Various features of the Akoose FV system stand out from the forms presented in Table 1 and Table 2. For instance, the Past and Future Perfective forms lack an FV entirely. Second, phonological simplification at the right edge of the verb results in complex underlying patterns surfacing in ways that adhere more closely to the canonical Bantu verb form than might be expected from their morphological composition.[16] This is seen most directly in the Past Imperfective form which appears with final sequence of *-áá* and where the Imperfective *ɛ́'* does not surface at all.[17] To a lesser degree, it can also be seen in the simplification of the *-e-'ɛ́* and *-ɛ́'-'ɛ́* sequences to *ɛɛ́* and *ɛ́ɛ́* respectively in the Negative Factative Perfective, Negative Factative Imperfective, and Future Imperfective Negative forms.

While the forms in Table 2 do not make clear what the source is for the abstract analyses presented in Table 1, evidence for them can be

[16] In the Perfective Negative form *enkênwɔ́gkɛ́* in Table 2 a *k* appears before the last vowel due to a process where a glottal stop appearing immediately after a consonant is partly assimilated to the preceding consonant.

[17] Hedinger (2008: 6) states that glottal stops are frequently dropped between vowels, connecting that aspect of this reduction to more general processes in Akoose.

found in dialectal variants as well as in verb forms whose stems do not have canonical CVC shape (Hedinger 2008: 101, fn. 9). For instance, in the Past Imperfective forms of CVV stems, the glottal stop of the Imperfective suffix is found, as seen in a form like *abóó'áá* 'it was breaking', based on the root *bóó* (Hedinger 2008: 123). Moreover, the analysis in Table 1 abstracts away from at least one complication of clear comparative interest, namely the fact that the Imperfective suffix in stems with CV shape has the form *-ag*, as seen in a verb such as *a-dy-ág-áá* 'he was eating' based on a root *dyɛ́* 'eat' (Hedinger 2008: 123). This form is readily identifiable with a reconstructed form *-ag generally associated with imperfective semantics (Sebasoni 1967; Nurse 2008: 262–264) and suggests that Akoose verbs have been affected by processes of phonological reduction in the portion of the verb stem between the initial CVC sequence and the FV.This portion of the verb stem is identified as the prosodic trough in Hyman (1998), i.e., a domain characterized by reduced possibilities of phonological contrast in comparison to other parts of the verb stem. In this case, such processes appear to have resulted in *-ag developing into *-'ɛ́*, though the details of such a process remain to be worked out. In CV stems, the suffix would have been protected from such effects due to the fact that their short lexical forms would allow *-ag to appear before the trough position. From a general diachronic perspective, these Akoose data suggest that new FV patterns can arise due to phonological reduction affecting the end of the stem (see §3.6).

Another aspect of the Akoose FV system of interest here is the specific surface segments seen at the end of verbs, namely Ø, *e*, *aa*, *ɛ*, and *ɛ'* (see Table 1). The fact that they appear with different lengths and tone patterns and that one of these ends in a glottal stop means that they should not be directly equated with the reconstructed FVs of Meeussen (1967: 110). They do, however, potentially point to the kinds of historical processes of reduction and fusion at the end of the verb stem that could have resulted in the canonical pattern. If we assume that the verbal template in Figure 1 represents an earlier stage of Akoose, then present-day Akoose would appear to be a language where a new FV system is emerging as the earlier one is breaking down. Alternatively, we could treat Akoose as representing a branch of Bantu where the template in Figure 1 never developed in the first place (see also Güldemann this volume). The results of this survey do not clearly indicate which analysis is to be preferred, but this is a clearly an important issue for PB reconstruction (see §5.2).

4.3. Kpe (A22)

In Table 3, the major verbal patterns of Kpe (A22), also known as Bakweri or Mokpwe, are presented following the description of Marlo & Odden (2007: 20).[18] Three segmental forms of the FV are found in the table: *a*, *e*, and *i*. The overall verb structure largely follows a canonical pattern, and the forms of these vowels are in line with the reconstructions proposed by Nurse (2008: 268) (see §1). The different FVs are not associated with straightforward semantics, but the *-a* FV appears to fulfill the expected default function. The column SPT in Table 3 indicates if a high tone appears on the subject prefix of the verb (in these examples having segmental shape *na*). The ꜜ is used to represent downstep.

Table 3: Forms of verb 'wash' in Kpe

Verb	Translation	Category	SPT	TAMP	FV
na-Ø-zoz-a	'I will wash'	FUT	*Ø*	*-Ø-*	*-à*
na-zí-zoz-e	'I did not wash'	PST NEG	*Ø*	*-zí-*	*-è*
na-zá-zoz-á	'I will not wash'	FUT NEG	*Ø*	*-zá̀-*	*-á*
na-ma-zoz-á	'I washed'	PST	*Ø*	*-ma-*	*-á*
na-zí-zóz-í	'I have not washed yet'	INC	*Ø*	*-zí*	*-í*
na-Ø-zoz-î	'I have washed'	PFV1	*Ø*	*-Ø-*	*-î*
náꜜ-má-zoz-a	'I have washed'	PFV2	H	*-̀má̀*	*-a*

Marlo & Odden (2007: 21) describe two deviations from the system exemplified in Table 3. First, monosyllabic stems and stems longer than CVC often have final vowels that do not vary. Relevant examples are provided in Table 4, which compares the monosyllabic root *và* 'divide' and the trisyllabic root *lakízé* 'forgive', with the CVC root *zoz* 'wash'.[19] These patterns are placed here under the heading of lexical

[18] Marlo & Odden (2007: 20) discuss two Perfective forms in Kpe, simply labeling them Perfective1 and Perfective2, and they do not appear to discuss how they are semantically or functionally distinct.

[19] Marlo & Odden (2007: 21) do not indicate the source of the long vowel in the verb 'divide' in Table 4, which differs from the short vowel they present in the citation form. It could be presumably be due to the morphological presence of a FV that has assimilated to the vowel of the root or due to a lengthening effect connected to a minimality constraint of some kind (see, e.g., Downing 2006: 54–55 and Hyman 2008 for discussion of minimality constraints in Bantu).

exceptions discussed in §3.5. It is not obvious how to interpret such stems in historical terms. Could the lack of distinct segmental FVs in forms based on roots like *và* and *lakízé* be conservative and representative of a historical stage where FVs were not obligatory? Or, could they be innovative and have resulted from FVs having been lost in some contexts that are yet to be determined? These questions will be considered again in §5.2.[20]

Table 4: FV variation by stem type in Kpe

Infinitive	**Gloss**	**PFV1**	**Gloss**
li-zoz-á	'to wash'	*na-Ø-zoz-î*	'I have washed'
li-vaá	'to divide'	*na-Ø-vaâ*	'I have divided'
li-lakízé	'to forgive'	*na-Ø-lakízɛ̂*	'I have forgiven'

A final important aspect of the Kpe system is that the verbal encoding of relative clauses and content questions involving Past Negative forms makes use of a fourth final vowel with the segmental shape *-ɛ*. Examples are provided in (3) (Marlo & Odden 2007: 25).[21] This pattern raises two questions. First, what is the historical source of this vowel? Given the fact that it appears with a complex (rising) tone, the most likely possibility would seem to be that it represents a fusion of two formerly morphologically distinct vowels, in a manner comparable to the morphological fusions seen in Akoose forms like the Negative Factative Perfective, as exemplified in Table 2 in §4.2. If that was the case, then this suggests that the Final position of the verb has been an active site of morphological formation in Kpe. Second, the presence of this fourth vowel opens up the question of just how large the FV inventory can be in Bantu languages. I am not aware of any work systematically exploring this topic, though Kpe represents

[20] The *izɛ* ending of *lakízé* 'forgive' in Table 4 is formally identical to the Causative suffix in the language, as described by Atindogbé (2013: 100), who transcribes it as *-izre*. This suggests that the presence of an invariant FV in this stem may be comparable to cases found in other surveyed languages involving the interaction between verb-final morphology and FVs, as discussed §3.4, at least in historical terms.

[21] The glossing in the examples in (3) is my own on the basis of information in Hawkinson (1986: 243), Marlo & Odden (2007), and Atindogbé (2013), as well as Michael Marlo (personal communication, 2021).

the upper limit of verb-final TAMP-encoding morphemes with a V shape in this survey.

(3) Kpe (Marlo & Odden 2007: 25)

a. *emó* *a-zí-mo-zoz-ĕ*
1.PRO SP1-PST.NEG-OP1-wash-FV
'the one who didn't wash him'

b. *njé* *!* *a-zí-zoz-ĕ*
who SP1-PST.NEG-wash-FV
'Who didn't he wash?

On the whole, the Kpe FV system largely follows the canonical pattern in that most verbs appears with one of three FVs with similar forms to the FVs presented in Meeussen (1967: 110), though the ways that it deviates from that pattern suggests interesting historical possibilities regarding when FVs became obligatory and how new FVs may have developed. From an areal perspective, Kpe is somewhat unusual in this survey. In terms of its FV patterns, Kpe behaves more like languages of Zone B, to be discussed below, than the other languages of the Zone A surveyed here, none of which show such canonical behavior (see also §5.1). This is despite the fact that Kpe is associated with the Southwest Region of Cameroon and is geographically separated from Zone B languages by other Zone A languages surveyed here.

4.4. Yasa (A33a)

The Yasa (A33a) verbal system presents an example of a language where all verbs end in vowels, but where there is no evidence that they are morphologically independent. Instead, they appear to be part of the verb stem. Examples of verb stems, drawn from Bôt (2011: 90), are provided in Table 5. The vowels appearing at the end of a stem are restricted to *ɛ*, *ɔ*, or *a* in a seven-vowel system.

Table 5: Yasa verb stems

Stem	Gloss
lɔ̀ndɛ̀	'sew'
bámɛ̀	'scold'

péwà	‘weigh’
ànà	‘fight’
ɔ́bɔ̀	‘fish’
ɔ̀kɔ̀	‘curse’

In Table 6, a number of Causative verb forms in Yasa are presented (Bôt 2011: 92), in Table 7, a number of Passive forms (Bôt 2011: 95), and, in Table 8, a number of Reciprocal forms (Bôt 2011: 97).[22] What is important in this context is that these forms provide no evidence for the presence of a distinct FV morpheme.

Table 6: Yasa Causative stems

Stem	**Gloss**	**CAUS**	**Gloss**
ndʒándʒà	‘work’	*ndʒándʒíjɛ̀*	‘make work’
bétà	‘show’	*bétíjɛ̀*	‘make show’
làpà	‘speak’	*làpìjɛ̀*	‘make speak’
lùŋgà	‘get angry’	*lùŋgùwɛ̀*	‘annoy’
kúd^{w}à	‘go out’	*kùd^{w}úwɛ̀*	‘bring out
wùpà	‘become wet’	*wùpùwɛ̀*	‘make wet’

The Causative suffix is analyzed as having a VCV shape where it invariably ends in *ɛ*, the initial V harmonizes as *i* or *u* depending on whether the vowel preceding it is rounded, and the intervening C appears as *j* after *i* and *w* after *u*. The presence of this suffix is associated with the loss of the last vowel of the stem. This can be accounted for via a general elision rule where the first vowel in a VV sequence arising as the result of morphological concatenation is deleted (Bôt 2011: 93). Due to the fact that Causative forms end in an invariant vowel, they provide no evidence for the presence of morphologically active final vowels in Yasa.

[22] Based on the translations provided for the Passive forms in Yasa by Bôt (2011), the Yasa Passive appears to be used as a marker of both passive and middle verbs. Its form suggests it can be associated with the PB positional *-am (see Dom et al. 2016:135–137 for relevant comparative discussion).

Table 7: Yasa Passive stems

Stem	**Gloss**	**PASS**	**Gloss**
lɔ̀ndɛ̀	'sew'	*lɔ̀ndɛ̀mɛ̀*	'be sewn'
bàdɛ̀	'add'	*bàdɛ̀mɛ̀*	'be added'
tɔ̀kɔ́lɔ̀	'collect'	*tɔ̀kɔ́lɔ̀mɔ̀*	'be collected'
ɔ̀:kɔ̀	'slander'	*ɔ̀:kɔ̀mɔ̀*	'be slandered'
pútà	'hunt'	*pútàmà*	'be hunted'
ɲá	'smoke'	*ɲámà*	'be smoked'

Table 8: Yasa Reciprocal stems

Stem	**Gloss**	**RECP**	**Gloss**
búsɛ̀mɛ̀	'reunite'	*búsɛ̀mɛ̀nɛ̀*	'meet'
vítɛ̀mɛ̀	'pursue'	*vítɛ̀mɛ̀nɛ̀*	'pursue each other'
ɔ̀:kɔ̀	'slander'	*ɔ̀:kɔ̀nɔ̀*	'slander each other'
tìlà	'write'	*tìlànà*	'write to each other'
lówà	'insult'	*lówànà*	'insult each other'
lúmà	'prick'	*lúmànà*	'prick each other'

The Passive and Reciprocal are both formed with the addition of CV syllables at the right edge of the verb, where the vowel fully harmonizes with the preceding vowel. This pattern, too, does not provide any evidence for morphologically active final vowel. It would be logically possible to analyze them as having a CVC-VC-V morphological structure, following what is reconstructed for PB extensions (see §1), with a vowel harmony rule affecting the non-initial vowels. However, there is no synchronic evidence for this in Yasa, making an analysis involving a suffix with CV shape the most straightforward one for this language. What is crucially lacking in Yasa, as compared to languages showing a more canonical pattern such as Kpe, just discussed in §4.3, are FV alternations that justify treating the last vowel of a verb stem as a distinct morpheme.

Tense forms for *nʤándʒà* 'work' and *tìlà* 'write' are presented in Table 9 (Bôt 1998).[23] The tense labels presented in Table 9 are not

[23] The F2 form presented in Bôt (1998: 55) for 'work' appears to be an error, where the P3 from was inadvertently repeated. This is why 'work' is replaced with 'write' for the F2 tense in Table 9.

specifically found in Bôt (1998) but are used to reflect the fact that the different past and future tenses are characterized as encoding remoteness distinctions.

Table 9: Yasa tense forms for *ndʒándʒà* ‘work’ and *tìlà* ‘write’

Tense	**Form**	**Coding**
PRS	*ndʒándʒá-ndí*	*-ˊndí*
P1	*ndʒándʒà*	*Ø*
P2	*ɓè-ndʒándʒà-kà*	*ɓè …-KV̀*
P3	*ndʒándʒ-é*	*-é*
F1	*mú-è-ndʒándʒà*	*mú-è-*
F2	*ndʒè-tìlà-kà*	*ndʒè-…-KV̀*

As is the case for data involving verb extensions, the tense forms of Yasa also do not provide evidence for a morphologically active FV. Instead, they can be analyzed as simply taking TAMP suffixes appearing after a vowel-final verb stem. The only form which, superficially, appears to provide evidence for an FV is the P3 form, where the last vowel of the verb changes to *ɛ*. However, Bôt (1998: 51–52) analyzes this as involving a process of VV reduction comparable to what was analyzed for Causative forms in Table 6. Specifically, the P3 form, consisting solely of a vowel, unlike the other tense suffixes, triggers deletion of the preceding vowel. Moreover, in stems ending in *ɔ*, a glide epenthesis process is found where the P3 suffix is preceded by a *j* and the last vowel of the root is not deleted, as seen in a form such as *tɔ̀kɔ̀jé*, based on the root *tɔ̀kɔ̀* ‘boil’. This further suggests that *-é* ‘P3’ is a suffix appearing at the end of a vowel-final verb stem rather than an FV that morphologically alternates with other FVs. Therefore, while it would clearly be possible to see these patterns as historically connected to the reconstructed FVs, there is no good reason to analyze them as FVs from a synchronic perspective.

A natural interpretation of the Yasa patterns is that former FV morphology became lexically incorporated into verb roots. A complication for such an analysis is determining the source of the specific vowels found at the end of verb forms such as those given in

Table 5 since they are not fully predictable. This issue will be discussed further in §5.2.

4.5. Nen (A44)

Following the description of Dugast (1971), Nen (A44) is a language lacking a system of obligatory FVs (see also Mous 2003: 288). Dugast (1967) includes verbs which appear to lexically end in a vowel (e.g., *hɛ́kɛ̀* 'remove'), though a casual inspection of this dictionary suggests that such monomorphemic verbs are not especially common. At least three extensions end in a vowel, a Direct Causative *-ì*, an Indirect Causative with allomorphs *-əsi* and *-osi*, and a Neuter with allomorphs *-ɛ*, *-i*, *-o*, and *-u*. The use of these suffixes results in the appearance of numerous other vowel-final verbs (Dugast 1971: 167–168). These verb-final vowels cannot be readily associated with the reconstruced FVs. However, there is a class of verbs which appears with a partly harmonizing vowel suffix after the root in a set of environments that Dugast (1971: 166) characterizes as involving the encoding of the past tense or the imperative mood. Examples of verbs appearing with this suffix are provided in Table 10, in some cases alongside formally similar verbs that do not appear with this suffix in the relevant contexts and which are included for purposes of comparison (Dugast 1971: 230–231).[24]

[24] Dugast (1967) does not appear to give specific information about which verbs appear with this suffix. Dugast (1971: 229–232) does not systematically present verbs which do not appear with it but provides examples of a number of stative verbs of this kind since many of the verbs which do take the suffix are stative (though there are also non-stative verbs which appear with the suffix as made clear by the data in Table 10). Because of this, all of the comparison verbs are stative, even though the description makes clear that there are non-stative verbs which do not take the suffix. In the table, the suffixed form of the verbs is characterized as being associated with past tense contexts, following Dugast (1971: 230), though, as mentioned above, they appear to also be used in at least some imperative contexts.

Table 10: Nen verbs taking vocalic suffixes

Root	PST	Gloss	Comparison
lìŋ	*liŋə*	'be angry'	*lèŋ* 'be fat'
bùl	*bulə*	'hunt'	
hès	*hɛsa*	'tilt a container'	*ndés* 'limp, be wobbly'
lènd	*lɛnda*	'realize'	*lánd* 'be desiccated, dry'
nɔ̀k	*nɔkɔ*	'break'	*kɔ́k* 'be pure, guard against'
tàŋ	*taŋa*	'be early, arrive first'	*nyáŋ* 'be spicy'

What conditions whether or not a verb appears with this vowel in the relevant semantic environments is not clear (Dugast 1971: 229). It seems likely that there is at least some degree of lexical conditioning even if further analysis could partly account for which verbs appear with this vowel. Based on the examples provided in Dugast (1971), it appears that this vowel is only found on low-tone monosyllabic roots ending in a consonant, providing a possible parallel to developments in central Bantu languages noted by Grégoire (1979: 167). Mous (2003: 291–292) offers additional discussion of these vowels including a historical analysis of them as reflexes of FVs which did not undergo processes of reduction affecting other Final Vowels.[25]

The unusual distribution of this harmonizing vocalic suffix suggests that it is a relic of what was a once more productive FV system, since it is otherwise hard to envision a pathway through which such a system of marking would develop only on some verbs. A good candidate for the source of this vowel may be *-a, given that one of the surfacing shapes of this suffix is *a* and the unusual semantic distribution of the suffix in past and imperative contexts, which fits the reconstruction of *-a as a default FV. If some reflex of *-a alternated with an FV like *-ɪ in certain TAMP contexts, with *-a retaining reflexes in Nen while *-ɪ was lost entirely, this could have produced the two classes of verbs found today, i.e., one class appearing with the vocalic suffix and another class not appearing with it. These two reconstructed FVs are associated with past meaning, and there is also evidence that their appearance may have been

[25] Mous (2003: 292) also discusses vowels appearing at the end of verbs which are not sentence final in Nen. He treats these as being epenthetic due to the fact that their quality, tone, and appearance is predictable, unlike the other verb-final vowels discussed here.

conditioned by the properties of the stem that they attached to, for instance, whether or not it was extended (see Nurse 2008: 271–276 and §3.3). If this interpretation is correct, then Nen represents a case where phonological changes at the end of the verb are relevant for understanding the development of the FVs. Nen is also a case where the historical situation may have involved the use of FVs to encode unusual categories, such as a combination of tense and prosodic features of the stem such as specific tone patterns and presence of a verbal derivational suffix (see §3.3 and §3.6), assuming that factors such as these might have conditioned the source patterns for the split in Nen verbs seen today, where some appear with this vocalic suffix and others do not.

4.6. Kpa (A53)

The system of verb prefixes and suffixes found in Kpa (A53), also known as Bafia, for encoding various TAMP functions in the affirmative is presented in Table 11 (Guarisma 2003: 320), where a plus sign represents that a combination is possible and a minus sign that it is impossible. As indicated in Table 11, Kpa has a relatively developed system of verb prefixes, but only two segmental final suffixes. One of these, coding perfective semantics, is vocalic, and the other, labeled retrospective, codes something along the lines of anterior semantics and has a CV shape. The third "suffix" is tonal in nature, classified as an instance of metatony by Guarisma (2003: 319).[26] It involves a high tone appearing after the root when the verb is not phrase final. As can be seen in Table 11, there are also verb forms lacking any suffix. Guarisma (2003: 319) places the prefixes into two sets on the basis of the divergence found in the prefixes that they can combine with.

[26] Metatony is a term used to describe phenomena in specific Bantu languages where, in certain TAMP configurations, verbs appear with high tones in syllables following the root if they are not phrase final. See Guarisma (2003: 320) for her specific use of this term as it applies to Kpa and Hyman (2017: 108–112) for more general discussion of metatony in Bantu.

Table 11: Kpa TAMP encoding

			Suffixes			
			-Ø	***-ɨ́***	**metatony**	***-ɣà***
			NTR	**PFV**	**IPFV**	**RET**
	Ø-	NTR	+	+	-	+
Set 1	*á-*	P0	-	+	-	-
	ń-	P1	-	+	-	-
	ê-	PROG	-	-	+	-
	rɨ́-	HYPO	-	-	+	-
Set 2	*mʌ́-*	INCEP	-	-	+	+
	ká-	ANT	-	(+)	+	+
	kɨ́-	CONC	-	(+)	+	+

Examples of the use of the two segmental suffixes are provided in (4) for the Perfective suffix and (5) for the Retrospective suffix. Where the relationship between the surfacing verb form and the underlying morphological pattern is obscured by phonological processes, an underlying representation of the verb is provided. Of note here are phonological processes affecting verbs which produce surface patterns that are fairly distinct from the underlying patterns. In (4b), a deletion process results in the surfacing form *ɣéɛ́*, where a long vowel, in effect, marks the Perfective. In (5b), a process of coalescence results in a single consonant appearing when a consonant-final root is followed by a consonant-initial suffix. Notably, the resulting form *tékà* has a shape that formally matches the canonical CVCV form of a CVC root followed by an FV.

(4) Kpa

a. *à-kɔ̀s-ɨ́* *ɓì-dʉ̂n*
SP$_1$-gather-PFV 8-fruit
'He gathered the fruits.' (Guarisma 1992: 218)

ɓʌ̀-ɣéɛ́ *zòʔ* /*-ɣén-ɨ́*/
SP$_2$-see.PFV 9.elephant
'They saw an elephant.' (Guarisma 2003: 321)

(5) Kpa

a. *bɛ̀l* *ì-ɓá-ɣà* *rɨ̀* *ɓɔ́n* *ɓíí* *ɓʌ́'ráá*
9.ancestor SP$_9$-be-RET with 2.child 2.3SG.POSS 2.three
'God had three children…' (Guarisma 2003: 321)

b. *à-tékà* *mɔ̀nɨ́* */à-téʔ-ɣà/*
SP$_1$-take.RET 6.money
'He had taken the money.' (Guarisma 1992: 219)

While it would be premature to come to strong generalizations based on only a few forms, Kpa is a language where phonological processes appearing at the right edge of the verb stem create surface patterns which are suggestive of possible processes for the development of the Bantu FVs from a system involving suffixing morphemes with more diverse shapes, as most clearly illustrated by the verb form in (5b) (see §3.6). The *ɣɛ́ɛ́* verb form in (4b) is also indicative of how assimilatory processes can reduce vowel distinctions in ways which could result, under the right conditions, in a collapse of morphological distinctions.

4.7. Gunu (A62)

The Gunu (A62) FV system, as described in Orwig (1989), is in some ways reminiscent of what is seen in Yasa (see §4.4) insofar as a vowel at the end of a verb has no clear semantic function. Unlike Yasa, however, there is evidence that it is morphologically active. To the extent that this vowel is coding anything, this would simply be that the word in which it is found is a verb. The form of this FV is largely predictable via rules of vowel harmony provided by Orwig (1989: 288–293) that assume an underlying form of the FV as *-a*. Examples of Gunu verbs with the FV are provided in Table 12 (Orwig 1989: 289). The divisions in the table represent the different forms of the FV as conditioned by the root vowel. The last form in the table *dɔmb-a* is specifically treated as exceptional with respect to vowel harmony.

Table 12: Examples of Gunu verbs illustrating FV patterns

Stem	**Gloss**
lab-a	‘enjoy’
báan-a	‘serve food’
fá-a	‘give’
fɛm-a	‘hate’
lɛ́ɛ-a	‘talk’
bɛ-a	‘have’
fon-a	‘bless’
bid-e	‘ask’
mi-e	‘bury’
déb-e	‘contain’
fug-e	‘mix’
buig-e	‘close’
sɔ̀s-ɔ	‘suck’
ɔ́b-ɔ	‘feel’
dɔmb-a	‘leave, pass’

In Table 13, examples of verbs appearing with various extensions are presented (Orwig 1989: 290–293). Forms carrying a Causative suffix are separated from the others due to the fact that this suffix triggers vowel harmony patterns affecting both the root and the FV. While FVs are not used to code morphological distinctions in Gunu, the fact that they are separated from the root in the presence of extensions indicates that they are still analyzed as morphologically distinct from the root.

Table 13: Gunu verbs with various extensions

Stem	Extended Stem	Form	Gloss
fól-a	*fól-ɛd-a*	DIM	'sweep'
bɔl-ɔ	*bɔl-ɛn-ɔ*	APPL	'borrow'
mag-a	*mag-ɛn-a*	APPL	'try'
nog-a	*nog-ɛn-a*	APPL	'braid'
ɔ́b-ɔ	*ɔ́b-ɔn-ɔ*	ITER	'feel'
ság-a	*ság-an-a*	ITER	'dry'
dɔmb-ɔ	*domb-i-o*	CAUS	'be tired'
nod-a	*nud-i-e*	CAUS	'vomit'
húm-e	*húm-i-e*	CAUS	'go out'

The Gunu system is an instance where phonological processes affecting vowels at the end of verb stems are relevant for understanding its FV system (see §3.6). In this case, it appears that patterns of vowel harmony, as well as other potential changes that are harder to historically recover, have completely neutralized any morphosyntactic distinctions that may have been encoded by the FVs. At the same time, the synchronic patterns provide good evidence that Gunu once made use of a more canonical FV system since it would otherwise be difficult to understand how a morphologically independent FV could develop on its own without any semantic function.[27]

[27] For a language with a minimal FV system like Gunu, it might also be reasonable to analyze extensions as infixes appearing before the last vowel of a CVCV verb root. However, since the last vowel of the verb is largely predictable, an FV analysis is also possible, despite its minimal semantic function. Which synchronic analysis might be adopted has relatively little bearing on the historical concerns of this chapter given that the last vowel of Gunu verbs is transparently a reflex of at least one of the reconstructed FVs (and possibly more than one depending on the precise historical details). The language Cicipu of the Kainji subgroup of Benue-Congo offers an interesting contrast to Gunu since its verbs show a largely similar pattern except for the fact that the second vowel of verbs with CV_1CV_2 structure is unpredictable. Extensions still appear before the last vowel producing a CV_1C-VC-V_2 pattern. In the Cicipu case, an infixation analysis can more straightforwardly account for the unpredictability of the last vowel of a derived verb (McGill 2009: 209–201).

4.8. Eton (A71)

Van de Velde (2008: 114) describes Eton (A71) as lacking FVs. Verbs can end in vowel, but these are not identified as associated with the reconstructed FVs. Common shapes for underived verb stems are CV, CVC, and CVCV, with CVC forms comprising around sixty percent of the collected verbs with these shapes, CVCV forms around twenty-five percent, and CV forms around fifteen percent (Van de Velde 2008: 115). Longer stems are found either because they are derived from shorter stems via verbal extensions or appear with a limited set of expansions, some of which are identical to extensions (Van de Velde 2008: 116–118).[28] The second vowel of roots with the shape CVCV is restricted to underlying *i* and *a*, the latter of which is subject to vowel harmony, and the same restriction holds for the vowels found in verbal extensions and expansions. The harmony affecting *a* is triggered by preceding mid vowels (Van de Velde 2008: 31). Examples of underived verb roots are provided in Table 14 (Van de Velde 2008: 115).

Table 14: Examples of monomorphemic Eton verb stems

Verb	**Gloss**
jà	‘sing’
vé	‘give’
tùg	‘rub’
pún	‘be afraid’
cìlà	‘forbid’
kómô	‘admire’
bémî	‘warn’

The fact that the last vowel in CVCV forms is restricted to two underlying vowels with forms that are similar to those of the reconstructed FVs, namely *-a for *a* and potentially either *-é or *-ɪ for *i*, might suggest that they should be treated as FVs. Moreover, there are morphological constructions where the vowel disappears in

[28] Expansions are similar to extensions in that they are suffixal and have comparable phonological behavior to extensions. However, they cannot be associated with any specific meaning, and they appear after roots which are not found without an expansion. See Schadeberg & Bostoen (2019: 172–173) for further discussion.

the presence of other suffixes in a way that is reminiscent of what is seen for FVs in languages whose verbs adhere more closely to canonical Bantu verb structure. Specifically, the vowel is lost when the verb appears with the causativizing suffix *-là*, as seen in the verb pair *yégî* 'learn' vs. *yéglê* 'teach' (Van de Velde 2008: 121).[29] However, Van de Velde (2008: 115) makes clear that the properties of these vowels can be predicted based on general prosodic patterns in Eton (Van de Velde 2008: 19), and there is no evidence for analyzing them as separate morphemes. Even if they were analyzable as such, there would still be the problem of explaining why they only appear on some verbs.

The patterns found in Eton raise a number of historical questions. On the one hand, the lack of FVs can, in principle, be viewed as resulting from an innovation where historical FVs were lost as morphologically active elements. Under this scenario, some roots would have lost any trace of the FV while, in other roots, a former FV would have become part of their lexical form. If this was the case, what processes would have governed which stems would have developed CVC shapes and which would have developed CVCV shapes? On the other hand, if Eton is somehow seen as representing a state of Bantu before the FV system had morphologized, there is still the same problem of understanding why some verbs have "final" vowels and others do not. In principle, one could simply say that this was due to variation in the lexical forms of different verbs, though that would raise important issues for the reconstruction of PB verb roots, suggesting that their possible shapes may have been more heterogenous than generally assumed (see, e.g., Meeussen 1967: 89). This issue will be discussed further in §5.2.

More generally in the present context, Eton is another language where phonological restrictions affecting the right edge of the verb are relevant for understanding the realization of vowels at the end of the stem (see §3.6). In particular, the presence of prosodic constraints limiting possible vowel oppositions in the second syllable of stems and also limiting stem size suggest a route through which a more heterogenous system of verbal suffixes could, in effect, be reduced to result in something like the Bantu FV pattern. If these restrictions

[29] See also Van de Velde (2008: 123, 129) for other morphological constructions showing similar patterns. The realization of the *-là* suffix with a front mid vowel in the word 'teach' appears to be due to a process of harmony affecting stem-final open syllables (see Van de Velde 2008: 38–39).

were subsequently "relaxed" at some stage of Bantu, verbal suffixal morphology could then allow stems to be expanded beyond two syllables. However, at that stage, the reduced FV pattern would have already morphologized and, in some sense, still attest to the presence of earlier prosodic restrictions.[30]

4.9. Gyeli (A801)

Grimm (2015: 215–216) discusses vowel patterns found at the end of Gyeli (A801) verbs. She provides arguments as to why, even though all Gyeli verbs end in a vowel, these should not be considered FVs, but are rather present due to syllable structure constraints. While there are restrictions on what vowels can appear in non-initial syllables, there is no evidence that these restrictions are tied to a limited number of morphological FVs and, instead, these seem to be prosodic in nature. Furthermore, extensions do not have the canonical -VC shape, where they appear between a stem and an FV. Rather, they have the shape -V or -VCV (Grimm 2015: 219), and they override the last vowel that would otherwise be found on the verb. Finally, the quality of the last vowel of a verb is not predictable and is, therefore, best analyzed as part of the lexical specification of the verb, unlike canonical FVs.

In Table 15, examples of Gyeli verbs are provided. These are mostly drawn from Grimm (2015: 223), with forms also taken from Grimm (2015: 217, 218, 224). Gyeli verb extensions are illustrated in Table 16, with forms based on the disyllabic roots *lúndɔ* 'fill oneself', *vìdɛ* 'turn sth.', and *kɛ̀lɛ* 'hang sth.'. While the presence of extensions is associated with the loss of the root-final vowel in disyllabic stems, this can be accounted for straightforwardly in phonological terms as the result of a deletion connected to hiatus resolution given the invariant vowels found in the extensions (Grimm 2015: 216–217).

[30] I leave open here the question of the timing of this proposed set of changes on the assumption that this would need to be considered in light of a more careful examination of NC verb structure (see §2). An additional complication is the possibility of cyclical change in NC and Bantu verb structures where periods of morphological and phonological reduction may have alternated with periods of morphological and phonological expansion (see Hyman 2011).

Table 15: Examples of monomorphemic Gyeli verb stems

Verb	**Gloss**
bà	'smoke'
dè	'eat'
djì	'open'
dyû	'kill'
líɛ̀	'cede, let'
bàwɛ	'carry sth.'
kɛ̀lɛ	'hang sth.'
kwàlɛ	'love'
vìdɛ	'turn sth.'
bvúɔ̀	'break sth.'
djíwɔ	'steal'
lúndɔ	'fill oneself'
gyàga	'buy'
kòla	'add'

Table 16: Verbal extensions on disyllabic verb roots in Gyeli

Extension	**Stem**	**Gloss**
Reciprocal	*lúnd-ala*	'fill one another'
Passive	*lúnd-a*	'be filled'
Causative	*lúnd-ɛsɛ*	'make sth. full'
Applicative	*lúnd-ɛlɛ*	'fill sth.'
Autocausative	*vìd-ɛga*	'turn (by itself)'
Positional	*kɛ̀l-ɔwɔ*	'assume hanging position'

Monosyllabic verbs have different behavior when appearing with extensions. They generally show an epenthetic consonant whose form is not synchronically predictable and which appears between their single vowel and the vowel of the extension. This means that they do not lose their lexical final vowel. For the few verbs that do not appear with these epenthetic consonants, their vowels still do not drop,

creating exceptional hiatus environments between the root and the extension. Relevant examples are provided in Table 17 (Grimm 2015: 217–218). Forms in the first half of the table appear with epenthetic consonants (which are bolded), and forms in the second half take the extensions without the addition of an epenthetic consonant.

Table 17: Verbal extensions on monosyllabic verb roots in Gyeli

Root	Gloss	Derived Stem	Gloss	Extension
sə̂	'vomit'	*sá**ŋg**ala*	'vomit together'	Reciprocal
bà	'smoke'	*bà**y**aga*	'smoke (by itself)'	Autocausative
dvùɔ	'hurt'	*dvù**g**ɛsɛ*	'make hurt'	Causative
bû	'destroy'	*bú**l**a*	'be destroyed'	Passive
sɔ́ɔ	'continue'	*sɔ́**s**ɛlɛ*	'continue with'	Applicative
bâ	'marry'	*bá**n**ala*	'marry one another	Reciprocal
dyú	'kill'	*dyú**w**ala*	'kill one another'	Reciprocal
vèè	'try on'	*vè**ʔ**ɛlɛ*	'make try on'	Applicative
dè	'eat'	*dí**β**a*	'be eaten'	Passive
dyâ	'lie down'	*dyáala*	'lie down together'	Reciprocal
kwê	'fall'	*kúɛsɛ*	'make fall'	Causative

As suggested by Grimm (2015: 218), the appearance of the epenthetic consonants could be historically explained via loss of consonants in roots when they appeared in word-final position, while the consonants were protected from such a process in the presence of an extension. Even if that is the ultimate historical source of the pattern, some degree of synchronic restructuring must have taken place given that the form *dè* 'eat' has an apparently straightforward PB etymology which has been reconstructed as a CV root, namely *dí (BLR 944) and, therefore, had no historical consonant which could have been lost.[31] Regardless as to the precise historical analysis, Gyeli appears to provide another example, alongside Eton, just discussed in §4.8, of the importance of prosodic size constraints for understanding Bantu morphological patterns given the differing behavior of monosyllabic and disyllabic stems (see also §3.6).

[31] The reconstructed roots referred to in the chapter are drawn from Bastin et al. (2002) and an identifier is provided for their specific reconstruction in the online version of the Bantu Lexical Reconstructions 3 (BLR) database.

Since Gyeli lacks a class of CVC verb roots, which is the canonical shape of monomorphemic verb roots in Bantu, in a pattern similar to what was seen for Yasa in §4.4, this again raises the questions of how stems in languages of this kind developed the particular lexical final vowel that they are found with.

4.10. Makaa (A83)

Makaa (A83) is a language that appears to largely lack FVs. However, it does employ a verb-final high tone that is associated with the appearance of a vowel in the expected FV position under specific circumstances. This high tone generally appears in non-progressive constructions except when coding the Distant Past, in which case it only occurs in non-progressive constructions coded for polar focus (Heath 1991: 6). This high tone does not appear on the verb but can appear on the following word, where it replaces the tone found in the word's first vowel, or it can be realized on an epenthetic vowel. The epenthetic vowel is found when this high tone would otherwise be placed before "a pronoun, a preposition, another verb, or an object without a prefix with a [low-toned] root (Heath 1991: 6)."[32] Relevant examples are provided in (6).

(6) Makaa (Heath 1991: 6–7)

a. *Mə́ ámə̀ wííŋg* ***ó****-mpyə̂.*
Mə̀ ámə̀ wííŋg ***ò****-mpyə̂*
1SG H1 P1 chase.away H2 2-dog
'I chased away the dogs.' (Heath 1991: 6)

b. *Mə́ ámə̀ wííŋg* ***ú*** *ncwòmbɛ́.*
Mə̀ ámə̀ wííŋg Ø-ncwòmbɛ́
1SG H1 P1 chase.away H2 7-sheep
'I chased away the sheep.' (Heath 1991: 6)[33]

[32] Heath (1991) does not appear to explicitly indicate how this high tone is realized in clauses where the verb is final. However, two contrasting examples that are provided by Heath (1991: 12–14), one with a transitive verb and one with an intransitive in a present perfect construction, suggest that the high tone does not appear when the verb is in final position.

[33] The translation in (6b) has been adjusted from what was provided in Heath (1991: 6) to match the gloss, since the original translation had a pronominal object rather than a nominal one.

c. *Mə á gù **ʉ́** gwòó.*
Mə *a* *gù* *Ø-gwòó*
1SG P2 H1 pick H2 7-mushroom
"I picked the mushroom." (Heath 1991: 7)

All of the examples in (6) appear with two floating high tones, one at the left edge of the verb (glossed H1) and one at the right edge of the verb (glossed H2). The high tone of interest here is the one at the right edge. In (6a), the verb appearing with this high tone is followed by the noun *òmpyə̂* 'dog' which begins with a low-tone noun class prefix. This prefix can serve as a host for the high tone, and the noun surfaces with an initial high tone, as indicated in the example. In the other two sentences, there is no postverbal host for the high tone, and, instead, an epenthetic vowel appears. This vowel is analyzed as having the basic segmental form *ʉ*, which is the form that is found when it appears between two consonants, as in (6b). If it follows a verb ending in a vowel, it assimilates to that vowel, as in (6c), where its segmental form is *u* rather than *ʉ* due the fact that follows the root *gù*.

One possible historical explanation for the appearance of these epenthetic vowels is that they represent traces of FVs that were lost in most phrasal contexts. If this is the case, it raises the question of the extent to which specific phrasal environments need to be considered in historical accounts of the development of the FVs and related patterns. The restricted distribution and quite specific conditioning of these vowels in Makaa would seem to make their analysis as relic forms more likely than their being innovations specifically to host a floating tone.

The Makaa case is not like any other language surveyed here, though the overall pattern fits into the general set of questions connected to the relationship between FVs and other suffixes, in this case a tonal suffix (see §3.4). While serious consideration is not given to the role of tone in FV formation in this survey, the Makaa epenthetic vowel makes clear that a full account of their development will need to take tonal patterns closely into account.

4.11. Kako (A93)

Kako (A93), described by Ernst (1991; 1995) and Yukawa (1992), makes use of a system of verb-final suffixes that follows a pattern

comparable to that associated with canonical FVs, but with a number of complications. Example data involving forms of the verb *ɓɛ̀ŋ* 'see' is provided in Table 18 (Ernst 1995: 11, 13). As can be seen, for this verb, one verbal category, the Subjunctive, is coded by the lack of a suffix and another category, the Past, is coded by a CV suffix. With five segmentally different Finals (including the Ø final for the Subjunctive), Kako has the largest system of Finals for any language in this survey, though the realization of these Finals can include consonants, as seen for the Past form in Table 18, which means that these cannot all be considered FVs.

Table 18: Verbal suffixes in Kako

Category	**Form**
Infinitive	*ɓɛ̀ŋ-ɛ̀*
Atemporal	*ɓɛŋ-a*
Imperative	*ɓɛ̀ŋ-á*
Subordinate	*ɓɛ̄ŋ-ɛ̄*
Subjunctive	*ɓɛ̂ŋ-Ø*
Past	*ɓɛŋ-má*

As discussed below, there are a series of complicated positional restrictions on non-initial vowels in Kako which limit the range of contrasts at the end of the verb. While it is not explicitly described as such, the FV appearing on infinitives seems to be lexically specified, though, as can be seen, it still appears to be morphologically active insofar as it can be replaced by other suffixes and its absence can be used to encode a verbal category. Ernst (1995: 15) presents at least one near-minimal pair of verb roots which appears to illustrate the lexical nature of FVs in infinitives: *kít-ɛ̀* 'to advise' and *kìt-ɔ̀* 'to style (hair)'. Comparable to what is found in some of the other surveyed languages (see §3.5), CV roots lack an FV in infinitive forms (Ernst 1995: 3). (This pattern will be discussed in more detail in §4.15.)

There are a number of morphophonological complexities involved in the realization of the Kako verb-final suffixes. This can be exemplified by considering the Past forms, as illustrated in Table 19 (Ernst 1995: 18–22).[34] The basic form of this suffix appears to be *-má*,

[34] The transcription of the Infinitive verb of 'arrive' in Table 19 has been adapted to represent nasalization with a tilde rather than the original diacritic found in the

but its form varies depending on the verb's last consonant.[35] The *-má* variant is found after CV roots and roots whose Infinitive ends in *e*, *ɛ*, and *o* and whose last consonant is a sonorant, as seen in, for example, forms like *womá* 'kill.PST' and *kelmá* 'do.PST' in Table 19. Stems ending with these vowels in the Infinitive and whose last consonant is a stop that is not palatalized, labialized, or *r* appear with a high vowel before *-má* that appears to represent a raised variant of the FV found in the Infinitive. This is seen in the forms *kitimá* 'advise.PST' and *wokumá* 'hear.PST' in Table 19. Stems whose FV in the Infinitive is *a* retain the vowel when *-má* is added, as seen in a form like *sanamá* 'work.PST'. Stems ending in palatalized or labialized consonants or extended stems whose Infinitives have FVs *e* or *ɛ* take *-á* in the Past, as in forms like *kwadʸá* 'love.PST' and *njesá* 'send.PST'. Ernst (1995: 21) only provides an example of an extended verb that independently ends in a palatalized consonant, which is why this is the only extended form included in the fifth set of forms provided in Table 19. Finally, there are a number of CV stems which are irregular, forming the past by replacing their last vowel with *á*, as seen, for example, in the opposition between the Infinitive and Past forms of 'hear' where *gwé* alternates with *gwá*.

source.

[35] A potential etymology for this suffix is that it represents a morphologization of the reconstructed verb *màd 'finish'. See Nurse (2008: 252–253) for discussion of verbal prefixes with shape *ma-* found in some Bantu languages which can be traced to the same reconstructed verb.

Table 19: Variation in past tense formation in Kako

Infinitive	**Past**	**Gloss**
wó	*wo-má*	‘kill’
ɗyə̀̃	*ɗyaŋ-má*	‘arrive’
kèl-ɔ̀	*kel-má*	‘do’
kít-è	*kit-i-má*	‘advise’
wōk-ɔ́	*wok-u-má*	‘hear’
sán-à	*san-a-má*	‘work’
jámbìn-à	*jambin-a-má*	‘cook’
kwàɗy-è	*kwaɗy-á*	‘love’
ɓèŋw-è	*ɓeŋw-á*	‘follow’
njès-è	*njes-á*	‘send’ (*s* = [ʃ])
dók-ìɗy-è	*dok-iɗy-á*	‘add’
kɛ̀	*ká*	‘go’
njɛ̀	*njá*	‘come’
gwé	*gwá*	‘die’

Other verbal forms show similar complications in their phonological realization. For instance, the Atemporal, which takes the suffix *-a* in Table 18, has allomorphs with a CV shape where the initial consonant is a velar followed by a harmonizing vowel, resulting in forms such as *wo-ku*, based on *wó* ‘kill’. There are also forms where the Atemporal is coded by the lack of a suffix, as in *kel*, based in *kèlɔ̀* ‘do’, among various other realizations (Ernst 1995: 24–28). The Imperative also shows fairly complex patterns of allomorphy as well as segmental overlap with the Atemporal in a number of cases (Ernst 1995: 37). The Subordinate form has a simpler segmental realization, which is often the same as the Infinitive, except for verbs whose Infinitive ends in an *-ɔ*, in which case it changes to *-ɛ* (Ernst 1995: 38). The Subjunctive also often takes on the same form as the Infinitive, except for verbs whose FV is *-ɛ* or *-ɔ*. These become *-i* and a harmonizing high vowel respectively after non-palatalized and non-labialized stops and delete after nasals (Ernst 1995: 41). This last variant is the one seen in Table 18.

Taken together, the pattern that emerges is one where there is evidence for six distinct verbal patterns of suffixation associated with

the expression of TAMP categories, as exemplified in Table 18, though these distinctions can be neutralized in specific verb forms and their realization can be controlled by a number of complicated factors sensitive to root-final phonology (see also §3.6).

An added layer of complication to the Kako system are restrictions on the allowable vowel qualities in final syllables of the Infinitive forms of verbs. These are summarized in Table 20 (Ernst 1995: 8, see also Ernst 1991). The table provides information on what vowels are allowed, separated by the final consonant of the root and whether the stem, including the FV, is two or three syllables (in the column labeled *σ*). This means that, in effect, FVs can simultaneously encode a morphological category (e.g., that a verb is in the Infinitive form) while also partly encoding aspects of the prosodic properties of the verb that they appear with (e.g., whether it is two or three syllables in length), though these categories are not necessarily uniquely encoded by a given vowel (see also §3.3). The FV *-ɔ*, for instance, is only associated with a subset of verbs that have two syllables including the FV, while the FV *-e* is mostly restricted to three-syllable verbs, excluding those whose final consonant is a palatal. A vowel like *-a*, by contrast, is less prosodically restricted and cannot be seen as encoding any information about the phonological properties of the verb other than the fact that it does not end in a labial-velar.

Table 20: Prosodic restrictions on final vowels in Kako Infinitives

Final consonant	***σ***	**Final vowel**			
Sonorant	2		ɛ	a	ɔ
(*m*, *n*, *ŋ*, *l*, *y*, *w*)	3	e		a	
Palatal	2	e	ɛ	a	
(*ɗy*, *ny*, *nj*; some *s*, *w*)	3	e	ɛ	a	
Labial-velar	2		ɛ		
(*kw*, *gw*, *ŋgw*)					
Occlusive	2		ɛ	a	ɔ
(*p*, *ɓ*, *t*, *k*, *mb*, *nd*, *ŋg*, *ŋgb*, *gb*, *r*; some *s*, *nj*)	3	e	ɛ	a	

The Kako patterns are perhaps the most interesting among the surveyed languages in the present context since they suggest a historical model for the development of the Bantu FVs involving an interplay between stem-final processes resulting in suffixal consonant loss (e.g., the *m* of the Past suffix as exemplified in Table 19) alongside prosodic processes affecting vowels, including not only vowel harmony patterns but also positional restrictions of the sort seen in Table 20. Taken together, these processes could result in phonological reductions that would cause formerly distinct morphemes to become segmentally homophonous. While these patterns of homophony are limited to specific phonological contexts in Kako, if they were to become extended to a wider range of contexts, it is possible to imagine the resulting system being limited to a small set of vowels, along the lines of what we see in Bantu languages showing the canonical Bantu FV pattern. Of course, this is speculative, and many details would need to be filled in to map out how a Kako-like system could develop into a canonical Bantu one. However, given that the ultimate source of the Bantu FVs is otherwise unclear, the phonological alternations associated with TAMP suffixes in Kako can potentially be seen as a model for the initial steps of a pathway for their development.

4.12.Myene (B11)

The Myene (B11) FV system is closer to the canonical Bantu system than the languages considered to this point except for Kpe (§4.3), and, in general, the surveyed languages of Zone B show more canonical FV patterns than the surveyed languages of the Zone A. In Myene, most verb stems end in an FV *-a* which can change in different TAMP configurations, as would be expected. There is, however, a class of verbs ending in *o* and *e* which have an invariant last vowel, meaning that they constitute lexical exceptions to the usual patterns (see §3.5). Verbs ending in *o* also include those which have been passivized via the replacement of FV *-a* with Passive marker *-o* (Gautier 1912: 82). The historical significance of this pattern will be discussed in more detail in §4.15. Examples of verbs showing FV *-a* in their Infinitive forms and *o* or *e* as their last vowel in their Infinitive forms are provided in Table 21 (Gautier 1912: 82).[36] The form *ke* ‘go’ in Table

[36] The transcription of the data in Table 21 has been adjusted to replace an original use of *è* and *ò* with *ɛ* and *ɔ* respectively, following my interpretation of Gautier (1912: 3). The verb *dyɔgo* ‘hear’ in Table 21 is presumably a reflex of the reconstructed root *jígu (BLR 3423), whose CVCV structure would already have

21 is synchronically treated as a short form of the regular verb *kẽnda*, though these forms go back to two distinct PB forms, namely *gì (BLR 1371) and *gènd (BLR 1363).

Table 21: Myene Infinitive forms

Verb	**Gloss**
bag-a	'bring'
bɛn-a	'plant'
but-a	'look for'
pon-a	'watch'
dẽnd-a	'do'
tang-a	'count'
dyɔgo	'hear'
avoro	'know'
ko	'be able'
re	'be'
zele	'not be'
ke	'go'

Myene otherwise appears to make use of two FVs, *-i* and *-e*, in addition to *-a* in the canonical way. Gautier (1912) does not appear to make an explicit statement regarding the existence or specific semantics of these two vowels, but they can be found in the verb conjugations provided, and the *-i* is associated with the past and the *-e* with subjunctive and subordinate contexts. Representative forms are provided in Table 22, based on the verb root *dyen* 'see' (Gautier 1912: 84–85).[37] Morphological segmentation in Table 22 is my own. Some forms are coded with an Imperfect suffix *-ag* appearing between the stem and the FV. Except for the Imperative, the forms are provided with a first person singular subject pronoun, as provided in the source.

been irregular in PB.

[37] Although not of direct relevance to the current study, Myene verbs can also show an interesting pattern of initial consonant mutations, resulting in two stems forms, one with a "weak" consonant and one with a "strong" consonant, as seen, for instance, in the Infinitive/Imperative pair *pona* 'to watch' vs. *wona* 'watch!' (Gautier 1912: 81–82). This is seen in the table below where the initial consonant of the root alternates between *dy* and *y*.

Spaces in the forms are also those provided in the source. Verbs whose stems end in *o* and *e* do not participate in these suffixal alternations, and verbs ending in *e* are additionally characterized as defective, i.e., lacking certain expected inflectional forms (Gautier 1912: 82).

Table 22: Verb forms in Myene

Verb form	**Function**
yen-a	Imperative
mi dyen-a	Present
my a-dyen-a	Immediate Past
my a-dyen-ag-a	Immediate Imperfect
my a-dyen-i	Near past
my a-dyen-ag-i	Near Imperfect
mi be dyen-a	Future
mi ga yen-e	Necessitative Subjunctive

While the presence of lexical exceptions in Myene raises historical questions regarding the path through which the FV system developed, its FV system is otherwise quite recognizable as a canonical Bantu system.

4.13.Kota (B25)

The Kota (B25) FV system appears to be largely canonical in form. Piron (1990: 129) describes three different segmental final suffixes, with forms *a*, *e*, and *ɛtɛ*. The *-a* can appear with a high tone or a low tone, while the *-e* and *-ɛtɛ* are both described as only appearing with a high tone. The FV *-a* is used with a wide range of verb forms in the affirmative and negative contexts, as well as past, present, and future contexts, and clearly is best understood as the default FV. The *-e* is described as appearing only with the Negative Present and the *-ɛtɛ* only in a Present Affirmative form associated with semantics involving an action that is being done for the first time, and it can presumably be historically associated with the Perfective *-ile (see

§1).[38] Examples forms of Kota verbs with these suffixes are given in Table 23 (Piron 1990: 131–139).

Table 23: Verb forms in Kota

Verb form	Gloss	Translation	Function
jók-ák-á	‘listen-IPFV-FV’	“listen!”	Imperative
mà-hút-á	‘1SG.TAMP-pay-FV’	“I pay”	Present
já-mò-làp-á	‘3SG.TAMP-TAM-disappear-FV’	“he disappeared”	Recent Past
já-ká-làp-á	‘3SG.TAMP-TAM-disappear-FV’	“he has not disappeared”	Recent Past Negative
mé-kón-àk-à	‘1SG.TAMP-plant-IPFV-FV’	“I will plant”	Immediate Future
mà-jók-étɛ́	‘1SG.TAMP-listen-FV’	“I am listening”	Present (“first time”)
má-bép-é	‘1SG.TAMP-carry-FV’	“I don’t carry”	Present Negative

Piron (1990) does not appear to contain an explicit statement regarding how roots which end in a vowel, such as verb roots with form CV, behave with respect to the presence of FVs and whether there may be lexical exceptions to the normal patterns. However, a partial paradigm of forms is provided for the CV verb root *dì* ‘be’, and it does appear to take FVs.[39] For instance, there is a Present form *àdjɛ́̋* (with a Class 1 subject prefix), analyzable as *à-dì-ɛ́*, which irregularly takes an FV with form *ɛ́*, rather than the expected *-a*. This is unlike Myene (see §4.12) where comparable exceptional verbs do not take an FV of any kind and end in invariant vowels regardless of the TAMP configuration in which they appear. Similarly, there is a past form with a Class 1 subject prefix *àdjàsá*, analyzable as *à-dì-à-sá* (with a Postfinal suffix *-sá*), which takes an FV *-a* in the canonical way (Piron 1990: 142–143).

Piron (1990: 62) describes a vowel harmony rule that can affect FV *-a* causing it to surface as *ɔ* after *ɔ* and *ɛ* after *ɛ* (see also §3.6). The latter change is of interest here due to the fact that this could result in a partial formal segmental overlap between FV *-a* and the Final suffix

[38] Piron (1990: 129) labels this suffix as coding a present tense, but Piron (1990: 133) implies it codes a past tense. The translations suggest it codes a present tense form, which is why I am using that label here.

[39] Piron (1990: 62) contains an abstract analysis of the conjugation of a CV verb *sɔ̀* ‘say’ that includes a FV at an underlying level of representation, though it is difficult to assess the extent of the evidence for this analysis. Piron (1990: 68) also gives derivations for CV and CVCV roots where they take the usual FV verb morphology. However,an intervening Imperfective suffix in these examples makes them not ideal for establishing their overall morphological behavior with respect to FVs.

-ɛtɛ in certain phonological contexts. This could lead to partial formal conflation, for instance with the second vowel of *-ɛtɛ* being reanalyzed as a surfacing form *-a*. Nevertheless, overall, the Kota system is in line with the canonical Bantu system.

4.14. Himba (B302)

Himba (B302) has four segmental FVs, an *-i* and *-e*, both appearing with low tones, an *-a* appearing with high and low tones, and an *-o*, appearing with a high tone (Rekanga 2000: 468). This makes it, along with Kpe, one of the languages with the highest number of FVs encountered in the survey. The first three FVs follow typical patterns. The *-i* and *-e* are relatively restricted in the contexts in which they occur, with *-i* found in recent past contexts and *-e* found in some present and future contexts. The FV *-a* appears in a wide range of other contexts, following its general pattern as a default FV. The FV *-o* is restricted to a specific infinitive construction that is also coded with a prefix. Relevant examples are provided in Table 24 (Rekanga 2000: 468–472).[40]

Table 24: Verb forms in Himba

Verb form	Gloss	Translation	Function
à-hù:ɲ-í	'3SG.TAMP-throw-FV'	"he threw"	Recent Past
ò-ndé-hù:m-è	'2SG-TAMP-descend-FV'	"you descend"	Present
à-ndé-bé-pù:p-á	'3SG-TAMP-TAMP-move-FV'	"he moves first"	Present Precessive
à-má-kìn-áɣ-à	'3SG-TAMP-refuse-IPFV-FV'	"he had refused"	Remote Past
ò-hómb-à	'2SG-buy-FV'	"that you buy"	Present Subjunctive
ò-há-nà-dʸ-à	'2SG-TAMP-TAMP-come-FV'	"that you do not come"	Negative Subjunctive
mó-ɣènd-á:ɣ-ò	'18-go-IPFV-FV'	"to go"	Infinitive

The FV *-o* only appears in infinitive forms with a specific prefix and also, apparently, requires the presence of an additional *-aɣ* suffix, which is found in the two examples provided in Rekanga (2000: 472). The restricted distribution of FV *-o* is an indication that it is a recent

[40] Rekanga (2000: 469) appears to label the form *òndéhù:mè* in Table 24 as a Recent Past but provides a Present translation, which is the category in which the verb is placed here. The identification of the *-aɣ* suffix as an Imperfective is my own, on the assumption that it is a reflex of *-ag. The identification of the *mo-* prefix in the last form of the table with Class 18 is also my own.

innovation. This is also suggested, of course, by the comparative picture. The source of this *-o* is not clear, but it does at least point to the potential for the development of new FVs in languages that otherwise appear to have a relatively stable canonical FV system.

While the behavior of verbs that might present potential lexical exceptions to FV patterns does not appear to be discussed in a general way, Rekanga (2000: 471) does provide the example *òhánàdʸà*, presented in Table 24 and based on a verb root analyzed as underlyingly having the form *dyè* 'come'. This suggests that there are not lexically-conditioned exceptions to the FV patterns given that this inflected form of the verb ends in *a* rather than *e*. It does appear, however, that the presence of the Passive suffix overrides the presence of an FV, as evidenced by forms like *nómàítsú* 'it (cl. 11) was given', based on the verb root *its* 'give', and *àndéhèβɔ́nɔ́* 'he was chosen', based on the verb stem *hɛvɔ́n* 'choose' (Rekanga 2000: 321) (see §3.4). In both cases, the last vowel of the verb can be associated with a Passive suffix analyzed as being underlyingly *o* that is affected by vowel harmony.[41] A full range of passivized verbs, in particular across the different possible FVs, is not presented in Rekanga (2000). So, there may be complications in the realization of the Passive that were not reported.

Overall, the Himba FV system is largely in line with the canonical Bantu system with the major points of difference being the development of the FV *-o* in one of the language's infinitive constructions and the fact that the Passive suffix apparently overrides the appearance of FVs that would otherwise be expected.

4.15.Punu (B43)

Punu (B43), following the descriptions of Bonneau (1956: 44–45) and Fontaney (1980: 75), makes use of FVs that are in line with the canonical Bantu pattern, though with some noteworthy differences. Most inflectional verb forms end in an FV *-a* which has a default status. There is also a final *-i* that appears in a small set of inflected forms, namely the Affirmative and Negative Present, Imperative verbs which are also marked for an object prefix, and the Affirmative Subjunctive. The latter two domains are associated with FV suffixes

[41] For this study, I had access only to the second volume of a multivolume work, which focuses on the morphology of Himba. Because of this, I was not able to examine the part of the work discussing processes of vowel harmony.

whose segmental form is reconstructed as *e by Meeussen (1967: 112), and the Punu *-i* in these contexts is presumably connected to the same pattern that prompted this reconstruction. The use of *-i* in negative verbs can also be connected to a form (tentatively) reconstructed by Meeussen (1967: 110) as *-ɪ. The use of an *-i* in the present affirmative would appear to represent some kind of innovation. Example verb forms, based on the stem *dibíg* 'close', which appears with an Impositive extension *-ig* [*iɣ*] (Fontaney 1980: 59), are presented, in Table 25.[42] Those verbs with subject marking appear with the 1PL marker *tu-*. The forms and category labels are drawn from Fontaney (1980: 78–80).

Table 25: Regular verb forms in Punu

Verb form	**Function**
u-dibíg-a	Infinitive
tu-kí-dibíg-a	Near future
tu-gó-dibíg-a	Future Negative
tú-tsi-díbig-a	Perfective
tu-má-dibíg-a	Imperfective
díbig-a	Imperative
tú-í-díbig-i	Present
tu-gé-díbig-i	Present Negative
tu-dibíg-i	Subjunctive
ji-díbig-i	Imperative (with object marker)

There are two general classes of exceptions to the patterns exemplified in Table 25. Verbs which end in vowels other than *-a* in their citation form have invariant vowels when conjugated. Some of these have the form CV, but Bonneau (1956: 44) also indicates that there are underived longer verbs, such as *ulu* 'hear' and *gufi* 'be small'. Example forms from two CV verbs of this class, *ji* 'eat' and *nu* 'drink' are presented in Table 26 (Fontaney 1980: 95–96). Regular FV patterns can re-emerge in these stems in the presence of extensions.

[42] See Schadeberg & Bostoen (2019: 178–179) for discussion of the Impositive in a comparative Bantu context.

For instance, a causativized form of ‘drink’ has the form *nu-ís-a*, which then follows the pattern seen in Table 25.

Table 26: Invariant final vowel forms in Punu

Verb form (‘eat’)	**Verb form (‘drink’)**	**Function**
tú-í-ji	*tú-í-nu*	Present
tú-ú-ji	*tú-ú-nu*	Future
tú-tsí-ji	*tú-tsí-nu*	Perfective

The other class of exceptions to the patterns exemplified in Table 25 are passivized verbs, which appear with a final *-u*. The Passive *-u* overrides any other expected FV (Fontaney 1980: 75). For instance, a verb like *lab-a* ‘see’ would have the form *lab-u* when passivized and behave like the verb *nu* ‘drink’, seen in Table 26 (Bonneau 1956: 45).

The Punu patterns are interesting due to the presence of lexical and morphological exceptions to canonical FV patterns (see §3.5). The primary question that this raises from a comparative perspective is how such a pattern could have developed. While the available sources do not provide comprehensive lists of exceptional verb roots such as those seen in Table 26, three that are presented have apparent PB etymologies. For the verbs in Table 26, it is presumably the case that *ji* ‘eat’ is a reflex of PB *dɪ (BLR 944) and *nu* is a reflex of *nyó (BLR 7047) and that a third verb *fu* ‘die’ (Fontaney 1980: 96) is a reflex of *kú (BLR 2089). See also Nsuka Nkutsi (1980). The exceptionality of these forms cannot be seen, therefore, as attributable to their being borrowed or connected to some other irregularity due to contact. The same holds for the Passive suffix.

If we assume that the canonical Bantu FV pattern can be associated with PB, we would need to propose a process where FVs were lost in these forms in Punu, perhaps accompanied by a vocalization process if their vowels had surfaced as glides when followed by an FV. The conditions that would allow such a change to take place are not obvious. However, in the Punu case, the fact that the vowel *a* would typically have appeared as [ə] in final position (Kwenzi Mikala 1980: 10) may have made it more likely to be lost in that context when preceded by another vowel. Alternatively, if we assumed that the exceptional verb forms in Punu represent an archaism before the

canonical FV system had completely developed, then that raises questions about the timing of the emergence of FVs in Bantu and specifically suggests that they may not yet have been fully morphologized in PB.

4.16.Nzebi (B52)

Nzebi (B52) is described as making use of two FVs, *-a*, in most forms—i.e., serving as a default—and *-i* in forms encoding the Perfect (Marchal-Nasse 1989: 119). The *-a* FV can be affected by a rule of vowel harmony causing it to assimilate to a preceding *ɛ*, *ɔ*, or *u*. It can also appear as *ə* in some cases (Marchal-Nasse 1989: 113). The FV *-i* can trigger patterns of regressive harmony raising preceding vowels (see, e.g., Marchal-Nasse 1989: 121–123, 130–131).[43] None of these processes appear to create any ambiguity with respect to which FV is appearing on a verb. Example verbs are provided in Table 27 (Marchal-Nasse 1989: 461–490).[44]

Table 27: Verb forms in Nzebi

Verb form	Gloss	Translation	Function
bà:-só:mb-á	'SM2.TAMP-buy-FV'	"they buy"	Neutral Present
bi-sa:-díb-əg-á	'SM8-TAMP-close-IPFV-FV'	"they don't close"	Negative Present
ní-ba-bɔ́:ng-ɔ	'TAMP-8-take-FV'	"they will take"	Indeterminate Future
bi-ma-díb-əg-a	'SM8-TAMP-close-FV'	"they have already closed"	Near Past
by-á-só:mb-ə́s-á	'SM8-TAMP-buy-CAUS-FV'	"they had sold"	Distant Past
bi-dib-ig-i	'SM8-TAMP-close-IPFV-FV'	"they have closed"	Perfect
a-sa-bé:mb-i	'SM1-TAMP-touch-FV'	"he has not touched"	Negative Perfect

Verb roots with shape CV appear with an expansion *-ad*, which is then followed by the regular FV. So, while these have exceptional behavior, they follow the regular FV patterns. The verb *kú* 'die', for example, has the infinitive *u-kw-á:d-a* (Marchal-Nasse 1989: 439–440).

While not specific to FVs, vowels found at the end of words longer than one syllable, which includes FVs, are subject to various reduction

[43] This pattern is also discussed in Guthrie (1968: 102–103).
[44] The identification of the *-Vg* [*Vx*] suffix with an imperfective is my own, on the assumption that it is a reflex of *-ag.

processes, which present possible historical models for the loss of FVs in other languages (Marchal-Nasse 1989: 42–43; see also Guthrie 1968: 119).

Overall, from a formal perspective, Nzebi's FV system more or less follows the pattern illustrated in Figure 1. The system is the smallest logically possible size of just two vowels, and it has a limited functional load, since the *-i* vowel appears in a fairly narrow set of forms. It shows some phonological complications, though not any that appear to shed any particular light on the development of FVs generally.

4.17. Overview of survey results

Table 28 places the languages covered in this survey into five broad categories based on the nature of their FV systems. This categorization is intended to complement the information provided in §3, which focused on grammatical phenomena relevant to understanding FV patterns rather than the languages themselves. The five categories are as follows: (i) Languages that show verb-final morphology that may show some similarities to FVs as found in canonical Bantu verbs as described in §1 but which also have features that cannot be straightforwardly connected to the reconstructed FVs of Meeussen (1967: 110). These are classified as having *non-canonical Final morphology*. (ii) Languages where vowels are found at the end of verbs in ways that show phonological parallels to verbs that appear with FVs but where there is no evidence that these vowels should be treated as distinct morphemes. These are classified as languages with *vowels found at the end of verbs, no distinctions encoded.* (iii) The one language in the survey that did not show any evidence of regular segmental FVs, Makaa (§4.10), categorized under the label *no regular segmental Final Vowels*. (iv) Languages which showed evidence for a relatively canonical FV system but where there were also exceptional verbs where FVs were not found. These are classified as having *canonical Final Vowel morphology, with exceptions*. And, (v) languages whose FV systems follow the canonical pattern, which are classified as having *canonical Final Verb morphology*. The results of the survey are furtjer discussed in §5.

Table 28: Overview of the results of the survey

Categorization	**Language**	**Summary of system**
Non-canonical Final morphology	Akoose (§4.2)	A complex system of verb-final TAMP encoding potentially involving multiple suffixes
	Nen (§4.5)	An FV appears on some verbs in a narrow set of semantic contexts
	Kpa (§4.6)	A complex system of verb-final TAMP encoding with only one vocalic suffixal element
	Kako (§4.11)	A complex system of verb-final TAMP encoding with both vocalic and non-vocalic suffixal elements
Vowels found at the end of verbs, no distinctions encoded	Yasa (§4.4)	Verbs end in lexically unpredictable vowels which do not exhibit clear evidence of having morphological status
	Gunu (§4.7)	Verb stems end in a morphologically separable vowel, but it does not encode TAMP contrasts
	Eton (§4.8)	Some verbs end in lexically unpredictable vowels which do not exhibit clear evidence of having morphological status
	Gyeli (§4.9)	Verbs end in lexically unpredictable vowels which do not exhibit clear evidence of having morphological status
No regular segmental Final Vowels	Makaa (§4.10)	Verbs do not generally end in vowels, but epenthetic vowels can appear after verb stems where a Final Vowel would be expected under specific phonological circumstances
Canonical Final Vowel morphology, with exceptions	Kpe (§4.3)	Four Final Vowels are found, but some verbs exceptionally end in invariant vowels
	Myene (§4.12)	Three Final Vowels are found, but some verbs end in invariant lexical vowels and Passive verbs are derived via an invariant verb-final vocalic suffix
	Himba (§4.14)	Four Final Vowels are found, but Passive verbs appear to be derived via an invariant verb-final vocalic suffix
	Punu (§4.15)	Two Final Vowels are found, but some verbs end in invariant lexical vowels and Passive verbs are derived via an invariant verb-final vocalic suffix
Canonical Final Vowel morphology	Kota (§4.13)	Two Final Vowels are found without any apparent exceptional behavior, along with one segmentally more complex Final element
	Nzebi (§4.16)	Two Final Vowels are found without any apparent exceptional behavior

5. Conclusion

5.1. When did the FVs develop?

Given the variability found with respect to verb-final morphology in this survey, an important concern that arises in the PB context is determining the stage of PB at which the reconstructed system developed. In order to consider this more closely, the map provided in Figure 2 provides the location of each of the surveyed languages while also indicating how they were categorized with respect to the five broad classes introduced in §4.17 (see Table 28).[45]

[45] This map was created using tools developed by Moroz (2017). The background map was produced by Thunderforest (see http://www.thunderforest.com) using data from OpenStreetMap (see https://www.openstreetmap.org/copyright).

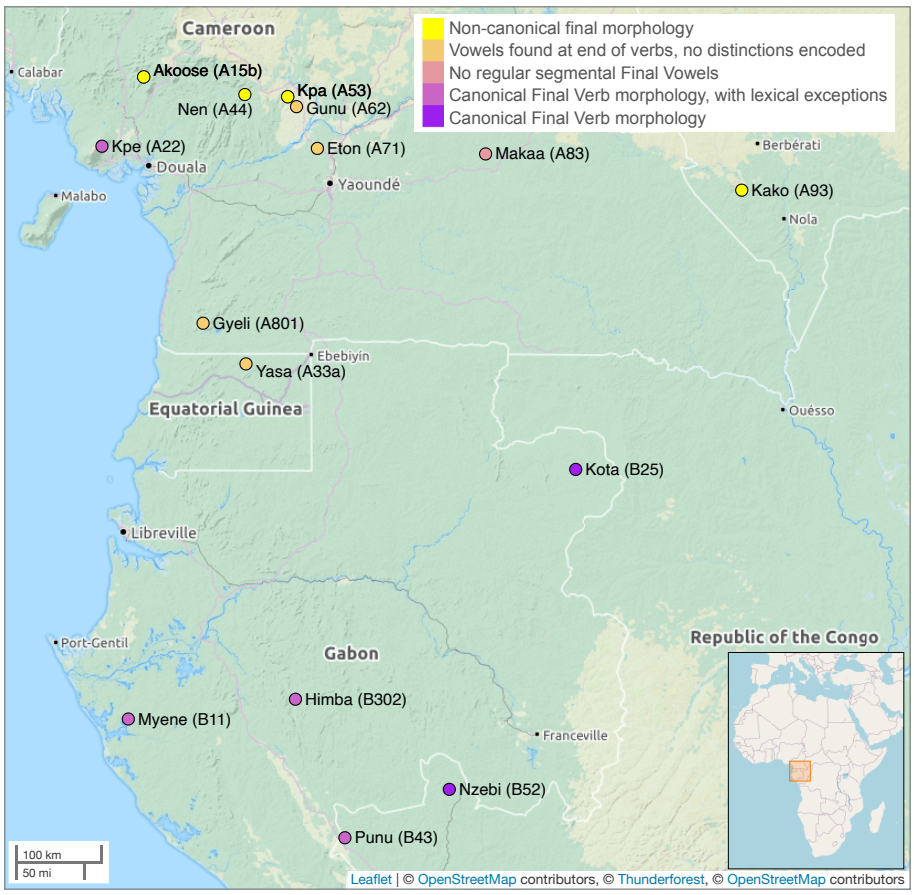

Figure 2: Locations of languages and overview of FV patterns found in this survey

In this map, a clear pattern emerges, where the languages in the southern part of the survey area in Gabon all have FV systems that are in line with the standard reconstructions, though some of these have lexically exceptional verb stems. In the northern area, with the exception of Kpe, the languages deviate from the reconstructed patterns in various ways, and they do not provide clear evidence for the reconstructed system.

The languages whose FV systems are in line with the reconstructed PB system, with the exception of Kpe, would appear to correspond most closely to those belonging to Node 2 of the phylogenetic tree in Grollemund et al. (2015: 2). This node includes most of the languages in Zone B and higher, as well as some languages from the A80 and

A90 groups. This could suggest that the canonical FV system was a relatively late development. Alternatively, a contact explanation could be given wherein FV patterns in line with the reconstructions were earlier present in the languages in the northern part of the northwestern area. These might have become reduced due to areal processes of morphological reduction by virtue of the fact the languages in Zone A are in the "buffer" region between isolating Kwa-type languages to their north and west and more canonically agglutinating languages to their south (see, e.g., Hyman 2004, Good 2012, 2017: 476–484 for relevant discussion and Stilo 2005 for discussion of the concept of a buffer zone). Under this interpretation, Kpe could be viewed as a relatively conservative language within the region.

At this stage, I believe it would be premature to argue that either of these scenarios is more likely than the other, or that they should be seen as mutually exclusive since the full historical picture almost certainly involved an interplay between genealogical and areal factors. The most important point to emerge from this study is that the northwestern Bantu data does not obviously point to the reconstructed FV system having been fully in place before the diversification of the Bantu languages, at least given the conventional understanding of what languages comprise the family.

5.2. How did the Final Vowels develop?

The survey presented in §4 does not point to any clear answers with respect to the development of the FVs in Bantu. However, it does reveal patterns of complexity suggesting that FV systems in the northwestern Bantu area cannot simply be understood as a straightforward reduction of the canonical Bantu pattern that has served as the basis for the existing reconstructions of FVs, as presented in §1. The most noteworthy questions raised by this survey in my view are those listed in (7).

(7)

a. Should languages like Akoose (§4.2) and Kako (§4.11), which make use of non-vocalic verb morphology in the Final position, be seen as having innovated non-vocalic Final morphology after losing FVs or as representing precursor systems to those

languages showing canonical FV patterns?

b. In languages which show no synchronic evidence for FVs, such as Yasa (§4.4) and Gyeli (§4.9) where all verb roots end in vowels, or Eton (§4.8), where many do, what is the source of the last vowel in those roots?

c. In languages with canonical FV patterns on most verbs, but with a class of verbs exceptionally not taking FV morphology, such as Kpe (§4.3), Kako (§4.11), Myene (§4.12), and Punu (§4.15), does the lack of FVs on these roots represent an archaism or an innovation?

d. How interconnected are processes of prosodification and the development of the canonical FV system?

e. Can FVs be used to establish isoglosses that separate different historical stages of Bantu?

At this stage, I believe that all of the questions in (7) must be considered open and without obvious answers. However, the languages of the survey do, at least, point to a historical path for the development of the canonical Bantu FV system along the following lines, though its time depth is not clear. These steps could be viewed roughly as follows, with languages from the survey that can be seen as models for each of the steps indicated: (i) an initial stage along the lines of what is found in Eton, where there is no system of FVs, and verb roots may or may not end in a vowel, (ii) the rise of a system of prosodic constraints on verbs placing restrictions on which vowels can appear in non-initial position, as seen in languages like Yasa or Eton, and even requiring the presence of a vowel at the end of the verb, as seen in a language like Gyeli, (iii) the integration of postverbal elements coding TAMP categories into the end of the verb which, in turn, became subject to prosodic constraints on verb shape, as seen in languages like Kpa (§4.6) and Kako (§4.11), (iv) the reduction of these elements to a vowel if they previously had a more complex shape, though only on a subset of verb forms, thus creating some classes of verbs appearing with FVs and some verbs appearing without them, as found, for example, in Myene and Punu, and (v) the analogical extension of these vocalic morphemes to all verb forms, even if some had previously not been part of the full set of historical

processes outlined above, along the lines of the system described for Nzebi (§4.16) in this survey.[46]

Even if the historical sketch just presented is a reasonable representation of the development of the canonical Bantu FV system, this does not mean that all of the languages referenced above represent direct reflexes of this development. It could also very well be the case that some of the languages once had the canonical pattern and lost it due to phonological change connected to the prosodification of the verb, with a language like Gunu (§4.7) having a morphologically active FV but without any morphological oppositions in the FV system possibly representing a near-final stage of this process. Another significant concern is what the source would be of the postverbal elements which would have morphologized into FVs, but proposals for this would require a separate study.[47]

Of the open questions listed in (7), the one where I think the historical situation is most easily reconstructed is (7c). The presence of lexical exception to Final patterns, in particular on CV stems, some of which are clearly quite old, as well as forms marked with the Passive, as discussed in §4.15, is most likely an archaism in my view. A historical scenario where FVs developed in longer verb systems, in part due to the fact that suffixes in these stems would have been subjected to more restrictive prosodic constraints, and were then extended to CV verbs, as well as verbs marked with the Passive, seems relatively historically plausible. By contrast, a scenario where CV verbs selectively lost FVs and then vocalized the glides that were part of the stem that would have appeared before an FV seems much less likely. If this is the right interpretation, it would mean that, even if the canonical Bantu FV system was largely in place for roots with CVC shape in PB, it had yet to fully extend to all verbs, suggesting a

[46] Although not part of the formal survey found in this chapter, the comparative description of Duma (B51), Mbede (B61), and Ndumu (B63), provided in Adam (1954: 72), shows languages apparently representing the transition between stages (iv) and (v), with Mbede showing CV roots without FVs, Ndumu showing these roots appearing with a FV, and Duma showing them appearing with an expansion suffix that hosts a FV.

[47] In this regard, Akoose (§4.2) suggests an interesting possibility that the source of FVs could be non-Final verbal suffixes such as *-ag, which took on reduced forms in longer verbs and then were reanalyzed as morphologically distinct from their longer forms.

possibly interesting isogloss to look for carefully somewhere in the border between Zone A and Zone B languages.

Of the other questions listed in (7), the one that strikes me as most difficult to resolve is (7b). In the languages which show CVCV roots where the last vowel is lexically specified (at least partially), where did the last vowel come from? There are various imaginable sources. They could be former FVs, with different FVs lexicalizing across different verbs, perhaps due to varying frequency patterns for the use of each verb in different TAMP configurations. They could represent vowels derived from other sources, such as elements associated with the Pre-Final slot in Figure 1. They could also have arisen from postverbal elements beginning with a vowel, where the following vowel was reanalyzed as belonging to the verb due to a reparsing, though developing this analysis would require determining what those elements might have been. In principle, they could also represent archaic elements which were lost in languages which developed a canonical FV system due to elision effects, or some other phonological process along those lines. This last scenario strikes me as unlikely, given the comparative Bantu context, since it would require a major alteration in the reconstruction of PB verb roots, and I simply point it out here as a logical possibility.

Overall, I think the most significant result of this survey is that it points to the need for a more thorough consideration of the development of the canonical FV system in Bantu, since it is not obvious how such a system could have developed and, as the survey makes clear, patterns in northwestern Bantu suggest that it may not have even fully developed within PB, i.e., ancestral Node 1 in Grollemund et al. (2015), even if the seeds of the system must have already been in place. I should also stress that this is a domain where expanded data collection is likely to reveal interesting new facts, especially in Zone A. The historical picture outlined above, for instance, is strongly influenced by the description of Finals in Kako, and to a lesser extent Kpa and Akoose, and it would be especially worthwhile to have a better sense of how many other languages in the northwest show systems like what is described for these languages, which are, in my view, promising models for either an early stage of PB or some pre-PB variety from which the Bantu languages emerged. More broadly, this study underscores the need for revisions to PB reconstructions which might be biased towards central and eastern Bantu patterns (see, e.g., Schadeberg 2003: 156). This appears to have

been the case for Meeussen's (1967) reconstruction of the FV system as well.

This conclusion should also be considered in the context of ongoing debate about the historical time depth of many of the features of the Bantu verbal system presented in Figure 1, in particular the verbal prefix system (see Güldemann 2011:123–129 and Hyman 2011:29–40 for relevant discussion as well as Güldemann and Nurse & Watters in this volume). The key question is whether the verbal prefixes, in particular those associated with slots -3–0 in Figure 1, should be treated as having already fully morphologized in PB or whether they were still expressed by morphosyntactically independent elements such as pronouns and auxiliary verbs, which would later develop into agreement markers and TAMP markers, respectively. If the FV system was not fully developed in PB, this would seem to be more in line with the position of Güldemann (2011) that the prefixes also represent a post-PB innovation insofar as both reconstructions point to a verbal system that was less morphologically elaborated and involved greater use of elements with some degree of syntactic independence than implied by Meeusen's (1967) reconstruction. If that is the case, however, it leaves open the important historical question of what might have triggered the processes of morphologization that resulted in the development of what has long been viewed as the canonical structure of the Bantu verb in such a large part of the Bantu-speaking area.

Abbreviations

1…18 without “s” or “p”	noun classes
1, 2, 3 with “SG” or “PL”	person and number
ANT	anterior
APPL	applicative
CAUS	causative
CONC	conclusive
DIM	diminutive
F1, F2	future tenses with remoteness distinctions, from more to less recent
FUT	future
FV	final vowel
H1, H2	floating high tone morphemes (Makaa)
HYPO	hypothetical
I	noun class with shape *i* (Bijogo)
INC	incompletive
INCEP	inceptive
IPFV	imperfective
ITER	iterative
NC	Niger-Congo
NEG	negative
NTR	neutral
OP_n	object prefix with subscript indicator of noun class
P0, P1, P2, P3	past tenses with remoteness distinctions, from more to less recent
PFV	perfective
PB	Proto-Bantu
PL	plural
PRON	pronoun
PROG	progressive
PRS	present
PST	past
RET	retrospective
SBJV	subjunctive
SG	singular
SP_n	subject prefix with subscript indicator of noun class
TAMP	tense/aspect/mood/polarity marker

Acknowledgments

I would like to thank participants at the International Conference on Reconstructing Proto-Bantu Grammar, organized by the Ghent University Centre for Bantu Studies and the Service of Culture & Society of the Royal Museum for Central Africa in Tervuren and

attendees of a meeting of Philological Society on May 1, 2020, for their feedback on the work discussed in this chapter as well as two anonymous reviewers, Koen Bostoen, Rozenn Guérois, Larry Hyman, Dmitry Idiatov, and Sara Pacchiarotti for more detailed comments.

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