Deconstructing the verbal STAMP system of Ebira

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Abstract:
This paper investigates linear and non-linear morphology in verbal inflection in Ebira, a Benue-Congo language of Nigeria. The non-linear morphology does not target the root, but rather occurs within pre-verbal auxiliary-like satellite units called a STAMP (Anderson 2011, 2015, 2016), a mnemonic for subject agreement, tense, aspect, mood, and polarity. This paper deconstructs Ebira STAMPs and identifies individual sub-STAMP morphs based on the extensive description in Adive (1989) and Scholz (1976). The individual inflectional categories for subject agreement (1S, 2, 3S, 1P, 3P), TAM (HABITUAL, COMPLETIVE, SUBJUNCTIVE, CONTINUOUS, and PERFECT), polarity (NEGATIVE), and clause-level meanings (INTERROGATIVE, 'IF', and 'WHEN') are decomposed (in part) as non-linear floating tones, floating moras, unassociated segments, and underspecified segments. While Anderson characterizes STAMPs as fused portmanteaux found widely in West and Central Africa (the Macro-Sudan Belt), we hold that 'STAMP' as a typological category may be too crude to assess areal typology. Instead we propose to investigate areality based on whether STAMP categories form a constituent *before* and to the *exclusion* of the verb root (requiring arguments independent of transcription practices). In concluding this paper, we ask why non-linear morphology such as grammatical tone does not target the root, and tie this to the pronounced functional load of lexical tone on roots in Ebira.

Keywords:
non-linear morphology, verb inflection, tone, phonological underspecification, analyticity vs. syntheticity, functional load of tone, areal typology, Nigeria

1. Introduction

The focus of this paper is the interaction of linear and non-linear morphology in verbal inflection. While non-linear morphology is underrepresented in morphological theory, it is extremely robust across languages. Consider Iau, a Papuan language (Lakes Plain: Indonesia), as discussed in Hyman (2018) citing Bateman (1990). In Iau, tone is lexically contrastive on nouns, but in verbs tone serves to contrast types of grammatical aspect. For the verb /ba/ 'to come' in (1), aspectual categories like punctuality, duration, completion, and telicity are exponed as tonal melodies which associate to the vowel of the verb root (note S = super-high).

(1) Iau non-linear morphology (Hyman 2018:699, citing Bateman 1990:35-36)

a.	H	bá	'came'	totality of action punctual
b.	M	bā	'has come, has shot'	resultative durative
c.	HS	bá˝	'might come, could come'	totality of action incompletive
d.	LM	bà	'came to get'	resultative punctual
e.	HL	bâ	'came to endpoint'	telic punctual
f.	HM	bá̰	'still not at endpoint'	telic incompletive

* [ACKNOWLEDGEMENTS TO BE INSERTED]

g.	ML	bā̀	'come (process), shoot something'	totality of action durative
h.	HLM	bâ̄	'sticking to, attached to'	telic durative

The focus of this paper is on a similar non-linear patterns in the Nigerian language Ebira, but ones which do not target the verb root itself. Instead of targeting the root, various inflectional categories are expressed within a pre-verbal auxiliary-like satellite unit called STAMP markers (Anderson 2011, 2015, 2016), a mnemonic for subject agreement, tense, aspect, mood, and polarity. In (2) below, the pre-verbal STAMP expresses various inflectional categories by altering its tone, length, vowel quality, and syllabicity. In contrast, the verb /vẹ́/ 'to come' (with lexical H tone) remains unaffected.

(2) Ebira non-linear morphology (Scholz 1976:53-54,65-66,107)

a.	MM	mi̱i̱	vẹ́	'I usually come'
b.	SS	mḛ́ḛ́	vẹ́	'I did not come'
c.	HL	m̀mè	vẹ́	'While I came…'
d.	ML	māà	vẹ́	'I am coming'
e.	HM	máā	vẹ́	'I came'
f.	HH	máá	vẹ́	'Did/do I come?'
g.	LH	màá	vẹ́	'If I come…'
h.	MM	māā	vẹ́	'(that) I should be coming'
i.	LSM	màa̋ā	vẹ́	'If I am coming…'
j.	LHM	màáā	vẹ́	'If I usually come…'
k.	HHM	mááā	vẹ́	'Should I be coming?'

Anderson presents STAMPs as a robust areal feature of West and Central Africa, which Güldemann (2008, 2010) refers to as the Macro-Sudan Belt. Within Anderson's (2011) summary of hundreds of African languages, he specifically classifies Ebira as a language with "fused Subject/TAM/Polarity" (p. 387), and as such would constitute prototypical STAMPs.

The major goal of this paper is to scrutinize this position by deconstructing Ebira STAMPs into its individual sub-STAMP form-meaning pairs, i.e. morphs. Extensive description in Adive (1989) and Scholz (1976) establishes inflectional categories for five subject agreement feature bundles (1S, 2, 3S, 1P, 3P), five TAMs (HABITUAL, COMPLETIVE, SUBJUNCTIVE, CONTINUOUS, and PERFECT), NEGATIVE polarity, and three clause-level meanings (INTERROGATIVE, 'if', and 'when'). The analytic contribution of this paper is to posit underlying structures of the corresponding exponents to these categories, involving both linear structure as well as non-linear structure such as floating tones, floating moras, unassociated segments, and underspecified segments. By decomposing STAMPs in this way, it makes testable predictions for future Ebira studies, as not all logically possible category combinations have been investigated yet.

Zooming out, I conclude that 'STAMP' as a typological category by itself may be too crude to assess areal typology. For Ebira, it both masks internal decompositionality as well as masking the fact that STAMPs and verbs (and intervening functional morphs) form a single domain for ATR vowel harmony. I propose a different way to assess whether STAMPs are an areal feature, namely if the exponence of STAMP categories form a constituent with one another *before* and to the *exclusion* of the verb root (requiring arguments independent of transcription practices).

Finally, this paper returns to the fact that Ebira non-linear inflection does not affect the verb root itself. One notable fact of Ebira is that its small literature (Ladefoged 1964, Scholz 1976, Adive 1989) all emphasize the ubiquity of tonal minimal pairs. In an effort to better understand the relation of these observations, I propose the 'functional load of tone hypothesis', which holds that the functional load of lexical tone on roots is inversely correlated with the

degree of grammatical tone affecting roots. Preliminary analysis of Ebira compared to another Nigerian language Kolokuma Izon supports this hypothesis.

This paper is organized as follows. Section 2 provides an overview of the areal typology of STAMPs in the Macro-Sudan Belt, while section 3 provides background on the Ebira language, its phonology, and clause structure. Section 4 deconstructs STAMPs into the categories summarized above, and justifies the proposed underlying relationships of sub-STAMP morphs. Section 5 provides discussion, and section 6 provides a conclusion.

2. STAMP markers in the Macro-Sudan Belt

There has been a resurgence in studying the areal patterning of African languages, which seeks to understand the distribution African linguistic structures independently from genetic unity. One macro-area which has emerged from this work is the 'Macro-Sudan Belt' (Güldemann 2008, 2010, 2011, 2018), a contiguous zone where features are shared more likely than not stretching from Senegal to the Sudan, south of the Saraha desert but north of the Bantu spread zone. In addition to Güldemann's seminal work, there have been many recent studies proposing, refining, or challenging the linguistic criteria which define this zone (e.g. Clements & Rialland 2008, Sande, Baier, and Jenks 2019, Rolle, Lionnet, and Faytak 2020, among many others), building on fundamental areal work (e.g. Greenberg 1959).[1]

One morphosyntactic feature omnipresent in the Macro-Sudan Belt is the pre-radical functional unit referred to as STAMP morphs (Anderson 2011, 2015, 2016), which are pre-radical in the sense of appearing before the verb root.[2] We can define STAMP forms following Anderson (2016:513, bolding mine):

> *[STAMP forms are]* ***portmanteau*** *morphs that encode the referent properties of semantic arguments that typically play the syntactic role of '****S[ubject]****'–that is, the person, number and gender properties of such an actant–in combination with categories of* ***T[ense], A[spect], M[ood] and P[olarity]****.*

Under this definition, a single form (i.e. a 'morph') jointly expresses subject agreement and other inflectional categories, which have been 'fused' into a single unit. STAMP forms typically show 'auxiliary'-like properties and are thus are typically understood as independent from verb roots, though may be reinterpreted (whether by speaker or linguist) as prefixal (Anderson 2016:524ff.).

Consider the Mande language Guro [goa] (Vydrine 2009), which Anderson points out frequently exhibit STAMP forms.

(3) Guro STAMP forms (Vydrine 2009:239)

a.	**ɓe**	zuru-o		[ɓe zuruo]
	2SG>3SG.IPFV	wash-IPFV		'(you) wash him/her/it.'
b.	**yaa**	zùrù-ò	ɗo	[yaa zùrùò ɗo]
	2SG>3SG.IPFV.NEG	wash-IPFV	NEG	'(you) don't wash him/her/it.'

The STAMP morphs are in bold in these examples, which express subject features (as well as the type of object being acted on, i.e. 2SG>3SG), aspectual features (IMPERFECTIVE), and polarity features (NEGATIVE). Most important to our study, the subject, aspect, and polarity features are 'fused' into a single portmanteau word, which (presumably) is non-decomposable.

[1] See the aforementioned Güldemann works and Rolle, Lionnet, and Faytak (2020) for extensive references.

[2] Anderson (2016) notes that 'STAMP morphs' – also denoted as S/TAM/P – have previously been called *tense-person complexes* (Creissels 2005) and *pronominal predicative markers/pronominal auxiliaries* (Vydrine 2011).

Given its ubiquity, should we consider STAMP morphs to be a defining feature of the Macro-Sudan Belt, to the exclusion of other macro-areas (e.g. to its north, east, and south)? I bring up this question not to answer it, but rather to refine the premises on which it rests. Can STAMP systems be deconstructed into sets of smaller form-meaning pairings, undermining its status as a 'fused' portmanteau? And what arguments can be made to support its relationship to other morphs and the verb root, independent of any transcription practices (e.g. whether transcribed as affixes, clitics, or independent words). In what follows, I decompose STAMP morphs in Ebira into more basic albeit abstract components, involving several types of non-linear morphology.

3. Background on Ebira

3.1 *The language*

Ebira [èbìrà] is a Benue-Congo language of Nigeria (ISO:igb), which forms a coordinate branch with the small Nupoid sub-family (Hyman 1972, Blench 1989, Weise 2013:102). It is spoken at the southeast extreme of the Nupoid area, and as such has been in substantial linguistic contact with Yoruba, Igala, and a variety of Defoid/North Edoid/Other Benue-Congo languages (Adive 1989:2-6, Salffner 2010:33-35, Eberhard, Simons, and Fennig 2020). Figure 1 below shows the location of Ebira speaking populations at the confluence of the Niger and Benue rivers.

There are three main dialect zones. The first is the Okene area labeled [1] in Figure 1. This is the primary dialect in the literature, the basis of the standard orthography (Blench 1989:309), and in the heart of where the Ebira population is distributed. The second is in and around the town of Igara to the southwest (labeled [2]), referred to as the Ẹtụnọ dialect. The third are 'Kwotto'/'Koto' dialects to the northeast (labeled [3]), in environs Koton-Karfe, Toto, and Umaisha, and referred to as dialects Igu, Opanda, and Ebira-Nya (the last near Lokoja – Laniran 1984:2). Ebira zone [2] is completely surrounded by other Benue-Congo speaking populations, while Ebira zone [3] has significant ethnic intermixing across the area, largely with Gbagyi [gbr] and Basa [bzw] populations (Eberhard, Simons, and Fennig 2020). Note, however, that there are smaller Ebira communities scattered throughout the area, as well as other groups within Ebira-dominant localities.

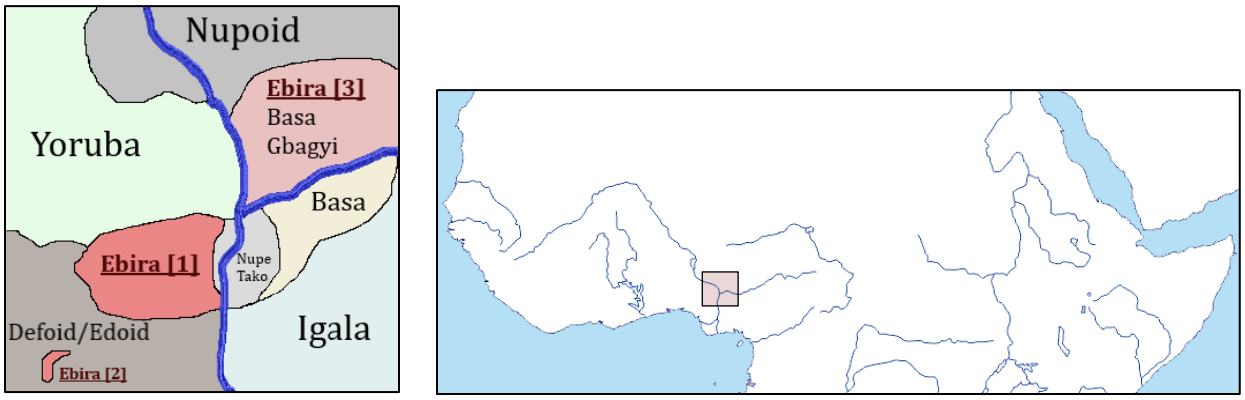

Figure 1: Ebira areas at confluence of Niger and Benue rivers

As stated, the literature on Ebira is almost entirely on the main dialect Okene [òkèéné] (area [1]), including the two main sources of this paper: Scholz (1976) and Adive (1989).[3] Where there are

[3] Adive (1989) describes his own speech (from the town of Obehira, outside of the city of Okene), while the main assistants in Scholz (1976) were from the Ọkẹnguẹ and Agẹẹva areas, also in the vicinity of the city of Okene. It is

intra-dialectal differences between the descriptions of Okene Ebira, this will be noted overtly. In what follows, we refer to the Scholz study as S76 and the Adive study as A89.

3.2 *Phonology*

The consonant inventory of Ebira is in (4).

(4) /p t c k b d j g s h v z m n ɲ ŋ r w y/

The phonemes /c j/ are described as palatal affricates, and [ʃ ʒ] are common allophones of /s z/. Consonants can also be 'labialized', e.g. minimal pairs **sẹ́** 'to chop off grass' vs. **sʷẹ́** 'to take iron blade from hoe handle' (Adive 1989:14). Contrastive palatalization is only found with /h/, e.g. **hámá** 'to imitate' vs. **ìhʸámá** 'louse' (Scholz 1976:23). Syllabic, tone-bearing nasals also exist, but are always followed by a homorganic stop, affricate, or nasal (Adive 1989:34-35), e.g. **ǹdá** 'father'. Notable is the absence of labial-velars /kp gb/ in the Okene dialect (though present in dialects to its northeast – Scholz 1976:8).

Ebira has a common vowel system found in the area, exhibiting nine vowel contrasts and an Advanced Tongue Root (ATR) harmony system.

i u
ị ụ
e o
ẹ ọ
a

Figure 2: Vowel contrasts (dot = [-ATR])

All vowels within a morpheme must agree in ATR value (with very few exceptions). The [+ATR] vowels are /i u e o/ and [-ATR] vowels are /ị ụ ẹ ọ/, e.g. **īrūkú** 'forest' vs. **ī̱rū̱kṵ́** 'farming'. The vowel /a/ is neutral, and can appear with both sets, e.g. **ākúkù** 'kind of vegetable', **ēvìnà** 'water yam' vs. **ī̱rāyį́** 'year', **árū̱sà** 'walnut'.

Many (if not most) functional morphemes have both [+ATR] and [-ATR] forms, which agree with the value of the root (classic root-controlled harmony – Casali 2003). This is shown below with the [+ATR] root **hú** 'to drink' and [-ATR] root **nà** 'to tear'.

(5) ATR harmony (root-controlled) (A89:81)
a. [+ATR] root **ó sí** hú 'he has drunk'
b. [-ATR] root **ọ́ sį́** ná 'he has torn'

This latter example also demonstrates that although /a/ is neutral and can co-occur with both ATR types, when in root position it triggers [-ATR] variants. We will return to the special behavior of /a/ in section 4.1 below.

Like the languages of its area, Ebira has a three-way tone contrast between /H M L/. Additionally, a fall /HL/ and a rise /LH/ are also possible on monomoraic vowels, but this is rare. A (near)-minimal pair is in (6) below, and are extremely common (see section 5.3 below). The lack of tone restrictions in disyllabic morphemes follows that, in Table 1.

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unclear how much internal variation there is within the main dialect Okene. We highlight any variation only as pertaining to the STAMP system.

(6) Verb root (near)-minimal pair(A89)

a. H ná 'to sell'
b. M nā 'to open'
c. L nà 'to tear'
d. HL nâ 'to leave'
e. LH ɲă 'to crack nuts with stones to get the seeds out'

T2 / **T1**	H	M	L	HL
H	íḍá 'place'	ízē 'grasscutter'	ákù 'inner room'	ọ́dâ 'law'
M	āhẹ́ 'song'	ūyē 'meat'	ānẹ̀ 'egret'	īhî 'loss'
L	òsé 'wife'	ọ̀rū 'crow'	ìdù 'lion'	*n/a*

Table 1: Non-restrictions on tonal combinations (A89:43)

Note that while Scholz also concludes that /HL/ is composed of a /H/ and /L/ component, in his description he emphasizes that its most common realization is that of a super-high tone, effectively creating a four-way height contrast. This will become important in the STAMP system, as described below.

Surface long vowels (VV) and super-long vowels (VVV) are interpreted as strings of single vowels rather than contrastive vowel length (Adive 1989:17). Blench (1989:313) notes that across the Nupoid family, no languages "show an underlying contrast between short and long vowels, although this appears as a surface representation" in some, such as Ebira. Within morphemes, VV sequences may share the same tonal value (**ààhẹ̀** 'play, drama') or bear different values (**àtàáhù** 'ankle'), and can appear in initial, medial, or final position. Many of these VV sequences transparently derive from elided medial consonants, e.g. **ù́ú́hʷẹ́** 'hen' from **àwù̀hʷẹ́** (Scholz 1976:30). VVV sequences are restricted to derived environments. No verb clusters exist (other than the general greeting **tàó** 'hello').

3.3 *Clause structure and the STAMP system*

Ebira shows a canonical head-initial, [SUBJECT][VERB][OBJECT] word order common in its linguistic area. Extended meanings (e.g. those expressing causation, an instrumental, accompaniment, a benefactive, motion, a comparative, *etc*.) are largely encoded via serial verb constructions rather than derivational morphology. An example from a text is provided below which demonstrates the basic linear order of major constituents.

(7) ọ̀tám ọ̀ọ́ sí́sā vẹ́, nāvọ́ mā vì̀dī rí́sā, dú́wā vâ rí́sā ō

ọ̀tá	ámī	**ọ̀ọ́**	sí́	ī́sā	vẹ́ ,						
friend	my	**3S.'if'**	take	food	come						
nāvọ́	**mā**		vì̀dī	rí́	ī́sā ,	dí́	**wā**	vâ	rí́	ī́sā	ō
wait	**1S.SJTV**		first	eat	food	and	**2S.SJTV**	will	eat	food	MOOD

'If my friend brought food, let me eat first before you eat' (A89:141)

This examples demonstrates the focus of the remainder of this paper, Anderson's STAMP morphs. Hereafter, I will refer to these as simply STAMPs. These are in bold above, and appear between the subject (if present) and the verb. STAMPs also appear before any other pre-radical functional morphs as well, e.g. the STAMP morph **wā** appears before the 'particle' **vâ** FUTURE

'will'. That STAMPs truly expone subject agreement features and should not be interpreted as the structural subject is shown below, where independent pronouns can co-occur STAMPs (in bold):

(8) Co-occurrence of STAMPs and independent pronouns (A89:118)

a.	ẹ̀mī	'I':	ẹ̀mī	**mâ**	rí ịsá	'I ate the food'
b.	ẹ̀wū	'you':	ẹ̀wṵ	**wâ**	rí ịsá	'you ate the food'
c.	ọ̀nī	'he/she':	ọ̀nī	**ô**	rí ịsá	'he ate the food'
d.	ẹ̀yī	'we':	ẹ̀yī	**yê**	hú ècè	'we drank some wine'
e.	ẹ̀wṵ...nīnī	'you' (pl.):	ẹ̀wṵ	**wê**	hú ècè nīnī	'you (pl) drank some wine'
f.	ẹ́nìnī	'they':	ẹ́nìnī	**ê**	hú ècè	'they drank some wine'

4. Deconstructing Ebira STAMPs

This section begins the analysis of Ebira STAMPs. The analysis is presented piece-by-piece, with only portions of the STAMP system presented at a time. All data presented here comes from Adive (1989) and Scholz (1976), as well as the major descriptive generalizations. The analytic contribution which I make here is in deconstructing the STAMPs into component parts.

The bulk of the data I cite below is from Adive's (1989) description. This is largely identical with Scholz (1976), but differs in small but significant ways which will be highlighted when pertinent. Appendix 1 summarizes these differences, for reference. As noted, both descriptions are of the main dialect centered around the city of Okene. I have chosen to model after Adive because he exhaustively supplies paradigms for nearly all STAMP contrasts.

4.1 *Basic TAM contrasts*

STAMPs in Ebira express five subject agreement feature bundles (ϕ-Fs): first person singular [1S] and plural [1P], third person singular [3S] and plural [3P] (there is no gender distinction), and second person [2]. The distinction between second person singular vs. plural is not expressed in STAMPs, but rather as a post-verb root particle **nīnī**. Subject ϕ-Fs co-occur with TAM and polarity features, either within the same STAMP complex or as another morph. The basic subject agreement contrasts are illustrated in the habitual aspect, with a [+ATR] verb **hú** 'to drink' and a [-ATR] verb **ná** 'to sell'.

(9) **Habitual** – [+ATR] (A89:83)

a.	[1S]	**mīī**	hú		'I habitually drink'
b.	[2]	**ūū**	hú		'you habitually drink'
c.	[3S]	**ōō**	hú		'he/she habitually drinks'
d.	[1P]	**īī**	hú		'we habitually drink'
e.	[2]+[PL]	**ūū**	hú	nīnī	'you (pl.) habitually drink'
f.	[3P]	**ēē**	hú		'they habitually drink'

(10) **Habitual** – [-ATR] (A89:83)

a.	[1S]	**mīị̄**	ná		'I habitually sell'
b.	[2]	**ụ̄ụ̄**	ná		'you habitually sell'
c.	[3S]	**ọ̄ọ̄**	ná		'he/she habitually sells'
d.	[1P]	**ịị̄**	ná		'we habitually sell'
e.	[2]+[PL]	**ụ̄ụ̄**	ná	nīnī	'you (pl.) habitually sell'
f.	[3P]	**ẹ̄ẹ̄**	ná		'they habitually sell'

As in these examples, the [ATR] value of the STAMP is always determined by the verb root, e.g. **mīī** vs. **mi̱i̱** in the (a.) examples. Notice as well that the STAMP consists of two moras, linked to a single vowel. There are no effects on the verb root: its internal segmental and tonal structure is identical to what it would be in isolation, e.g. in imperatives, **hú!** 'drink!' (Adive 1989:89).

To begin our analysis, we can deconstruct these STAMPs into two components. The first component is the subject agreement phi-features (*ϕ*-Fs). I take the segmental shape of the STAMPs as the exponence of individual *ϕ*-F bundles, e.g. [1S] ↔ /mI/. Such morphs are represented with an archiphoneme vowel in capital letters (Trubetzkoy 1969:79), which denotes that it is unspecified for an inherent [ATR] value. These *ϕ*-F morphs are provided in the top row in Table 2 below, marked in red. Each consists of *ϕ*-Fs, an underlying segmental shape, and a mora to which the vowel is linked. As a class, they bear no underlying tone.

The second component of the STAMPs in examples (9)-(10) is that of the aspect feature [HABITUAL] ([HAB]). Given that all STAMPs here are bimoraic and have mid tone, the exponence of this aspect can be understood as a floating mora linked to a mid tone, i.e. [HAB] ↔ μ–M . This is indicated in the leftmost cell of second row, in blue. These combine in a straightforward manner in the remaining cells, which reflect the surface forms in examples (9)-(10). The M tone (in blue) additionally docks to the mora in red, while the [HAB] mora (blue) docks to the segmental tier (red). Any parts of the resulting structure which are not part of the input structure are denoted in gray (which could be characterized as epenthetic).[4]

S (ϕ-Fs) / TAM	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
M | μ [HAB]	M /\ (μμ) \/ mI [1S][HAB]	M /\ (μμ) \/ U [2][HAB]	M /\ (μμ) \/ O [3S][HAB]	M /\ (μμ) \/ I [1P][HAB]	M /\ (μμ) \/ E [3P][HAB]

Table 2: Habitual aspect STAMPs

In addition to the habitual Ebira has the STAMPs in (11), organized according to basic TAM distinctions and illustrated with [3S] 'he/she/it' ([+ATR] variants are to the left, [-ATR] variants to the right).

(11)

a.	Habitual	**ōō**	hú	'he habitually drinks'	**o̱o̱**	ná	'he habitually sells'
b.	Completive	**ô**	hú	'he drank'	**o̱**	nà	'he tore'
c.	Subjunctive	**ò**	hú	'he should drink'	**ọ̀**	ná	'he should sell'
d.	Continuous	**èè**	hú	'he is drinking'	**àà**	ná	'he is selling'
e.	Future	**ō**	vê hú	'he will drink'	**o̱**	vâ ná	'he will sell'
f.	Immediate future	**èè**	vê hú	'he is about to drink'	**àà**	vâ ná	'he is about to sell'
g.	Past perfect (**sÍ**)	**ó**	sí hú	'he has drunk'	**ọ́**	sị́ nà	'he has torn'
h.	Past perfect (**rÁĀ**)	**ó**	réē hú	'he has drunk'	**ọ́**	ráā ná	'he has sold'

[4] Notice that in each cell, the moras are footed in parentheses. For most STAMP cells, this is not relevant, but in a minority introduced in section 4.3, I posit contrastive footing to account for some syllabification patterns.

There are five new STAMPs here: falling tone (completive), low tone (subjunctive), bimoraic low tone (continuous, immediate future), mid tone (future), and high tone (past perfect).

Let us examine first the COMPLETIVE aspect ([COMPL]). This data is strictly from Adive's description; see Appendix 1 for comparison to Scholz. The completive has a range of meanings, compatible with both past and present interpretations depending on context. Example (a.) below demonstrates it is compatible with several types adverbials e.g. **ēyínēyínī** 'everyday', (b.) demonstrates it is used in simple stative clauses e.g. **báɲī** 'to be big', and (c.) shows it with an auxiliary **zú̩** 'can'.

(12) Completive aspect (A89:80,138)

a. **mê** hú 'I drink'
mê hú ēyínēyínī 'I drink everyday'
mê hú ɛ̀ɛ̀rí̩ 'I drank yesterday'

b. ōzí īzé **o̩** báɲī 'Ize's child is big'

c. **o̩** zú̩ rí̩ ī̩sá 'he can eat food'

In Scholz, this is referred to as 'completive' which we adopt here, while in Adive it is called the 'simple past'. We adopt the 'completive' designation given that it is not restricted to past tense.[5]

(13) **Completive** [+ATR] [-ATR] (A89:80)

a.	[1S]	**mê**	hú	'I drank'	**mâ**	nà	'I tore'
b.	[2]	**wê**	hú	'you drank'	**wâ**	nà	'you tore'
c.	[3S]	**ô**	hú	'he/she drank'	**o̩**	nà	'he/she tore'
d.	[1P]	**yê**	hú	'we drank'	**yâ**	nà	'we tore'
e.	[3P]	**ê**	hú	'they drank'	**e̩**	nà	'they tore'

Let us break down these completive STAMPs. We can maintain the underlying form of the subject ϕ-Fs as in Table 2 above. The common exponent of completive aspect in these STAMPs is a HL falling tone (on a single mora), and the presence of a vowel [e/a] in those STAMPs with a consonant initial or high-vowel initial subject exponent.

S (ϕ-Fs) / TAM	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
H L	H L \ / (μ) | mA [1S][COMPL]	H L \ / (μ) | wA [2][COMPL]	H L \ / (μ) | O [3S][COMPL]	H L \ / (μ) | yA [1P][COMPL]	H L \ / (μ) | E [3P][COMPL]
A [COMPL]					

Table 3: Completive aspect STAMP morphs

[5] Other appropriate labels might be 'perfective', 'factative' (Welmers 1973), or 'performative' (Hewson and Bubenik (1997). See Nurse (2008:314) for further discussion and references of this terminology, discussing Bantu.

Here, completive aspect is exponed as floating H L tones and a floating segment **A**, which does not project a mora. The two sub-STAMP morphs must be integrated together; on their own, both are phonologically deficient. The floating tones (in blue) and the subject agreement mora (in red) link without complication.

When two vowels are adjacent, this is a marked structure which is resolved via a number of processes, shown in (14). The floating segment **A** is preserved when it can. In (a.), (b.), and (d.) below, the **A** surfaces because the subject marker can be preserved: the initial consonant of [1S], and the high vowel in [2] and [1P] becomes a glide. In (a.), a form ***m^{y}A** is not possible, as palatalization only applies to /h/ (as stated in section 3.2 above).

(14)

a.	[1S]	mI	+	A	→	mA	(*m^{y}A)
b.	[2]	U	+	A	→	wA	
c.	[3S]	O	+	A	→	O	(*OA, *A)
d.	[1P]	I	+	A	→	yA	
e.	[3P]	E	+	A	→	E	(*OA, *A)

In contrast in (c.) and (e.), the vowel is not [-HIGH] and as such cannot glide. No vowel clusters are allowed in Ebira. Here, the underlying vowel of the subject exponent surfaces, i.e. **O** and **E**, and not the floating **A** of the completive. We can attribute the winner being **O**/**E** rather than **A** if we assume that segments which are pre-linked to moras are retained over floating segments, when the two are in competition. This additionally accounts for the fact that otherwise, **O**/**E**+**A** in hiatus contexts are resolved in favor of **A**:

(15) Vowel hiatus (Adive 1989:52-53)

a.	ô t**ò à**zà	→	ô t**à**zà	'He arranged the people'
b.	ô r**é à**zà	→	ô r**á**zà	'He saw some people'

In such contexts, both vowels are pre-linked to moras.

The final important aspect of the data in Table 3 involves ATR harmony. Here, the [-ATR] vowel /a/ alternates with [+ATR] /e/ (e.g. **mê hú** 'I drank' vs. **mâ nà** 'I tore'). While Adive (1989:76) indicates that the pairing here is 'morphological', a purely phonological solution is available. The e/a alternation affects all STAMPs which show /a/ in [-ATR] contexts, and thus should not be treated as a morphological quirk.

A phonological analysis is as follows. In roots (as in other contexts), /a/ is neutral and may appear with either ATR set. However, when it in a STAMP (or a pre-radical particle) it can *only* appear with [-ATR] triggers. Given this, it follows that within roots /a/ remains without an ATR value (it does not agree with fellow root vowels for either [+ATR] or [-ATR]). In contrast, in STAMPs it acquires a [+ATR] value with a [+ATR] trigger. If /a/ is [+LOW][+FRONT], then in the context of [+ATR] it would become [+LOW][+FRONT][+ATR]. We can assume that such a phonological feature bundle is banned (a common constraint cross-linguistically):

(16) *[+LOW][+ATR]: low vowels cannot be [+ATR] (i.e. */ạ/~*/æ/~*/ə/~*/ɜ/, etc.)

The [+LOW] feature is changed to [-LOW], which results in a bundle [-LOW][+FRONT][+ATR], i.e. the segment /e/.

Let us now examine the SUBJUNCTIVE mood ('should', 'ought to', 'let', *etc*.). Here we see there is split between the forms in 3rd person vs. 1st and 2nd person STAMPs:

(17)	**Subjunctive**	[+ATR]			[-ATR]		(A89:90)
a.	[1S]	**mē**	hú	'I should drink'	**mā**	ná	'I should sell'
b.	[2]	**wē**	hú	'you should drink'	**wā**	ná	'you should sell'
c.	[3S]	**ò**	hú	'he/she should drink'	**ọ̀**	ná	'he/she should sell'
d.	[1P]	**yē**	hú	'we should drink'	**yā**	ná	'we should sell'
e.	[3P]	**è**	hú	'they should drink'	**ẹ̀**	ná	'they should sell'

The 3rd person forms take low tone here, while 1st and 2nd person forms take mid tone. This is reflected in Table 4.

TAM \ S (ϕ-Fs)	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
M ~ A [SBJV]	M | (μ) | mA [1S][SBJV]	M | (μ) | wA [2][SBJV]	L | (μ) | O [3S][SBJV]	M | (μ) | yA [1P][SBJV]	L | (μ) | E [3P][SBJV]
L ~ A [SBJV]					

Table 4: Subjunctive mood STAMPs

We can account for this with a simple allomorphy rule (18), which states that subjunctive is exponed as a floating low tone Ⓛ and a floating segment **A** in the context of a [3] person ϕ-F, but as floating mid Ⓜ plus **A** elsewhere (circled tones indicating they are underlyingly floating).

(18) Subjunctive allomorphy
- a. [SBJV] ↔ Ⓛ A / [3]___
- b. [SBJV] ↔ Ⓜ A

Next, consider the CONTINUOUS aspect [CONT] in (19), which is bimoraic and low-toned.[6]

(19)	**Continuous**	[+ATR]			[-ATR]		(A89:90)
a.	[1S]	**mèè**	hú	'I am drinking'	**màà**	ná	'I am selling'
b.	[2]	**wèè**	hú	'you are drinking'	**wàà**	ná	'you are selling'
c.	[3S]	**èè**	hú	'he is drinking'	**àà**	ná	'he is selling'
d.	[1P]	**yèè**	hú	'we are drinking'	**yàà**	ná	'we are selling'
e.	[3P]	**éyéē**	hú	'they are drinking'	**ẹ́yáā**	ná	'they are selling'

Like the habitual it is bimoraic, and like the other TAMs it exhibits the e/a alternation. However, two aspects are noteworthy. First, the [3P] form is irregular, with respect to both tone and

[6] Note that Adive calls this the 'present continuous tense'. I do not adopt assume any temporal component as there are examples in both Adive and Scholz with past tense reference, e.g.:

ọ̄mùyà	**àà**	mè	ūkọ́rō	ètèrè	ḿmè	ré	é
Omuya	**3S.CONT**	do	work	well/hard	1S.C:'WHEN'	see	him

'Omuya **was** working hard when I saw him' (A89:70)

segmental shape. Second, unlike with the other cases seen so far, the [3S] surfaces as e/a rather than its underlying vowel /O/.

To account for these facts, we analyze the [CONT] STAMP as consisting of a segment **A** but crucially one which is pre-linked to a mora, accompanied by a floating low tone. Given that the [CONT] portion **A** appears after the subject portion **O** for [3S], and given that both vowels are pre-linked to moras, the winner is the expected second vowel **A** according to the general hiatus rules of the language, e.g. as in (15) above. This is illustrated in the table below.

S (ϕ-FS) / TAM	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
L μ | A [CONT]	L /\ (μμ) \/ mA [1S][CONT]	L /\ (μμ) \/ wA [2][CONT]	L /\ (μμ) \/ A [3S][CONT]	L /\ (μμ) \/ yA [1P][CONT]	H M | /\ μ(μμ) | \/ EyA [3P][CONT]

Table 5: Continuous aspect STAMPs

The floating low tone docks to the STAMP in the absence of any other tones. Although not pertinent here, it will become clear why it is analyzed as a floating rather than pre-linked tone, detailed in section 4.3 below.

As stated, the [3P] form is irregular (in its cell, the irregular portions are in gray). Although this form cannot be derived compositionally, a number of remarks are in order. First, there may be an anti-homophony pressure here: if it were to apply transparently, it would collapse the distinction between [3S] and [3P]. Second, all [3P] STAMPs across TAMs surface with an initial **E**, which may suggest a type of paradigmatic uniformity at work. Regardless, it remains difficult to explain why these pressures apply here and only here within the large set of STAMP paradigms.[7]

Next, FUTURE tense is primarily expressed with the pre-radical morph **vê/vâ,** i.e. **vÂ** (its archiphonemic representation). The STAMP which **vÂ** co-occurs with solely expresses subject agreement features. The mid tone on the STAMP is interpreted as default tone and not morphologically assigned. [We provide evidence below that the habitual, in contrast, *does* assign mid tone.]

(20)	**Future**	[+ATR]		[-ATR]	(A89:78-79)
a.	[1S]	**mī** vê hú	'I will drink'	**mį̄** vâ ná	'I will sell'
b.	[2]	**ū** vê hú	'you will drink'	**ų̄** vâ ná	'you will sell'
c.	[3S]	**ō** vê hú	'he will drink'	**ǭ** vâ ná	'he will sell'
d.	[1P]	**ī** vê hú	'we will drink'	**į̄** vâ ná	'we will sell'
e.	[3P]	**ē** vê hú	'they will drink'	**ę̄** vâ ná	'they will sell'

[7] One interesting fact comes from comparison to Scholz (1976). Despite its differences from Adive (see Appendix 1), this [3P][CONT] cell in Scholz is also irregular within its described system: the form there is **ēyèē/ę̄yàā**, even though others are bimoraic ML, e.g. **mēè/māà** [1S] and **ēè/āà** [3S].

	μ | mI [1S]		μ | U [2]		μ | O [3S]		μ | I [1P]		μ | E [3P]	
H L \/ μ | vA [FUT]	M | (μ) | mI [1S]	H L \/ (μ) | vA [FUT]	M | (μ) | U [2]	H L \/ (μ) | vA [FUT]	M | (μ) | O [3S]	H L \/ (μ) | vA [FUT]	M | (μ) | I [1P]	H L \/ (μ) | vA [FUT]	M | (μ) | E [3P]	H L \/ (μ) | vA [FUT]

Table 6: Future tense STAMPs with FUTURE morph **vÂ**

This general future tense contrasts with an immediate future tense ('about to'). This is expressed with the continuous form of the STAMP plus the future morph **vÂ**.

(21) **Immediate future** (A89:82-83)

a.	[1S]	**mèè**	vê	hú	/	**màà**	vâ	ná	'I am about to drink/sell'
b.	[2]	**wèè**	vê	hú	/	**wàà**	vâ	ná	'you are about to drink/sell'
c.	[3S]	**èè**	vê	hú	/	**àà**	vâ	ná	'he is about to drink/sell'
d.	[1P]	**yèè**	vê	hú	/	**yàà**	vâ	ná	'we are about to drink/sell'
e.	[3P]	**éyéē**	vê	hú	/	**ẹ́yáā**	vâ	ná	'they are about to drink/sell'

The final set of basic TAM contrasts is a STAMP with floating high tone and floating A. This STAMP co-occurs with a pre-radical morph which express PAST PERFECT, **sÍ** or **rÁĀ** [PRF].[8]

(22) **Past perfect** – [+ATR] (A89:81)

a.	[1S]	**mé**	sí	hú	/	**mé**	réē	hú	'I have drunk'
b.	[2]	**wé**	sí	hú	/	**wé**	réē	hú	'you have drunk'
c.	[3S]	**ó**	sí	hú	/	**ó**	réē	hú	'he has drunk'
d.	[1P]	**yé**	sí	hú	/	**yé**	réē	hú	'we have drunk'
e.	[3P]	**é**	sí	hú	/	**é**	réē	hú	'they have drunk'

(23) **Past perfect** – [-ATR] (A89:81-82)

a.	[1S]	**má**	sį́	nà	/	**má**	ráā	ná	'I have torn/sold'
b.	[2]	**wá**	sį́	nà	/	**wá**	ráā	ná	'you have torn/sold'
c.	[3S]	**ǫ́**	sį́	nà	/	**ǫ́**	ráā	ná	'he has torn/sold'
d.	[1P]	**yá**	sį́	nà	/	**yá**	ráā	ná	'we have torn/sold'
e.	[3P]	**ę́**	sį́	nà	/	**ę́**	ráā	ná	'they have torn/sold'

Adive (1989:80) remarks that "[t]here does not seem to be any distinction in meaning" between **sÍ** and **rÁĀ**, and that "[t]he same speaker may use them interchangeably". The only difference appears to be word order: with **sÍ**, the word order is OV (with **rÁĀ** it is VO):

(24)

mé	**sí**	ècè	hú		
1SG	**PRF**	wine	drink	'I have drunk wine'	(A89:81)

[8] Although Adive refers to this as 'past perfective', translations are more aligned with a 'past perfect' interpretation.

This difference straightforwardly derives from **sÍ** having been grammaticalized from **sį́** 'to take' in a serial verb construction (e.g. in (7) above).

The past perfect STAMP is high-toned with floating **A**, not yet been seen amongst the basic STAMP contrasts. At this point, we could analyze it as (i) directly expressing perfect, (ii) as encoding some default TAM value, or (iii) having its floating high tone and segment **A** assigned directly by the particles **sÍ/rÁĀ**. We follow (i), whereby there are two co-exponents of [PRF]: one being part of the STAMP (in blue) and the second being a separate, pre-radical morph (in purple).

TAM + [PRF] \ S (*ϕ*-Fs)										etc.
H	H		H M	H	H	H	H	H	H	etc.
	|		| |	|	|	|	|	|	|	|	
	μ		μ μ	(μ)	μ	(μ)	μ	(μ)	μ	
	|	~	\/	|	|	|	|	|	|	
A	sI		rA	mA	sI	wA	sI	O	sI	
[PRF]	[PRF]		[PRF]	[1S][PRF]	[PRF]	[2][PRF]	[PRF]	[3S][PRF]	[PRF]	

Table 7: Past perfect STAMP with PRF morph **sÍ~rÁĀ**

To summarize this section, I have posited the TAM designations in Table 8 below, which combine with subject agreement exponence to create the basic inventory of STAMP morphs. All of these are phonologically deficient in some way, but become well-formed phonological outputs in combination with subject agreement exponence.

Habitual aspect	**Completive aspect**	**Subjunctive mood**		**Continuous aspect**	**Past Perfect aspect**	**(Used in Future)**
M	H L	M	L	L	H	
|						
μ		~		μ		∅
				|		
	A	A	A	A	A	
[HAB]	[COMPL]	[SBJV]	[SBJV]	[CONT]	[PRF]	

Table 8: Interim summary of basic STAMP morph contrasts

4.2 *Negative polarity*

In Adive's description, there are three STAMPs used in negative contexts. The first appears in the completive and the future (recall that the completive can be used in both past and present contexts). Its STAMP consists of a floating high tone and floating segment **E**, and co-occurs with a pre-radical morph **yÍ** [NEG]. In the future, it additional co-occurs with **vÂ** [FUT].

(25) **Negative Completive** (A89:90-91)

a.	[1S]	**mé**	yí	hú	'I did not drink'	**mę́**	yį́	ná	'I did not sell'
b.	[2]	**wé**	yí	hú	'you did not drink'	**wę́**	yį́	ná	'you did not sell'
c.	[3S]	**ó**	yí	hú	'he/she did not drink'	**ǫ́**	yį́	ná	'he/she did not sell'
d.	[1P]	**yé**	yí	hú	'we did not drink'	**yę́**	yį́	ná	'we did not sell'
e.	[3P]	**é**	yí	hú	'they did not drink'	**ę́**	yį́	ná	'they did not sell'

(26) **Negative Future** (A89:91-92)

a.	[1S]	**mé**	yí	vê	hú	'I will not drink'	**mẹ́**	yį́	vâ	ná	'I will not sell'
b.	[2]	**wé**	yí	vê	hú	'you will not drink'	**wẹ́**	yį́	vâ	ná	'you will not sell'
c.	[3S]	**ó**	yí	vê	hú	'he will not drink'	**ọ́**	yį́	vâ	ná	'he will not sell'
d.	[1P]	**yé**	yí	vê	hú	'we will not drink'	**yẹ́**	yį́	vâ	ná	'we will not sell'
e.	[3P]	**é**	yí	vê	hú	'they will not drink'	**ẹ́**	yį́	vâ	ná	'they will not sell'

Adive states that the negative has fewer TAM contrasts than in their positive counterparts, a common cross-linguistic feature. No information is provided on negative continuous structures, and we leave it for future work whether such meanings are expressed via the negative completive, some other negative construction (e.g. negative habitual, in (28)-(29) below), or simply ineffable (no linguistic expression/paraphrasing).[9]

The decomposition of this general negative STAMP is in Table 9 below. As shown, negation is exponed both within the STAMP and in the separate morph **yÍ**. The portion exponing polarity is in light blue. Following the tables above, the portion of the STAMP exponing subject agreement is in red, TAM in darker blue, and the separate morph in purple. I only show the form as would be in the negative completive; for the negative future, one would simply include the future marker **vÂ.**

There are two additional negative STAMPs. One is the NEGATIVE PERFECT and the other is the NEGATIVE HABITUAL. The negative perfect STAMP is in (27) below, which differs from the negative STAMP in (25)-(26) above by being bimoraic with a falling tone.

(27) **Negative Perfect** (A89:90-91)

a.	[1S]	**méè**	yí	ré		'I have not seen'	**mẹ́ẹ̀**	yį́	rį́		'I have not eaten'
b.	[2]	**wéè**	yí	ré		'you have not seen'	**wẹ́ẹ̀**	yį́	rį́		'you have not eaten'
c.	[3S]	**óò**	yí	ré		'he/she has not seen'	**ọ́ọ̀**	yį́	rį́		'he/she has not eaten'
d.	[1P]	**yéè**	yí	ré		'we have not seen'	**yẹ́ẹ̀**	yį́	rį́		'we have not eaten'
e.	[3P]	**éè**	yí	ré		'they have not seen'	**ẹ́ẹ̀**	yį́	rį́		'they have not eaten'

The analysis of this STAMP is in Table 10 below. It consists of HL sequence linked to a mora, with a floating segment **E**, and is glossed as [NEG.PRF]. Note that the portion of this STAMP which is different from the simple [NEG] STAMP is in dark blue (representing TAM meaning).[10]

Next, consider the negative habitual. Unlike other negatives, the pre-radical morph is **mĀ** rather than **yÍ**, translated below as 'does not habitually', and in other places as 'never' (e.g. Adive 1989:145, Scholz 1976:40). The STAMP is high-toned and consists of a floating segment **A** rather than floating **E** as seen with the other negative structures.

[9] In Scholz' description, there is also no discussion of a negative continuous. One example is present, incidentally:

mį̄	kā	" **mḗ**-yḯ	nǭ	íní	òhù	"	[mį̄ kā mḗyḯ nínóhù]
1SG	say	" **1SG**-NEG	go	inside	market	"	'I said "I am not going to market" ' (S76:50)

This pre-radical complex **mḗyḯ** with super-high tone is also used in the negative completive in Scholz' description.

[10] The alternative to such a unified structure is to assume two distinct morphs: the [NEG] portion and a separate allomorph of the perfect. In positive polarity, perfect would be exponed as a floating H and floating **A** segment, while here it is a L tone pre-linked to a mora. Either analysis is compatible with the rest of the paper. In these negative STAMP tables in general, one may wish to pursue a pure allomorphy account, e.g. [PRF] (and [HAB]) in the context of negative have unique allomorphic forms. I leave this possibility aside, but acknowledge it.

(28) **Negative Habitual** [+ATR] (A89:94)

a.	[1S]	**mé**	mē	hú	ị̀bíyā	'I do not habitually drink beer'
b.	[2]	**wé**	mē	hú	ị̀bíyā	'you do not habitually drink beer'
c.	[3S]	**ó**	mē	hú	ị̀bíyā	'he/she does not habitually drink beer'
d.	[1P]	**yé**	mē	hú	ị̀bíyā	'we do not habitually drink beer'
e.	[3P]	**é**	mē	hú	ị̀bíyā	'they do not habitually drink beer'

(29) **Negative Habitual** [-ATR] (A89:94)

a.	[1S]	**má**	mā	rí̤	ṳ̀rá	'I do not habitually eat pork'
b.	[2]	**wá**	mā	rí̤	ṳ̀rá	'you do not habitually eat pork'
c.	[3S]	**ǫ́**	mā	rí̤	ṳ̀rá	'he/she does not habitually eat pork'
d.	[1P]	**yá**	mā	rí̤	ṳ̀rá	'we do not habitually eat pork'
e.	[3P]	**ẹ́**	mā	rí̤	ṳ̀rá	'they do not habitually eat pork'

The decomposition of this STAMP is in Table 11. Notice that both the [NEG.HAB] here and the [PRF] (Table 7, above) are exponed identically, namely a floating high tone and floating **A**. Given the distinct semantics of these two STAMPs, I take this to be incidental homophony.

S (ϕ-Fs) / TAM/P + [NEG]	μ | mI	μ | U	μ | O	μ | I	μ | E
H + E [NEG]	H | μ | yI [NEG]	H | (μ) | mE [1S][NEG]	H | μ | yI [NEG]	H | (μ) | wE [2][NEG]	H | μ | yI [NEG]	H | (μ) | O [3S][NEG]	H | μ | yI [NEG]	H | (μ) | yE [1P][NEG]	H | μ | yI [NEG]	H | (μ) | E [3P][NEG]	H | μ | yI [NEG]

Table 9: [NEG] STAMP with NEG morph **yÍ**

S (ϕ-Fs) / TAM/P + [NEG]	μ | mI	μ | U	μ | O	μ | I	etc.
H L \/ μ + E [NEG.PRF]	H | μ | yI [NEG]	H L | | (μμ) \/ mE [1S][NEG.PRF]	H | μ | yI [NEG]	H L | | (μμ) \/ wE [2][NEG.PRF]	H | μ | yI [NEG]	H L | | (μμ) \/ O [3S][NEG.PRF]	H | μ | yI [NEG]	H L | | (μμ) \/ yE [1P][NEG.PRF]	H | μ | yI [NEG]	etc.

Table 10: [NEG.PERF] STAMP with NEG morph **yÍ**

S (ϕ-Fs) / TAM/P + [NEG]	μ | mI	μ | U	μ | O	etc.
H + A [NEG.HAB]	M | μ | ma [NEG.HAB]	H | (μ) | mA [1S][NEG.HAB]	M | μ | ma [NEG.HAB]	H | (μ) | wA [2][NEG.HAB]	M | μ | ma [NEG.HAB]	H | (μ) | O [3S][NEG.HAB]	M | μ | ma [NEG.HAB]	etc.

Table 11: [NEG.HAB] STAMP with NEG.HAB morph **mĀ**

4.3 *Clause-level meaning*

There are three additional STAMP series which demonstrate decompositionality. I refer to these collectively as CLAUSE-LEVEL MEANINGS, which include the interrogative (a. below) and two denoting dependent clause relationships, one translated as 'if' (b.) and another as 'when' (c.):

(30) STAMPs expressing clause-level meaning
- a. **máá** ná ? 'Did I sell?'
- b. **màá** hị̀ ị̄sá,... 'if I buy food,…'
- c. **ḿmẹ̀** vẹ́,... 'when I came,…'

The data in this section demonstrate that in addition to the pre-established STAMP categories common in the Macro-Sudan Belt, in Ebira certain clause-level meanings must too be included.

4.3.1 The interrogative

First, let us examine the INTERROGATIVE [INT]. One interrogative STAMP is used in a disjunction of contexts, namely completive aspect, perfect aspect, and future tense. It is a bimoraic high-toned STAMP, with floating **A**. The interrogative of the perfect and future co-occur with **sÍ** [PRF] and **vÂ** [FUT], respectively.

(31) **Interrogative Completive** (A89:87)

a.	[1S]	**méé**	hú ?	'Did I drink?'	**máá**	ná ?	'Did I sell?'
b.	[2]	**wéé**	hú ?	'Did you drink?'	**wáá**	ná ?	'Did you sell?'
c.	[3S]	**óó**	hú ?	'Did he/she drink?'	**ọ́ọ́**	ná ?	'Did he/she sell?'
d.	[1P]	**yéé**	hú ?	'Did we drink?'	**yáá**	ná ?	'Did we sell?'
e.	[3P]	**éé**	hú ?	'Did they drink?'	**ẹ́ẹ́**	ná ?	'Did they sell?'

(32) **Interrogative Perfect** (A89:88)

a.	[1S]	**méé**	sí	hú ?	'Have I drunk?'	**máá**	sị́	ná ?	'Have I sold?'
b.	[2]	**wéé**	sí	hú ?	'Have you drunk?'	**wáá**	sị́	ná ?	'Have you sold?'
c.	[3S]	**óó**	sí	hú ?	'Has he/she drunk?'	**ọ́ọ́**	sị́	ná ?	'Has he/she sold?'
d.	[1P]	**yéé**	sí	hú ?	'Have we drunk?'	**yáá**	sị́	ná ?	'Have we sold?'
e.	[3P]	**éé**	sí	hú ?	'Have they drunk?'	**ẹ́ẹ́**	sị́	ná ?	'Have they sold?'

(33) **Interrogative Future** (Adive 1989:88)

a.	[1S]	**méé**	vê	hú ?	'Will I drink?'	**máá**	vâ	ná ?	'Will I sell?'
b.	[2]	**wéé**	vê	hú ?	'Will you drink?'	**wáá**	vâ	ná ?	'Will you sell?'
c.	[3S]	**óó**	vê	hú ?	'Will he/she drink?'	**ọ́ọ́**	vâ	ná ?	'Will he/she sell?'
d.	[1P]	**yéé**	vê	hú ?	'Will we drink?'	**yáá**	vâ	ná ?	'Will we sell?'
e.	[3P]	**éé**	vê	hú ?	'Will they drink?'	**ẹ́ẹ́**	vâ	ná ?	'Will they sell?'

The decomposition of this STAMP is in Table 12 below. The clause-level meaning denoted by the interrogative is in green, to distinguish it from TAMP categories (which were in blue) and other pre-radical morphs (which were in purple). Hereafter, we refer to these as C-morphs. Notice that the H of the [INT] morph is 'pre-spread', which we return to shortly. Given that the surface form of the third singular STAMP is **O** (the [3S] value) rather than **A** (the [INT] value), I interpret [INT] as having a floating segment **A** rather than a pre-linked one. Only pre-linked **A** wins when adjacent to **O** in a hiatus structure.

S (ϕ-FS) / C (CLAUSE)	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
H / | \ μ A [INT]	H /\ (μμ) \/ mA [1S][INT]	H /\ (μμ) \/ wA [2][INT]	H /\ (μμ) \/ O [3S][INT]	H /\ (μμ) \/ yA [1P][INT]	H /\ (μμ) \/ E [3P][INT]

Table 12: Interrogative STAMP used in completive, perfect, and future

Let us now examine how the three components of STAMPs – subject agreement, TAMP categories, and C-level meaning – combine to form complex STAMPs. While the [INT] STAMP above is used in completive, perfect, and future, two distinct forms are used in the INTERROGATIVE CONTINUOUS and the INTERROGATIVE HABITUAL.

(34) **Interrogative Continuous** (A89:87)

a.	[1S]	**ḿméé**	hú ?	'Am I drinking?'	**ḿmáá**	ná ?	'Am I selling?'
b.	[2]	**úwéé**	hú ?	'Are you drinking?'	**ú̩wáá**	ná ?	'Are you selling?'
c.	[3S]	**ééé**	hú ?	'Is he/she drinking?'	**ááá**	ná ?	'Is he/she selling?'
d.	[1P]	**íyéé**	hú ?	'Are we drinking?'	**íy̩áá**	ná ?	'Are we selling?'
e.	[3P]	**éyéé**	hú ?	'Are they drinking?'	**éy̩áá**	ná ?	'Are they selling?'

(35) **Interrogative Habitual** (A89:89)

a.	[1S]	**m̄méē**	hú ?	/	**m̄máā**	ná ?	'Do I habitually drink/sell?'
b.	[2]	**ūwéē**	hú ?	/	**ū̩wáā**	ná ?	'Do you habitually drink/sell?'
c.	[3S]	**ōóō**	hú ?	/	**ō̩óō̩**	ná ?	'Does he/she habitually drink/sell?'
d.	[1P]	**īyéē**	hú ?	/	**īy̩áā**	ná ?	'Do we habitually drink/sell?'
e.	[3P]	**ēéē**	hú ?	/	**ēy̩éē̩**	ná ?	'Do they habitually drink/sell?'

These two interrogative STAMPs all have three moras, which is broken into two syllables in some cases (e.g. **ḿ.méé**), but becomes a super long vowel in others (e.g. **ááá**). Continuous STAMPs have an all high pattern, while the habitual has a MHM pattern.

Let us examine the individual components of these interrogative STAMPs. First, in the interrogative, completive, perfect, and future are neutralized, shown in (a.)-(c.) below (cf. first person forms in statements, completive **mÂ**, perfect **mÁ**, and future **mĪ**). Second, in the basic set of TAM contrasts (Table 8 above), the only two TAMs which contributed a mora were the continuous and habitual. The presence of the extra mora in the interrogative is therefore accounted for by a simple concatenation of the underlying mora strings (d.)-(e.).

(36)

		Statement	Interrogative
a.	Completive	**mâ**	**máá**
b.	Perfect	**má**	**máá**
c.	Future	**mī̩**	**máá**
d.	Continuous	**màà**	**ḿmáá**
e.	Habitual	**mī̩ī̩**	**m̄máā**

The decomposition of interrogative continuous and habitual are in Table 13 and Table 14.

S (ϕ-Fs) / C + TAMP	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
H L / | \ μ + μ | A A [INT] [CONT]	H / | \ μ(μμ) | \/ mmA [1S][INT][CONT]	H / | \ μ(μμ) | \/ uwA [2][INT][CONT]	H / | \ μ(μμ) \ | / A [3S][INT][CONT]	H / | \ μ(μμ) | \/ IyA [1P][INT][CONT]	H / | \ μ(μμ) | \/ EyA [3P][INT][CONT]

Table 13: Interrogative STAMP used in continuous aspect

S (ϕ-Fs) / C + TAMP	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
H M / | \ μ + μ A [INT] [HAB]	M H M | | | μ(μμ) | \/ mmA [1S][INT][HAB]	M H M | | | μ(μμ) | \/ uwA [2][INT][HAB]	M H M | | | μ(μμ) \ | / O [3S][INT][HAB]	M H M | | | μ(μμ) | \/ IyA [1P][INT][HAB]	M H M | | | μ(μμ) \ | / E [3P][INT][HAB]

Table 14: Interrogative STAMP used in habitual aspect

Let us break down first the table with continuous aspect. Here is where the presence of the 'pre-spread' H tone of [INT] is important. In the continuous interrogative the H tone falls on all three mora. We can posit that because the [CONT] morph's low tone is floating and not pre-linked to a mora, it loses to the pre-spread H tone of the [INT]. The notion of 'pre-spread' can be interpreted as a prioritized linking to any toneless moras to its right and left. [In Appendix 1, we discuss the description in Scholz which suggests the floating low remains present but undocked].

Moreover, compare the default interrogative forms (e.g. 3rd person **ọ́ọ́** in Table 12) to the continuous form in (34) (e.g. 3rd person **ááá**). In (19) above, continuous aspect is exponed as **A** pre-linked to a mora (e.g. **àà ná** 'he is selling'). Because *pre-linked* **A** should win from basic vowel hiatus principles, it is therefore completely expected that all interrogative continuous forms should have a final **A**, as well.

Related to this point is the final important feature, namely the STAMP's syllabic shape. Unlike other STAMP sets, all but [3S] are (unequivocally) disyllabic. To account for this, we must adopt a specific set of operations in the derivation. In (37) below, the underlying forms (taken from Table 13) are in the leftmost column (not including tone). To its right, two major operations take place: syllabification and coalescence. Let us assume by default that there is a restriction that syllables cannot have more than two moras (nothing in Ebira phonology contradicts this), and let us further assume that syllable constituency is formed right-to-left (all other things being equal). This results in the latter two mora placed within a single syllable, and the initial mora being either extrametrical as some kind of adjunct to the syllable, or as forming its own syllable (I do not decide which is best here). The resulting structure is μ(μμ). Note that the two **A** exponents coalesce into a single **A**.

(37) **Interrogative Continuous**

	Underlying forms		Syllabification+Coalescence		C-epenthesis/V-deletion	
a.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)	
	| |		| |		| \ |	
	mI + A + A		ṃ (A)		ṃ(mA)	
b.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)	
	| |		| |		| \ |	
	U + A + A		U (A)		U(wA)	
c.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)	
	| |		| |		\ | /	
	O + A + A		O (A)		(A)	(*OwA)
d.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)	
	| |		| |		| \ |	
	I + A + A		I (A)		I (yA)	
e.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)	
	| |		| |		| \ |	
	E + A + A		E (A)		E (yA)	

One other aspect needs to be explained for this intermediate form: [1s] **mI** becomes syllabic [ṃ]. It is unclear whether this is a regular process in Ebira (it does occur in another context, in (45) and Table 17 below). We may assume that due to **mI** being in a 'weak' position (outside of the bimoraic syllable to its right), it undergoes reduction to [ṃ].

Let us now look to the final column in (37) above, involving C-epenthesis/V-deletion. We can assume that because the first and last vowels are pre-linked in the underlying representation, one cannot assimilate to the other nor be deleted at the first stage of the derivation (Syllabification+Coalescence). This however creates a phonotactic problem, given the constraint against heterorganic vowel clusters. Two repairs are present. In most forms, an epenthetic consonant is inserted between them, which is determined by the initial segment: [m] after **ṃ**, [w] after high back **U**, and [y] after front vowels **I** and **E**. The other repair involves V-deletion, when there is adjacency between **O** and **A**. Let us assume that **O** is too dissimilar to any glide (e.g. [w]) to license it for epenthesis. The result is that one of the vowels must delete, which would be **O** by general vowel hiatus rules.[11,12]

Now let us examine interrogative STAMPs used in habitual aspect, from Table 14. These are distinct from the continuous in their tone shape – habitual forms are MHM – and the forms of the third person STAMPs – uniformly **O** and **E**. Here is where the status of the TAMP tone as floating or pre-linked is important. We can compare two [1S] forms:

	Underlying			STAMP		Underlying			STAMP
a.	H	L		H	b.	H	M		M H M
	/ | \			/ | \		/ | \	|		| | |
	μ	μ	→	μ(μμ)		μ	μ	→	μ(μμ)
	+ |			| \/		+			| \/
	A	A		mmA		A			mmA
	[INT]	[CONT]		[1S][INT][CONT]		[INT]	[HAB]		[1S][INT][HAB]

Table 15: Comparison of interrogative STAMP in continuative vs. habitual aspect

Because the L tone exponing [CONT] is not pre-linked, the [INT] tone wins. However, the M tone exponing habitual is pre-linked to a mora. Therefore, both the H of the [INT] and M of the [HAB] surface on the STAMP.

Notice one aspect of this analysis, one which remains unclear: why do all of the habitual forms have an initial M? As it stands, this remains unexplained. Not enough is known about the tone system in general of Ebira to know whether this is something which has precedence elsewhere in the grammar, nor about the variation which exists in the STAMP system. Something of importance is that in Scholz' description (unlike Adive's above), interrogative habitual STAMPs have the (expected) HHM pattern:

[11] Another possibility is to assume that [-HIGH] vowels must share the same value for [BACKNESS] in order to jointly license an epenthetic consonant between them. Both /E/ and /A/ are [FRONT] – as established by their pairing in ATR harmony (16) – while /O/ is [BACK]. The [+HIGH] vowels /I U/ are not subject to such restrictions, and can always trigger epenthetic [y] and [w] respectively.

[12] Also relevant to this discussion is a piece of data mentioned in passing by Adive (1989:124-125). Most question words are clause-initial (i. below), but at least one actually splits the STAMP morph into two parts (ii.):

(i.) **sẹ́vẹ́ dí** ú càká á (ii.) ọ́ **mẹ̀mẹ̀** àà vẹ́
why 2S break it 'Why did you break it?' 3S **how** INT.CONT come 'How is he coming?'

Here, the question word **mẹ̀mẹ̀** 'how' appears between the S and C/TAM/P portions of the STAMP complex. The H tone of the interrogative appears on the subject marker **O**, which is separate from the mora sponsored by the interrogative and the mora pre-linked to **A** of the continuous. Notice as well in (i.) with an overt question word, the STAMP marker is short and high-toned rather than long, and has the underlying vowel quality of the subject agreement morph. Compare **ú** in (i.) above to **wáá** ná ? 'Did you sell?' before in (31). This likely suggests further decomposition of the INTERROGATIVE morph itself, though not enough information is presently available to pursue such an analysis in this paper.

(38) Interrogative habitual from Scholz' description – [HHM], rather than [MHM]
ṷwáā vẹ́ ? 'Do you usually come?' (S76:54)

Scholz states explicitly that "utterance-initial M is not very stable" and that preceding a high tone, mid tones "may be realised on a pitch anywhere from halfway between low and high up to high" (p. 49). Further phonetic investigation is required.

Let us now examine the segmental forms of the habitual. This is in (39) below.

(39) **Interrogative Habitual**

	Underlying forms		**Syllabification+Coalescence**		**C-Epenthesis/V-Deletion**
a.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)
	|		| \/		| \/
	mI + A +		ṃ (A)		ṃ(mA)
b.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)
	|		| \/		| \/
	U + A +		U (A)		U(wA)
c.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)
	|		\ | /		\ | /
	O + A +		(O)		(O)
d.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)
	|		| \/		| \/
	I + A +		I (A)		I(yA)
e.	μ μ μ	→	μ (μ μ)	→	μ (μ μ)
	|		\ | /		\ | /
	E + A +		(E)		(E)

At the first stage (Syllabification + Coalescence), the major difference compared to the continuative is that here only one vocalic segment is pre-linked, namely the subject agreement portion. We have seen throughout (e.g. Table 11, Table 12, Table 14, and several earlier ones) that unlinked **A** is deleted if it competes with a *linked* mid vowel (**O**, **E**). This also holds here; otherwise the subject agreement portion remains. Following these operations, an epenthetic consonant is inserted according to the principles established above.

Before moving to 'if' and 'when' clause-level STAMPs, there is another way that interrogatives can be formed. This involves a clause-final floating mora linked with mid tone, with this mora taking the value of the final vowel. Clause-final lowering is another common feature of the Macro-Sudan Belt (Rialland 2007, 2009).

(40) Clause-final mid-toned floating mora expressing interrogative (A89:117,123)

a. ọ̄ vẹ́ **ḛ̄** 'Did he come?'

b. īzé ô ré ōzí **ī**?
Ize 3S.COMPL see child INT 'Did Ize see the child?'

c. ōzí àdívē yį́ **į̄**?
child Adive this INT 'Is this Adive's child?

The examples in (a.-b.) illustrate that the clause-final interrogative can co-occur with a non-interrogative STAMP, in these cases the third singular completive aspect. We can compare this to the interrogative completive from (31) above expressed as a single STAMP unit, e.g. **ọ́ọ́ ná?** 'Did he/she sell?'.

In general, Adive (1989) notes that "any indicative VP can be made interrogative in Ebira by lengthening the final vowel" with mid tone (p. 95). In some contexts the interrogative can *only* be expressed via this clause-final strategy. This holds for the copula construction in (c.) above, where there is no possible STAMP form. Another is in negative context, where interrogative mood is not exponed by the STAMP, but rather solely via the clause-final interrogative pattern. Two examples are below, which show a STAMP in its negative form, and not in its interrogative form.

(41) Clause-final interrogatives in the negative (A89:95)

a.	mé	yí	hú	**ū** ?	
	1S.NEG	NEG	drink	INT	'Did I not drink?'
b.	mẹ́	yị́	ná	**ā** ?	
	1S.NEG	NEG	sell	INT	'Did I not sell?'

4.3.2 'If' and 'when'

We can now examine the final two STAMP sets, with the additional two clause-level C morphs, one translated as 'if' (42)-(43), the other 'when' (44)-(45). The exponent of [C:'IF'] is a LH bimoraic STAMP, with e/a alternation associated with the floating segment **A**.

(42) [C:'IF'] STAMP [+ATR] (A89:97)

a.	[1S]	**mèé**	húsè , mī vâ dọ́	'if I ask, I will get (it)'
b.	[2]	**wèé**	húsè , ū vâ dọ́	'if you ask, you will get (it)'
c.	[3S]	**òó**	húsè , ọ̄ vâ dọ́	'if he/she asks, he/she will get (it)'
d.	[1P]	**yèé**	húsè , ī vâ dọ́	'if we ask, we will get (it)'
e.	[3P]	**èé**	húsè , ẹ̄ vâ dọ́	'if they ask, they will get (it)'

(43) [C: 'IF'] STAMP [-ATR] (A89:97,100)

a.	[1S]	**màá**	hị̀ ịsá , mī vâ rí ọ́	'if I buy food, I will eat it'
b.	[2]	**wàá**	hị̀ ịsá , ū vâ rí ọ́	'if you buy food, you will eat it'
c.	[3S]	**ọ̀ọ́**	hị̀ ịsá , ọ̄ vâ rí ọ́	'if he/she buys food, he/she will eat it'
d.	[1P]	**yàá**	hị̀ ịsá , ī vâ rí ọ́	'if we buy food, we will eat it'
e.	[3P]	**ẹ̀ẹ́**	hị̀ ịsá , ẹ̄ vâ rí ọ́	'if they buy food, they will eat it'

The STAMPs above are interpreted by Adive as completive aspect. The same forms are used in the past perfect where it co-occurs with the pre-radical morph **sÍ** [PRF], as well as future tense where it co-occurs with **vÂ** [FUT].

Further, the exponent of [C:'WHEN'] is a HL bimoraic STAMP, whose second syllabic is uniformly **mE**:

(44) [C:'WHEN'] STAMP [+ATR] (A89:100)

a.	[1S]	**ḿmè**	ré é , ọ̄ dàhí	'when I saw him, he was all right'
b.	[2]	**úmè**	ré é , ọ̄ dàhí	'when you saw him, he was all right'
c.	[3S]	**ómè**	ré é , ọ̄ dàhí	'when he/she saw him, he was all right'
d.	[1P]	**ímè**	ré é , ọ̄ dàhí	'when we saw him, he was all right'
e.	[3P]	**émè**	ré é , ọ̄ dàhí	'when they saw him, he was all right'

(45) [C:'WHEN'] STAMP [-ATR] (A89:101)

a. [1S] **ḿmę̀** vę́ , mârí ịsá 'when I came, I ate food'
b. [2] **ú̩mę̀** vę́ , wârí ịsá 'when you came, you ate food'
c. [3S] **ǫ́mę̀** vę́ , ǫ̂ rí ịsá 'when he/she came, he/she ate food'
d. [1P] **ḭ́mę̀** vę́ , yârí ịsá 'when we came, we ate food'
e. [3P] **ę́mę̀** vę́ , ę̂ rí ịsá 'when they came, they ate food'

The decomposed structures of [C:'IF'] and [C:'WHEN'] STAMPs are in the tables below:

S (ϕ-FS) / C	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
L H \/ μ) A [C:'IF']	L H | | (μ μ) \/ mA [1S][C:'IF']	L H | | (μ μ) \/ wA [2][C:'IF']	L H | | (μ μ) \/ O [3S][C:'IF']	L H | | (μ μ) \/ yA [1P][C:'IF']	L H | | (μ μ) \/ E [3S][C:'IF']

Table 16: C-element 'if' STAMP

S (ϕ-FS) / C	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
H L \/ (μ | mE [C:'WHEN']	H L | | μ(μ) | | mmE [1S][C:'WHEN']	H L | | μ(μ) | | UmE [2][C:'WHEN']	H L | | μ(μ) | | OmE [3S][C:'WHEN']	H L | | μ(μ) | | ImE [1P][C:'WHEN']	H L | | μ(μ) | | EmE [3P][C:'WHEN']

Table 17: C-element 'when' STAMP

Three aspects here are noteworthy. First, notice that just as with interrogative [INT] (Table 12), there is no evidence for overt realization of TAM within the STAMP. Second, both of these C-elements have a pre-associated syllable boundary. With [C:'IF'], it is after the mora – i.e. **μ)** – while with [C:'WHEN'] it appears after it – i.e. **(μ**. The function of this will become clear shortly, so I refrain from its explanation momentarily. Third, just as [1S] **mI** became syllabic [m̩] in Table 13 and Table 14, it becomes [m̩] before **mE** in Table 17.

Like with the interrogative, these C-elements can be combined with the continuous aspect, resulting in a complex but decomposable STAMP. For example, compare the [3S] forms of the continuous [C:'IF'] in (a.) below with that in (b.). In the continuous, there is an extra mora and the STAMP is **A** rather than **O**, both part of the regular exponence of [CONT].

(46) Third singular form of [C:'IF'] in the continuous aspect

a. [3S][CONT] **àáā** vẹ́, ọ̀ hị̀ ị̀kẹ̀kẹ́ 'if he is coming, he should buy a bicycle' (A89:12)

b. cf. [3S] alone **ọ̀ọ́** hị̀ ị̄sá , ọ̄ vâ rí̤ ọ́ 'if he/she buys food, he/she will eat it' (A89:97)

This same pattern holds for the [C:'WHEN'], e.g. the basic form [3S] **ÓmÈ** compared to its form in the continuous **ÓmÀÀ** (A89:99).

The decomposed tables of the [C:'IF'] and [C:'WHEN'] in the continuous aspect are in Table 18-Table 19. Let us break these down. For the most part the [C:'IF'] and [C:'WHEN'] tables are as expected. The additional pre-linked **A** surfaces in all forms. However, two aspects require comment. First, for the [C:'IF'] table, the tone pattern is expected to be LHL for all forms. However, only [3P] **EyA** shows this tone pattern; for all others it is LHM.[13] We interpret this as a blend between the H tone of [C:'IF'] spreading rightwards, and the floating L tone of [CONT], resulting in M tone. This is admittedly *ad hoc*, but may have a principled explanation if we consider other facts described about Ebira. Rightward spread of H tones onto L is actually claimed in Scholz' description, e.g. in /cémà wá/ 'lift them' (p. 98), the high spreads rightward until the next high, resulting in [cḗmā́ wá] (with automatic upstepping).

[13] Recall that the 3rd PL STAMP was also distinct from all others in the basic continuous aspect STAMP (Table 5).

C + TAMP \ S (ϕ-FS)	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
L H \/ μ) A [C:'IF'] + L μ | A [CONT]	L H **M** | | | (μ μ)μ \ | / mA [1S][C:'IF'][CONT]	L H **M** | | | (μ μ)μ \ | / wA [2][C:'IF'][CONT]	L H **M** | | | (μ μ)μ \ | / A [3S][C:'IF'][CONT]	L H **M** | | | (μ μ)μ \ | / yA [1P][C:'IF'][CONT]	L H L | | | (μ μ)μ \/ / EyA [3P][C:'IF'][CONT]

Table 18: C-element 'if' STAMP in the continuous

C + TAMP \ S (ϕ-FS)	μ | mI [1S]	μ | U [2]	μ | O [3S]	μ | I [1P]	μ | E [3P]
H L \/ (μ | mE [C:'WHEN'] + L μ | A [CONT]	H L | /\ μ(μμ) | |/ mmA [1S][C:'WHEN'] [CONT]	H L | /\ μ(μμ) | |/ UmA [2][C:'WHEN'] [CONT]	H L | /\ μ(μμ) | |/ OmA [3S][C:'WHEN'] [CONT]	H L | /\ μ(μμ) | |/ ImA [1P][C:'WHEN'] [CONT]	H L | /\ μ(μμ) | |/ EmA [3P][C:'WHEN'] [CONT]

Table 19: C-element 'when' STAMP in the continuous

In addition to tone, the second aspect requiring comment for these tables is the pre-specified syllable boundary. As shown, [C:'IF'] has a pre-specified boundary **μ)**, while [C:'WHEN'] is **(μ**. The function of this pre-specified boundary is to account for the fact that the former results in a super-long vowel (e.g. [1S][[C:'IF'][CONT] **màáā**), while the latter retains a disyllabic structure (e.g. [3S][C:'WHEN'][CONT] **ḿmàà**). To illustrate, consider in Table 20 the four 3-mora STAMPs which we have established, which combine subject agreement, C-elements, and TAMP. Only moraic and segmental representation is present (without tonal information).

	Underlying				**STAMP**
a.	μ		μ		μ(μμ)
	|		|	→	| \/
	A	+	A		mmA
	[INT]		[CONT]		[1S][INT][CONT]
b.	μ		μ		μ(μμ)
		+		→	| \/
	A				mmA
	[INT]		[HAB]		[1S][INT][HAB]
c.	(μ		μ		μ(μμ)
	|	+	|	→	| |/
	mE		A		mmA
	[C:'WHEN']		[CONT]		[1S][C:'WHEN'][CONT]
d.	μ)		μ		(μ μ)μ
		+	|	→	\ | /
	A		A		mA
	[C:'IF']		[CONT]		[1S][C:'IF'][CONT]

Table 20: Illustration of pre-specified syllable boundaries

Examples (a.) and (b.) illustrate default syllabification, which groups the second two moras together, while example (c.) has a pre-specified boundary before **mE**. The result for both types is a structure **μ(μμ)**, and in both the result is syllabified [m̩] in a STAMP **mmA**. In contrast, in (d.) the pre-specified boundary is on the other side of the mora, resulting in a structure **(μμ)μ**. This corresponds to a structure **mA**, with a super-long vowel. From these structures, we can posit that the syllabic form [m̩] (or its equivalent in the STAMPs with other subjects) is only licensed in a *pre*-footed position. Positing the pre-specified boundary with **(μ** with **mE** also accounts for why [m̩] surfaces even in bimoraic STAMPs, e.g. [1S][C:'WHEN'] **ḿmÈ**.

4.4 *Interim summary*

To summarize, I have established contrastive underlying structure for five subject agreement feature bundles (1S, 2, 3S, 1P, 3P), five TAMs (HABITUAL, COMPLETIVE, SUBJUNCTIVE, CONTINUOUS, and PERFECT), NEGATIVE polarity, and three clause-level meanings (INTERROGATIVE, 'IF', and 'WHEN'). These compose Ebira STAMPs. Additionally, there were a number of co-occurring pre-radical morphs which accompany certain STAMPs, e.g. **vê/vâ** [FUT]. These individual morphs are summarized below.

STAMP components				Pre-radical morphs	Verb root
S	**C**	**TAM**	**P**		
	H	M	H	H L	
	/ | \	|		\/	
μ	μ	μ		μ	
|				|	
mI	A		E	vA	
[1S]	[INT]	[HAB]	[NEG]	[FUT]	
	L H	H L	H L	H	
	\/		\/	|	
μ	μ)		μ	μ	
|				|	
U	A	A	E	sI	
[2]	[C:'IF']	[COMPL]	[NEG.PRF]	[PRF]	
	H L	M L	H	H M	
	\/			| |	
μ	(μ	~		μ μ	
|	|			\/	
0	mE	A A	A	rA	
[3S]	[C:'WHEN']	[SBJV] [SBJV]	[NEG.HAB]	[PRF]	
		L		H	
				|	
μ		μ		μ	
|		|		|	
I		A		yI	
[1P]		[CONT]		[NEG]	
		H		M	
				|	
μ				μ	
|				|	
E		A		ma	
[3P]		[PRF]		[NEG.HAB]	

Table 21: Interim summary of STAMP and other verbal morphs

These representations were color coded to identify the component morphs of each STAMP, and to identify which parts constituting exponence of a STAMP category and which were not (those parts in gray). One motivation for color-coding the individual morphs is to be compatible with a fully decompositional analysis as well as a fully storage-based one. The decompositional analysis would hold that the grammar combines these morphs to form STAMPs, while the storage-based one would hold that STAMPs are stored as a whole and are selected in the relevant context. The ultimate representation maintains internal morph boundaries, whether as generated by the grammar as an output or as stored in the lexicon. An advantage of the decompositional view is that it makes predictions for future work on Ebira. Not all logically possible combinations have been attested in the scant description of Ebira thus far, and some of the irregularities we have seen may receive a more principled explanation if they have developed from (or toward) regular decomposition.

5. Discussion

5.1 *Phonological wordhood in Ebira: Evidence from vowel harmony*

The previous section has sought to understand the internal composition of the areal-typological unit called STAMPs in the Macro-Sudan Belt, as demonstrated by the Ebira language. The result is internal complexity which is masked when taken to be a non-decomposable unit. Here, I approach Ebira from the opposite direction: units which are grouped separately can be understood to form a single phonological constituent, which rival that of larger words found in 'synthetic' African languages, e.g. in Bantu, Atlantic, Kordofanian, Kainji, amongst others. Thus, the interpretation of Ebira as 'analytic' masks largescale constituents of morphs which would otherwise be taken to be stand-alone 'words'.

As stated, all descriptions of Ebira agree that there is robust and productive ATR harmony. Strict co-occurrence restrictions exist within morphemes, e.g. **ìzē** 'grasscutter' and **ī̩nḛ́** 'stomach', but no words like ***izẹ** or ***i̩ne**. Across multi-morpheme phonological domains, surface allomorphy between [+ATR] and [-ATR] variants is common, as demonstrated for all STAMPs and all pre-radical morphs from above. A larger list of non-STAMP variants is summarized from Adive (1989) and Scholz (1976) in Table 22. [ATR] variants include question words in (a.) which appear in clause-initial position, pre-clause markers (b.), most object pronouns (c.), and other prefixes such as the agentive (d.).

	Class	[+ATR]	[-ATR]	Meaning		Class	[+ATR]	[-ATR]	Meaning
a.	Q-words	ìjí	ì̩jí̩	'when, if'	b.	Pre-clause	dí	dí̩	'then, and, so that'
		ōní	ọ̄ní̩	'who, whom'			àsí	àsí̩ (~àsú̩)	NEGATIVE SUBJUNCTIVE
		ìhí	ì̩hí̩	'when'	c.	Object pronouns	mī	mī̩	'me'
		ízí	ízí̩	'where'			wū	wū̩	'you'
		ísí	ísí̩	'what kind of'			yī	yī̩	'us'
		èní	ẹ̀ní̩	'whom'	d.	N prefixes	ōn-Ⓗ	ọ̄n-Ⓗ	'one who does, -er'
		sí	sí̩	'what'					
		sévé-dí	sḛ́vḛ́-dí̩	'why'					

Table 22: Compiled set of [ATR] variants of function morphemes[14]

In both descriptions there is unambiguous largescale ATR harmony which operates across several morphs before and after the verbal root. We repeat the negative future [ATR] pair, from (26). Throughout this section, the ATR domain is provided in parentheses.

(47) ATR pairs (A89:91,94)

a.	**[+ATR]**	(mé	yí	vê	hú)		
		1S.NEG	NEG	FUT	drink	'I will not drink'	
b.	**[-ATR]**	(mḛ́	yí̩	vâ	ná)		
		1S.NEG	NEG	FUT	sell	'I will not sell'	

[14] Adive and Scholz disagree marginally as to which of the list above show ATR variants. In general, Scholz lists most ATR harmony variants and Adive less. For example, the negative subjunctive is **àsú̩** 'don't', as in **àsú̩ nâ** 'don't go'. Adive overtly states that "*àsú̩* does not harmonize with any other forms" and "remains invariable", while Scholz includes it within his list of function words with [ATR] variants (S76:86), decomposed as **asI-U** (e.g. [+ATR] context **àsí-ú-kù** 'don't be late' – S76:65).

Analgous examples from Scholz are ubiquitous across his description as well, e.g. the pair in (48) with [+ATR] verb **tú** 'to beat' and [-ATR] **tụ́** 'to send'. In (a.), the STAMP and object pronoun are [+ATR] variants, while in (b.) they are [-ATR] variants. This demonstrates true root control of harmony, where it spreads it both directions from the root. Note that Scholz uses dashes to separate morphs, a point we return to below.

(48) a. **(óō**-tú-**mī)** 'he beat me' b. **(ọ́ọ̄**-tụ́-**mī)** 'he sent me' (S76:39)

Additional ATR pairs are taken from Scholz, provided in (49) below. Note that the super high transcribed below is realization of HL falling tone in non-word final position (realization as super high is discussed in Appendix 1).

(49) **ATR pairs (S76)**

a. [+ATR]

i. **(mɛ́-yí**-ré-**wū)**
1S.NEG-NEG-see-you 'I did not see you' (S76:73)

ii. **(ó-sí**-zwè**)**
3S.PERF-PERF-run.away 'he has run away' (S76:68)

b. [-ATR]

i. **(mɛ̱́-yɪ́**-hɪ̣́) wá
1S.NEG-NEG-call them 'I did not call them' (S76:88)

ii. mɪ̣ kā **(ó-sɪ́-**rù̱rʊ́**)**
1S say 3S.PERF-PERF-be.plenty 'I say it is plenty' (S76:73)

c. [+ATR] **(sɛ́vɛ́dí-wɛ́ɛ̄**-hú) ēɲī
why-2S.CONT-drink water 'why are you drinking water?' (S76:40)

d. [-ATR] **(sɛ̱́vɛ̱́dɪ́-mɪ́**-mɛ̀ɛ́**)**
why-1S.INT-do\it 'why did I do it? (S76:40)

e. [+ATR]

i. **(ɪ́zɪ́-wɛ́ɛ̄**-tù**)** [ɪ́zʊ́wɛ́ɛ̄tù]
where-2S.INT.CONT-go 'Where are you going' (S76:88)

ii. **(ízí-òó**-tù**)** [ízóòótû]
where-3S.C:'IF'-go '…wherever he goes' (S76:99)

f. [-ATR]

i. **(ɪ̱́zɪ̱́-ʊ̱́**-nọ̄**)**
where-2.INT-go 'where did you go?' (S76:80)

ii. **(ɪ̱́zɪ̱́-ɪ̱́**-nọ̄**)**
where-1P.INT-go 'where did we go?' (S76:99)

The examples in (a.)-(b.) demonstrate that ATR targets all pre-radical morphs between the STAMP and the root. Moreover, (c.)-(f.) shows that the ATR harmony extends into question words (see Table 22), and thus targets morphs beyond the STAMP (at least as described by Scholz).

Thus, both Adive's description and Scholz' description identify large harmony domains, which Scholz equates with the "phonological word" (S76:36ff.). Despite this agreement, Adive makes the decision to largely separate morphs via spaces (following analytic traditions), while Scholz separates morphs via dashes (following synthetic traditions). This demonstrates how orthographic practices should not matter for language analysis, whether as practices by linguists or community members/writing traditions.

The ambiguity of analytic vs. synthetic transcription in West Africa is well known (e.g. Creissels *et al.* 2008)[15], though nonetheless often still goes overlooked. Even in the extensive survey of STAMPs in Anderson (2011, 2016), the author acknowledges this issue. As the following quote demonstrates, some of this can be attributed to different traditions in the Fracophone vs. Anglophone linguistic communities:

> *"Different analytic traditions interpret word-structure in the languages of the [Macro-Sudan Belt] as either tending toward* ***quasi-isolating (francophone tradition)*** *or* ***synthetic structures (anglophone tradition)****. Thus, many languages of the MSB are analyzed as showing doubled inflection but unbound 'agreement', pronouns or argument-encoding markers. Split patterns of this sort are also attested in languages of the MSB. Indeed, given these differing analytic traditions it is difficult to know whether the relative paucity of complex verb forms deriving from fused auxiliary structures is an artefact of these kinds of analyses or represent a valid typological observation for the languages of this linguistic area."* (Anderson 2011:230; bolding mine)

Despite acknowledging the caveat, most authors (including Anderson) accept at face value the analytic status of a language based on transcription practices.

This ambiguity of analyticity vs. syntheticity speaks to the need for more refined criteria for understanding internal systems of African languages, especially those in or abutting the Macro-Sudan Belt. Ebira clearly shares numerous properties with neighboring languages, regardless of the interpretation of verbal morphology and any traditional transcription practices. It has no noun classes, and no verbal grades (unlike Hausa). There is a lack of post-verbal functional marking (e.g. suffixes or enclitics), largely confined to verbs appearing after the 'main' verb in a serial verb construction (e.g. **tá** 'to finish'). This applies both to inflectional and derivational suffixation (e.g. stem 'extension' for valency, motion, reciprocity, *etc*.).[16] The form of inflected stems is typically identical to non-inflected stems (e.g. in isolation), and there is very little allomorphy in general. All of these features are common in surrounding varieties within Yoruba/Defoid, Edoid, and Nupoid (see Figure 1 above).

5.2 *A proposal: STAMPs are pre-verbal morph constituents which exclude the verb root*

This suggests that we abandon entirely the role of orthographic convention in determining areal features. How should we then proceed to assess areality, especially with respect to STAMPs?

A proposal I would like to make is in (50), which can be tested against a sample of African languages for areal patterning. The first component is specific to this study, while the second component builds on Anderson's original conception of STAMP areality.

(50) **Proposal**

a. **STAMPs as constituents which exclude the root:**
The exponence of subject agreement, clause-level meaning, tense/aspect/mood, and polarity forms a constituent *before* and to the *exclusion* of the verb root

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[15] As quoted in Anderson (2016:524), Creissels *et al*. (2008:93) caution that "many descriptions of African languages do not identify pronominal markers appropriately, treating them as independent words". Anderson points out that this the case in the East Mande Boko/Busa cluster (Jones 1998), "where the orthography treats STAMP morphs as freestanding elements but phonologically they are prefixes".

[16] Nurse (2007:241) mentions one interesting diachronic proposal from Hyman (2004): in 'analytic' languages akin to Ebira, "derivational extensions could no longer be expressed because the prosodic stem became limited to four, three, and then two syllables".

b. **STAMPs as domains for allomorphy and portmanteaux:**
The exponence of subject agreement, clause-level meaning, tense/aspect/mood, and polarity may condition allomorphy on each other or form portmanteaux to the *exclusion* of the verb root

Essentially, this proposal states that any pre-radical morphs in the STAMP field show properties of affixation to one another, rather than prefixation to the root.

Let us examine how Ebira fares with respect to this proposal. First, most sub-STAMP morphs by themselves constitute deficient representations (e.g. without a tone, without a mora, without a segment). Their mutual affixation to one another is necessary to comply with phonological well-formedness. Second, although the STAMP system is to a large degree decomposable, there exists both allomorphy and portmanteau morphs exponing more than one stamp category, as well as other general irregularities.

Allomorphy		**Portmanteau**	**Irregularity**
M	L	H L	H M
		\/	| /\
~		μ	μ(μμ)
A	A		| \/
[SBJV]	[SBJV]	E	EyA
(Elsewhere)	(after [3] pers.)	[NEG.PRF]	[3P][CONT]

Table 23: Irregular morphology with STAMP categories

These all involve STAMP categories: subjunctive mood allomorphy is conditioned by [3] subject features and portmanteau morphs are between perfect aspect and negative polarity. Other irregularities are between STAMP categories, e.g. between the [3P] subject and continuous aspect STAMP (unexpected parts in gray). Crucially, these relations happen to the *exclusion of the verb root*. Roots are neither targets nor triggers of such morphological quirks.[17]

Third, all sub-STAMP morphs appear pre-radically, but separated from the root by non-STAMP pre-verb morphs which were in purple throughout, e.g. **vÂ** [FUT]. Importantly, such morphs effectively show that STAMP sub-components do not have to be adjacent to the root, in line with their not forming a constituent. For example, data is repeated above from the continuous aspect (a.) and future tense (b.). When these two are combined, the continuous aspect incorporates with the [1S] morph (c.).

[17] Irregular root forms are very limited in general. Adive (1989:133) describes some allomorphy with motion verbs. For the verb 'to go', a form **nâ** occurs in intransitive clauses, **nǭ** in semitransitives, and **nā** in serial verb constructions. For the verb 'to come', **vẹ́** occurs in intransitive and semitransitive clauses, while **vá** occurs in serial verb constructions. None of this is sensitive to STAMP morphology.

(51)

a.	**mèè**	hú		**màà**	ná	
	1S.CONT	drink		1S.CONT	sell	
	'I am drinking'			'I am selling'		
b.	**mī** vê	hú		**mị̄** vâ	ná	
	1S FUT	drink		1S FUT	sell	
	'I will drink'			'I will sell'		
c.	**mèè**	vê	hú	**màà**	vâ	ná
	1S.CONT	FUT	drink	1S.CONT	FUT	sell
	'I am about to drink'			'I am about to sell'		

Crucially, the continuous aspect does not have to be directly adjacent to the verb, either as a suffix to **vÂ** [FUT] (a.), or prefix to the verb (b.):

(52)

a.	*mī	véè	hú	*mị̄	váà	ná
	1S	FUT.**CONT**	drink	1S	FUT.**CONT**	sell
	'I am about to drink'			'I am about to sell'		
b.	*mī	vê	**è**-hú	*mị̄	vâ	**à**-ná
	1S	FUT	**CONT**-drink	1S	FUT	**CONT**-sell
	'I am about to drink'			'I am about to sell'		

The fact that sub-STAMP morphs constitute a separate domain from the verb root is supported by all STAMP sets. Consider the larger table below, which repeats data from above involving habitual aspect (a.), continuous aspect (b.), interrogative mood (c.), and the clause-level meaning 'when' (d.). In the left part of the table, examples from Adive are provided, and below this lies the decomposed structure of the STAMP plus the verb.

To their right are hypothetical but non-attested structures, where aspect/mood morph are either suffixes or prefixes to the root itself. For example in (a.), if [HABITUAL] attached to the root, we would expect its floating mora and mid tone to affect the verb root, rather than the subject agreement morph. The expected surface patterns would be ***ō ná-ā*** if it were suffixal, or ***ō nāá*** or ***ō ñ-ná*** if it were prefixal.

	STAMP field		Root	Cf.	Hypothetical root suffix	Hypothetical root prefix
a.	**ǭǭ ná** 'he/she habitually sells' (A89:83)				*ō ná-ā	*ō nāá
	M	M	H		M H M	*ō n̄-ná
	|	/\	|		| |	
	μ μ	→ (μμ)	μ		μ (μμ)	
	|	\/	|		| \/	
	O	O	na		O na	
	[3S] [HAB]	[3S][HAB]	[√SELL]		[3S] [√SELL][HAB]	
b.	ōcū **àà vę́** 'Ocu is coming' (A89:75)				*ō vá-à	*ō vę̀ę́
	L	L	H		M H L	*ō vàá
		/\	|		| |	*ō vàà
	μ μ	→ (μμ)	μ		μ (μμ)	*ō à-vę́
	| |	\/	|		| \/	*ā à-vę́
	O A	A	vę		O vA	
	[3S] [CONT]	[3S][CONT]	[√COME]		[3S] [√COME][CONT]	
c.	īrēzí **ǫ́ǫ́ jį̄** īzé ịrẹ̄rú 'Did the dog bite Ize?' (A89:110)				*ō já-á	*ō jį́į́
	H	H	M		M H	*ó jį́į́
	/ | \	/\	|		| /\	*ō á-jį́
	μ μ	→ (μμ)	μ		μ (μμ)	*ó á-jį́
	|	\/	|		| \/	*ā á-jį́
	O A	O	jį		O jA	*á á-jį́
	[3S] [INT]	[3S][INT]	[√BITE]		[3S] [√BITE][INT]	
d.	**ǫ́mę̄ vę́** , ǫ́ rí ịsá 'when he came, he ate food' (A89:101)				*ō vę́-mę̂	*ō mę̂-vę́
	H L	H L	H		M H H L	*ō mę́-vę̀
	\/	| |	|		| \/	
	μ (μ	→ μ(μ)	μ		μ μ(μ)	
	| |	| |	|		| |	
	O mE	OmE	vę		O vęmE	
	[3S] [C:'WHEN']	[3S][C:'WHEN']	[√COME]		[3S] [√COME][C:'WHEN']	

Table 24: Hypothetical root suffixes and prefixes of STAMP morphs

None of these structures are attested in Ebira, and it is exactly these types which we expect to be absent if the proposal in (50) accurately characterizes STAMPs as being both before and to the exclusion of the verb root.

Note that this proposal does not prohibit the STAMP as a whole forming a constituent with the verb root. This is in fact the case in Ebira: the STAMP and the verb root are one phonological word as defined by vowel harmony (which also includes some clause-initial morphs, pre-radical verbal morphs, and object pronouns). The structure in (53) still complies with the proposal because the sub-STAMP morphs form a constituent [ ] to the exclusion of the root, even though they together form a larger constituent ( ).

(53) ([(S)(C)(T)(A)(M)(P)] … [VERB ROOT])P-word

This proposal is more specific than previous typologizing of STAMP morphs, and as such can assess areal patterning in a more precise way. This of course has the potential to show the lack of any clustering in the Macro-Sudan Belt, which would warrant rejecting it as a defining feature of this macro-area. In fact, this may indeed be the case, based on a cursory examination of certain proposals within the Bantu literature, whose languages largely fall outside of this zone.

For example, Myers (1987, 1998) builds on the work of Barrett-Keach (1980,1986) for Swahili and proposes that in numerous Bantu languages, the inflected verb should be divided into a verb stem headed by a verb root and a constituent consisting entirely of inflectional affixes, labeled 'Aux'. This is called the 'inflectional stem hypothesis', schematized in (54) below (Myers 1998:232).[18] See Pietraszko (2018) for further references and additional arguments.

(54) Inflectional stem hypothesis (for Bantu verbs)
[[x-y-z]AUX [root…]STEM]INFLECTED VERB

Applied to Shona (Zimbabwe), this splits the inflected verb into two constituents as below.

(55) The Shona inflected verb (Myers 1998:240)
a. nd-a-ká-mu-tár-ís-ir-a

nd-	a-	ká-	mu-	tár	-ís	-ir	-a
1SG.SBJ-	PAST-	REMOTE-	3SG.OBJ-	look	-CAUS	-APPL	-FV

'I looked for him/her (yesterday or before)'
b. [[nd-a-ká]AUX [mu-tár-ís-ir-a]STEM]INFLECTED VERB

While there are clear differences from Ebira – most notably in the presence of derivational suffixes and the final vowel – bifurcating the inflected verb as above renders such Bantu languages much closer to STAMP structures than would otherwise be assessed purely from a tradition of transcribing Ebira analytically but Bantu synthetically.

5.3 *Function load of tone hypothesis*

We have seen that a number of sub-STAMP morphs are exponed with tone, either pre-linked to specific mora, or floating and integrating with surrounding moraic structure. We may consider such tonal structure as 'grammatical tone'. Unlike many other African languages (and the Iau patterns in the introduction), tone here never affects the verb root itself; it only affects STAMP morphs.

[18] Technically, what is called the 'stem' here should be the 'macro-stem', as it includes pre-radical object markers, e.g. *mu-* 'him/her' in (55).

We can relate this to another observation. Adive finds that "it is easy to observe some lexical contrasts on monosyllabic items especially verbs of CV syllable structure", as well as commonly on VCV nouns and CVCV verbs. Minimal pairs are found throughout the lexical material on Ebira, e.g. a four-way contrast in (56) (repeated from above).

(56) Verb root 4-way minimal pair

a.	H	ná 'to sell'	c.	L	nà 'to tear'
b.	M	nā 'to open'	d.	HL	nâ 'to leave'

We may hypothesize that the frequency of tonal minimal pairs and the lack of grammatical tone affecting roots is not a coincidence. From this, we may posit the hypothesis in (57) involving 'functional load', which can informally be defined as "a measure of the 'work' that any particular contrast does in a language, as compared to other contrasts" (Hall *et al*. 2017; see the page for 'functional load' for extensive references):

(57) **Functional load of tone hypothesis**:
The functional load of lexical tone on roots is inversely correlated with the degree of grammatical tone affecting roots

In other words, the greater the role of tone in distinguishing lexical roots, the less likely grammatical tone will layer onto roots which may disrupt lexical identity, and vice versa.[19]

Let us compare Ebira to another language Kolokuma Izon to illustrate how this hypothesis is to be evaluated. We will only examine monosyllabic verbs. For Ebira, I compiled all 1σ verb roots found in both Adive and Scholz, totaling 194 verbs. This is in Appendix 2. From this, I eliminated all incidentally homophonous verb roots. This left 166 roots which are a unique combination of consonants, vowels, and tone.

A similar data set was collected from the Kolokuma dialect of Izon [ijc], taken from Williamson & Timitimi's (1983) dictionary (another Nigeria language but in the unrelated Ijoid family). I chose this language because it *does* show grammatical tone which affects verb roots. In an [OBJECT VERB] phrase in Kolokuma Izon, the object tones completely overwrite the tones of the verb. Lexical items in Izon have both inherent tone as well as tone which they assign to their left, analyzed here as floating tone. When a noun appears in object position, its floating tones overwrite the tones of the verb. Such floating tones may be LH (b.), H (c.), or L (d.). Compare the verb *di* 'to look at', pronounced [dĭ:] in isolation (a. below), to its derived tone patterns. As with Ebira, the dot below a vowel indicates [-ATR].

(58) Overwriting of verb tones (Williamson 1965:11,37,109,102)

a.	Isolation tone: **dì^{LH}**	[dĭ:]	'look at'			
b.	tọ̀bọ̀ụ̀^{LH}	'child'	→	[tọ̀bọ̀ụ̀	**dĭ**]	'look at a child'
c.	tọ́rú^{H}	'river'	→	[tọ́rú	**dí**]	'look at a river'
d.	ọ̀ndù^{HL} bí^{L}	'the other'	→	[ọ̀ndù bí	**dì**]	'look at the other (side)'

In all [OBJECT VERB] constructions, there is complete neutralization of the underlying tones of the verb. The floating tone pattern of the object overwrites the verb regardless of the latter's prosodic shape (applying equally to 1σ, 2σ, and 3σ verbs) and regardless of the verb's underlying tones.

[19] Scholz (1976:55) comes close to discussing this, stating "apparently due to their high functional load grammatical tone patterns are not subject to tone perturbation or tone alteration. Thus across morpheme boundaries grammatical tone requires few extra rules to describe morphophonemic processes".

(59) Neutralization to [L…H] in context of **tọ̀bọ̀ụ̀**$^{\mathbf{LH}}$ 'child' (Williamson 1965:37,98)

a.	dì^{LH}	'look at'	→	[tọ̀bọ̀ụ̀	**dǐ**]	'look at a child'
b.	ẹ́rí^{H}	'see'	→	[tọ̀bọ̀ụ̀	**ẹ̀rí́**]	'see a child'
c.	wẹ́ní^{H}-mọ́^{H}	'walk-towards'	→	[tọ̀bọ̀ụ̀	**wẹ̀nì-mọ́**]	'walk towards a child'

According to the functional load of tone hypothesis, the presence of grammatical tone such as this predicts that the functional load of lexical tone in Kolokuma Izon will be smaller than that of Ebira. Indeed, minimal pairs are difficult to come by in Izon (and Ijoid languages generally), though they do exist (e.g. **bọ̀ọ̀**$^{\mathbf{LH}}$ 'to agree' vs. **bọ́ọ́**$^{\mathbf{H}}$ 'to pass, be too much'). We can quantify this to more directly compare it to Ebira. There are 200 σ-verb roots in the Kolokuma Izon dictionary, found in Appendix 3. As above, I eliminated incidentally homophonous verb roots, resulting in 187 roots which are a unique combination of consonants, vowels, and tone.

What happens if we eliminate all tone contrasts from the underlying representation of lexical roots in each language? For example, the four-way minimal pair in Ebira **ná**, **nā**, **nà**, **nâ** are all now rendered toneless **na**. In Ebira, this results in a change from 166 unique roots to 102, but in Kolokuma Izon it is only a change from 187 unique roots to 169. In other words, eliminating tone in Ebira results in unique roots decreasing by of over 38% (leading to much greater homophony), while in Kolokuma Izon it decreases by just under 10%.

Language	**σ-verbs**	**Unique roots** (w/o homophonous roots)	**No Tone - Unique roots** (if all tone contrast is eliminated)	**Decrease**
Ebira	*n* = 194	166	102	38.55%
Kolokuma Izon	*n* = 200	187	169	9.63%

Table 25: Functional load of tone in Ebira vs. Kolokuma Izon

As it stands, this supports the functional load hypothesis. Future work can determine the extent to which this holds given larger typological surveying, and use more sophisticated metrics.[20]

6. Conclusion

The focus of this paper concerned the interaction of linear and non-linear morphology in verbal inflection in Ebira. Such morphological patterns do not target the root, but rather the various inflectional categories form a pre-verbal auxiliary-like satellite unit called a STAMP (Anderson 2011, 2015, 2016), a mnemonic for subject agreement, tense, aspect, mood, and polarity.

This paper deconstructed Ebira STAMPs and identified individual sub-STAMP morphs based on the extensive description in Adive (1989) and Scholz (1976). The individual inflectional categories for subject agreement (1S, 2, 3S, 1P, 3P), TAM (HABITUAL, COMPLETIVE, SUBJUNCTIVE, CONTINUOUS, and PERFECT), polarity (NEGATIVE), and clause-level meanings (INTERROGATIVE, 'IF', and 'WHEN') were decomposed (in part) as non-linear floating tones, floating moras, unassociated segments, and underspecified segments. By decomposing STAMPs in this way, it makes testable predictions for future Ebira studies, as not all logically possible category combinations have been investigated yet.

While Anderson characterizes STAMPs as fused portmanteaux found widely in the Macro-Sudan Belt, I concluded that 'STAMP' as it stands as a typological category may be too crude to assess areal typology. For Ebira, it both masks internal decompositionality as well as masking the fact that STAMPs and verbs form a single domain for ATR vowel harmony. I proposed a different way to assess whether STAMPs are an areal feature, namely if the exponence of STAMP

[20] No doubt, part of these findings are related to the fact that Kolokuma Izon has more possible vowel sequences: it allows onglide dipthongs (**ia**), offglide diphthongs (**ai**), and contrastive nasal vowels. Ebira has slightly more consonant contrasts.

categories form a constituent *before* and to the *exclusion* of the verb root (requiring arguments independent of transcription practices).

Finally, this paper also proposed the 'functional load of tone hypothesis', which holds that the functional load of lexical tone on roots is inversely correlated with the degree of grammatical tone affecting roots. Preliminary analysis of Ebira compared to another Nigerian language Kolokuma Izon (Williamson 1965, Williamson & Timitimi 1983) supports this hypothesis. This sends the groundwork for further testing with a wider sample of languages and more refined quantitative analysis.

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8. Appendices

8.1 *Appendix 1: Description in Scholz (1976)*

As alluded to several times in paper, Scholz' (1976) description of the Ebira STAMP system for the most part corroborates Adive's description. This is expected, as they both describe the central dialect Okene (area [1] in the map from Figure 1). Still, Scholz differs in several key ways, which I present here.

One major difference between Scholz and Adive is in the completive aspect, as below.

(60) Completive Aspect in Scholz

a. **máā**-vẹ́ 'I came' (S76:53)

b. **ǫ́ǭ**-sį́ ẹ̄cṵ́kṵ́ tṵ́ īrēnū [ɔ́ɔ̄ʃɛ̋tʃő́kő́ túrēnū]
3S.COMPL-take bone put mouth 'he had a bone in his mouth' (S76:102)

In these examples, completive is expressed via a HM tone pattern, an additional mora, and a floating segment **A**. This is similar to but not identical to the analysis based on Adive. The decomposed structure for both of these are below:

Author	S (ϕ-Fs) / TAM	μ | mI [1s]	μ | O [3s]
Scholz:	H M \/ μ A [COMPL]	H M | | (μμ) \/ mA [1s][COMPL]	H M | | (μμ) \/ O [3s][COMPL]
Cf. Adive: (Table 3 above)	H L A [COMPL]	H L \/ μ | mA [1s][COMPL]	H L \/ μ | O [3s][COMPL]

Table 26: Comparison of completive aspect in Scholz (cf. Adive)

Another key difference is in negative polarity. Scholz' analysis involves tonal upstep whereby a high tone (H) is realized as a super-high tone (S). A high before a low is generally upstepped, both within and across morphemes (a. below). In certain environments, this applies opaquely. In (b.), the super-high tone spreads into the low tone resulting in a [SSH] sequence. In (c.), a low-high sequence following the super-high becomes all high.

(61) Sample environments where H → S before L (S76:67-68)

a. / àgúgù / → [àgűgù] 'crocodile'
/ īnómí nìnī / → [īnőmĭ nìnī] 'birds' (bird + PL)

b. / ó-wèyí / → [őwéyí] 'a small one'

c. / wá-zú-mè-é / → [wázűméé] 'you can do it'

Both authors agree there certain tone-bearing units can be underlyingly associated with a HL sequence, e.g. **nâ** 'to leave'. Scholz describes that in most contexts this is realized as a super-high tone, effectively creating a four-height contrast. An example of (derived) super-high contrasting with high is below.[21]

(62) Surface super-high contrasting with high (S76:64)

a. / hámá wá / → [hámá wá] 'imitate them'

b. / cémâ wá / → [cémă wá] 'lift them'

I bring up these facts as they are relevant to certain key differences in Scholz' description of the STAMP system. Returning to the negative mood, this is marked by a super-high tone. We can assume here that there is a floating low tone which triggers upstepping, which appears after negative marker **yÍ**$^{\text{Ⓛ}}$ [NEG].

[21] Adive too discusses the presence of a downstep (e.g. HLH → H$^{\downarrow}$H), but provides far less discussion and phonetic corroboration, and is not consistent in his transcription practices in marking the two types of high tones.

(63) Super-high in negative (S76:73,38)

a.	[+ATR]	mé-yí$^{\downarrow}$-ré-wū	→	mḗ-yḯ-ré-wū
		1S.NEG-NEG-see-you		'I did not see you'
b.	[-ATR]	mẹ́-yị́$^{\downarrow}$-vẹ́	→	mḛ́-yḭ́-vẹ́
		1S.NEG-NEG-come		'I did not come'

Further, the next major difference involves the continuous aspect. While Adive describes this as a long low-toned STAMP (Table 5 above), Scholz describes it with a mid-tone component as well, which precedes the low tone:

(64) Continuous aspect as described by Scholz

a.	**mēè**-zí-wū			**māà**-vẹ́			
	1S.CONT-expect-you			1S.CONT-come			
	'I am expecting you'			'I am coming' (S76:88,53)			
b.	**ēè**-nà	ōwú	[ēènōwú]	**āà**-kà	ịrẹ̄yị̄		[āàkàrẹ̄yī]
	3S.CONT-tear	shout		3S.CONT-say	say		
	'she is crying'			'he is speaking' (S76:45,83)			

One interesting fact is that the third person plural is irregular in the continuative as described by Scholz, as in (65). Adive too described this form as irregular, although with a different tone pattern (again, Table 5).

(65) **ẹ̄yàā**-mẹ̀ ịsá ọ́-kà yị̀ wá bḛ́ḛ́
3P.CONT-do what 3S-say give them ?
'they were doing what he told them to' (S76:91)

A direct comparison is below:

Author	S (*ϕ*-Fs) / TAM	μ | mI [1S]	μ | O [3S]	μ | E [3P]
Scholz:	M L μ | A [CONT]	M L | | (μμ) \/ mA [1S][CONT]	M L | | (μμ) \/ A [3S][CONT]	M L M | | | μ(μμ) | \/ EyA [3P][CONT]
Cf. Adive: (Table 5 above)	L μ | A [CONT]	L /\ (μμ) \/ mA [1S][CONT]	L /\ (μμ) \/ A [3S][CONT]	H M | /\ μ(μμ) | \/ EyA [3P][CONT]

Table 27: Compaison of continuous aspect in Scholz (cf. Adive)

In Scholz' description, both the mid tone and low tone components of [CONT] appear in several other contexts. We can see this if we examine a complex STAMP which consists of aspectual marking with clause-level meaning (66)-(67). In (66), examples (a.) and (b.) illustrate

the form of interrogative for second person, which can be compared to (c.) which shows the interrogative continuous. In (c.), we see both a low and mid component not seen in the other contexts. Note that here they appear in a linear order LM, while in Table 27 above it was an order ML.

(66) Interrogative in Scholz (S76:68,72,54)

a. **wéé**-vìdī-ré-é
   2.INT-before-see-it 'did you see it before?'
b. **wáá**-mè̩-é̩
   2.INT-do-it 'did you do it?'
c. **ṵ̋wā̋ā** vè̩ (< ṵ́wá$^{\textcircled{L}}$ā)
   2.INT.CONT come 'are you coming?'

Further, (67) below shows a series with the clause-level meaning 'if'. The basic form is in (a.), followed by the continuous form (b.) and the habitual form (c.).

(67) Clause-level meaning 'if' in Scholz (S76:54)

a. **màá** vè̩ 'If I come…'
b. **màā̋ā** vè̩ 'If I am coming…' (< màá$^{\textcircled{L}}$ā)
c. **màáā** vè̩ 'If I usually come…'

These forms are decomposed in the table below.

	Individual morphs (based on Scholz)			STAMP (from Scholz)	(cf. Adive)
a.	H | μ μ | U A [2] [INT]		→	H /\ (μμ) \/ wA [2][INT]	H /\ (μμ) \/ wA [2][INT]
b.	H | μ μ | U A [2] [INT]	M L μ | A [CONT]	→	H^{L}M /\ | μ(μμ) | \/ UwA [2][INT][CONT]	H / | \ μ(μμ) | \/ uwA [2][INT][CONT]
c.	L H \/ μ) | mI A [1S] [C:'if']		→	L H | | (μ μ) \/ mA [1S][C:'IF']	L H | | (μ μ) \/ mA [1S][C:'IF']
d.	L H \/ μ) | mI A [1S] [C:'if']	M L μ | A [CONT]	→	L H^{L}M | | | (μ μ)μ \ | / mA [1S][C:'IF'][CONT]	L H **M** | | | (μ μ)μ \ | / mA [1S][C:'IF'][CONT]
e.	L H \/ μ) | mI A [1S] [C:'if']	M | μ [HAB]	→	L H M | | | (μ μ)μ \ | / mA [1S][C:'IF'][HAB]	(*not available*)

Table 28: Comparison of decomposed interrogative and [C:'if'] forms in Scholz vs. Adive

8.2 *Appendix 2: Ebira monosyllabic verbs*

All available Ebira monosyllabic verbs are presented below. Those taken from Adive (1989) are abbreviate 'A', and those from Scholz (1976) as 'S'.

#	Source	Ebira	Meaning
1	A	bà	to dig
2	A	bā	to fast
3	S	bā	to fight
4	A	bè	to ambush, to trap someone
5	A	bɛ́	to carve (wood)
6	A	bó	to be old
7	A	cé	to break
8	A	cí	to get a load down off head

#	Source	Ebira	Meaning
9	A	cí	to germinate (seeds)
10	S	cí	to crack
11	A	cì	to press down in order to level
12	S	cì	to curse
13	A	dá	to light a fire
14	A	dà	to fetch
15	A	dà	to cut
16	A	dā	to display wares
17	A	dɔ́	to get
18	A	dù	to clear bush for farming
19	A	dū	to be spoiled
20	A	dō	to chase
21	A	gà	to divide
22	A	gà	to share
23	A	gā	to praise in song
24	A	gɛ́	to meet
25	A	gɛ́	to hang on, to put on
26	A	gɛ́	to sew
27	A/S	gú	to thatch a house, to plait hair
28	A	gù	to close (a door)
29	A	gʊ́	to take side with
30	A	gʊ̀	to plant yam seedling
31	A	gō	to be complete
32	S	gō	to catch
33	A	há	to peel
34	A	há	to split wood with an axe
35	A	hà	to bark (a dog)
36	S	hâ	to (take) away
37	A	hā	to wake up
38	A	hɔ̀	to ask
39	A	hɔ̄	to drive, to pilot
40	S	hɔ̄	to swim
41	A	hé	to excrete body waste
42	A	hě	to be in possession of something by finding it
43	A	hɛ̀	to be retarded in growth
44	A	hí	to weave
45	A	hí	to be full
46	A	hí	to call
47	A	hì	to sweep
48	A	hì	to buy
49	A	hī	to string (beads)
50	A	hú	to drink
51	A	hù	to roast (in fire)
52	A	hū	to uproot
53	A	hʊ́	to boil
54	A	hʊ̀	to open
55	A	hō	to grow
56	A	jě	to stand

#	Source	Ebira	Meaning
57	A	jɛ́	to be happy
58	A	jɛ̌	to wait
59	A	jì	to jump
60	A	jī	to separate two people from fighting
61	A	jī	to bite
62	A	jī	to cut off a leaf or twig
63	A	ká	to get water or grains with a cup from a big container
64	A	kà	to move
65	A	kà	to fish in a small river by damning
66	A	kā	to say
67	A	kɔ́	to teach, to learn
68	A	kú	to foam or water to boil over
69	S	kú	to cover
70	A	kù	to be late
71	A	kū	to happen in ancient times
72	A	kú	to lift someone's legs
73	A	kú	to shave (hair) for someone
74	A	kú	to gather
75	A	kù	to play football
76	A	kwɔ	to grind
77	A	má	to fell (a tree)
78	A	mā	to give birth
79	A	mɔ̄	to measure (grains) with measuring cup
80	A	mɛ̀	to do
81	A	mí	to put out light or fire
82	A	ná	to sell
83	A	nà	to tear
84	A	nâ	to leave
85	A	nā	to open
86	A	ɲá	to hit with hand
87	A	ɲǎ	to crack nuts with stones to get the seeds out
88	A	nǒ	to make announcement with a special gong
89	A	nɔ̄	to go
90	A	né	to trigger off (trap)
91	A	nè	to prepare (gravy)
92	A	nē	to throw
93	A	ɲě	to wipe
94	A	nī	to be clean
95	A	ɲí	to laugh
96	A	ɲí	to have
97	A	ɲì	to cut a tooth
98	A	ɲī	to choose
99	A	nò	to knead
100	S	nò	to be soft
101	A	nū	to leak
102	A	ŋū	to enter
103	A	ŋwà	to loosen, to untie
104	A	ŋwɛ̄	to spin wool or cotton

#	Source	Ebira	Meaning
105	A	pá	to train or raise up a child
106	A	pà	to beg
107	A	pā	to play tricks
108	S	pā	to display
109	S	pā	to tell
110	A	pɔ̀	to be cheap
111	A	pō	to mix flour in liquid
112	A	rá	to inhabit (a place)
113	A	rɔ̀	to be easy
114	A	rɔ̄	to pour liquid through a funnel
115	A	ré	to see
116	A	rě	to lick the fingers
117	A	rɛ́	to be sharp (knife)
118	A	rí	to eat
119	A	rò	to think
120	A	rǒ	to make a hole through a wall
121	A	sā	to be bland, to lose taste
122	A	sɛ́	to chop off grass
123	A	sɛ̀	to bargain, to market
124	A	sɛ̄	to come true (predictions or prophecy)
125	A	sí	to pay
126	A	sí	to take
127	A	sì	to look for, to want
128	A	sú	to die
129	S	sú	to sound
130	S	sú	to tie
131	S	sù	to sleep
132	A	swá	to be smooth
133	A	swé	to cough
134	A	swē	to start weaving a basket or mat
135	A	swē	to initiate something
136	A	swɛ́	to take iron blade from hoe handle
137	S	swɛ́	to guess
138	A	tá	to be finished
139	A	tá	to weave (a rope)
140	A	tɔ́	to chew
141	A	tɔ̀	to prepare mud for building walls of a house
142	A	tǔ	to pick up small items from the ground
143	A	tɛ́	to be made ashamed
144	A	tɛ̀	to hide
145	A	tî	to sigh, to groan
146	A	tò	to arrange
147	A	tú	to beat
148	A	tú	to be on/in
149	A/S	tú	to put, send
150	A	tù	to pull
151	A	vá	to marry
152	A	và	to turn

#	Source	Ebira	Meaning
153	A	và	to pour
154	A	vā	to break dry wood
155	A	vɔ́	to be left, part of something
156	A	vɔ̄	to cut meat in large pieces
157	A	vɛ́	to come
158	A	ví	to be ripe
159	A	ví	to be ready (cooked food)
160	A	vì	to be, is
161	A	vú	to be lost
162	A	vó	to put on trousers/pants or skirt
163	A	vù	to be rotten
164	A	vwɔ̀	to make flour meal
165	A	wá	to carve a pointed stick
166	A	wà	to dig in the sand
167	A	wɛ́	to sharpen a hunting stick
168	S	wó	to boast
169	S	wú	to fall to pieces
170	S	wú	to hear
171	A	wū	to kill
172	S	wū	dry
173	A	yá	to be bent
174	A	yà	to be in a place
175	A	yɔ́	it is
176	A	yé	to understand
177	A	yɛ́	to know
178	A	yí	to steal
179	A	yí	to give, this is
180	A	yî	to refuse
181	A	zá	to catch, hold
182	A	zé	to be enough
183	S	zɛ́	to winnow
184	A	zɛ̌	to agree to, answer
185	A	zí	to lie in wait for someone, expect
186	A	zì	to sieve
187	A	zī	to hurt (someone)
188	A	zī	to wander
189	A	zū	to tie up an animal to a tree
190	A	zó	can, able
191	A	zù	to fall (rain)
192	A	zù	to show someone something
193	A	zwɔ́	to be scarce
194	A	zwè	to run

8.3 *Appendix 3: Kolokuma Izon monosyllabic vowels*

The following is a list of all monosyllabic vowels found in Kolokuma Izon from Williamson & Timitimi's (1983) dictionary. Final <n> indicates vowel nasality. Inherent tones on the vowels are immediately after the underscore. Those tones in parentheses are floating tones which dock to the following word, or to itself if spoken in isolation (subject to well-formedness conditions).

#	Kolokuma Izon	Meaning
1	aun_L(L)(H)	yawn
2	baa_H(H)	kill
3	baɪ_H(H)	hit
4	ban_H(H)(L)	blind
5	bɔɔ_H(H)	pass, be too much
6	bɔɔ_L(L)(H)	agree
7	bɔʊ_L(L)(H)	be soft, weak
8	bɔʊn_H(H)	to roof
9	bein_H(H)	fill
10	bɛɛ_L(L)(H)	say
11	bɛɪn_H(H)	cross, fall into trap
12	bɪɛn_H(H)	defecate
13	bɪɛn_H(H)	call on gods
14	bii_L(L)(H)	request
15	bɪɪ_L(L)(H)	ask
16	biin_L(L)(H)	many
17	bo_H(H)	come
18	bou_H(H)	drink, absorb
19	bua_H(H)	lease land
20	buu_H(H)	be mature
21	daa_H(H)	lead, push, challenge (general light verb)
22	daan_L(L)(H)	place foot on
23	daɪ_H(H)	weave
24	dɔɔ_HL	be calm, peaceful
25	dɔʊ_L(L)(H)	need, look for, want
26	dee_H(H)(L)	be proud
27	dei_L(L)(H)	become
28	dɛɛ_L(L)(H)	set, place, arrange
29	dɛɪ_H(H)	carry child on hip
30	dɪa_H(H)	dry (of sun)
31	dɪa_L(L)(H)	show
32	dɪɛ_L(L)(H)	share out, divide
33	dɪɛɪ_L(H)(L)	pull apart
34	dii_H(H)(L)	forbid
35	dii_L(L)(H)	look at
36	dɪn_H(H)	clear bush
37	dʊa_H(H)	help, support
38	duo_L(L)(H)	follow
39	duu_H(H)	mourn (a husband)
40	dʊʊ_H(H)	light fire
41	dʊʊ_H(H)(L)	go upstream
42	dʊʊ_H(H)(L)	chew
43	duu_L(L)(H)	escape (by running)
44	dʊʊ_L(L)(H)	touch
45	duun_HL	be dusty
46	faa_L(L)(H)	finish, be lost
47	fan_H(H)	twist

#	Kolokuma Izon	Meaning
48	fɔʊn_H(H)	shake, blow, swing
49	fɔʊn_H(H)(L)	drag
50	fɛɛ_H(H)	buy
51	fɛɪn_L(L)(H)	roast, make mark on body
52	fɪ_H(H)	eat
53	fie_H(H)	talk, speak, sound (vi)
54	fɪɪ_L(L)(H)	die
55	fiin_L(L)(H)	fly, fade
56	fɪn_H(H)	pinch, be very small
57	fʊa_H(H)	bite
58	fʊɪn_HL	dare
59	fʊn_H(H)	hear
60	gaa_L(L)(H)	be on alert, cock (gun)
61	gaan_L(L)(H)	be clear
62	gbaa_H(H)	say, tell
63	gbaa_L(L)(H)	work on unfinished canoe
64	gbaan_L(L)(H)	close, shut, rub
65	gbaɪn_H(H)	keep, store, act stealthily
66	gbaɪn_L(H)(L)	obstinate
67	gbɔɪn_L(L)(H)	lose (part of body)
68	gbɔʊn_H(H)	unlock, loosen
69	gbein_H(H)	sew, throw, pole
70	gbɛɛ_H(H)	pay
71	gbiin_L(L)(H)	bind edges, tie
72	gɔɪɪn_H(H)	be small and pointed
73	gɛɛ_L(L)(H)	write, draw, cut with knife
74	gɛɪ_L(L)(H)	spread (of news, sore)
75	goiin_H(H)	be pointed (of nose)
76	goo_L(L)(H)	read
77	goo_L(L)(H)	dye
78	gʊa_L(L)(H)	mix
79	gʊɔ_H(H)	get medicine, treat
80	guu_H(H)	level out
81	kaa_H(H)(L)	mature (of foodstuffs)
82	kaɪ_H(H)	to nail, mend, lock up
83	kaɪn_L(H)(L)	tear, burst
84	kan_H(H)	wander, struggle
85	kan_H(H)	plot against, tear, destroy
86	kan_H(H)(L)	ask someone to do work, then entertain
87	kɔɔ_L(L)(H)	be left, remain
88	kɔɔn_L(L)(H)	look for, gather, make a living
89	kɔɔn_L(L)(H)	hurt, to smart someone
90	kee_H(H)	exclaim
91	kɪa_H(H)	filter
92	kɪɛn_L(L)(H)	count
93	kii_L(L)(H)	stop, prevent, build weir, fix
94	kɪn_H(H)	hack
95	koo_L(L)(H)	crave attention

#	Kolokuma Izon	Meaning
96	kpaa_L(L)(H)	secure, arrest, narrow, paddle
97	kpaɪ_L(H)(L)	cringe
98	kpɔʊ_H(H)	stub toe
99	kpɔʊ_H(H)	tow a boat
100	kpɔʊ_H(H)	oldish but young in appearance
101	kpee_L(L)(H)	pack, pile up
102	kpein_L(L)(H)	blink, wink
103	kpo_H(H)	mould, coil, roll
104	kpoo_L(L)(H)	clear away
105	kpʊn_H(H)	pull, drag
106	kʊa_H(H)	play game
107	kʊɔ_H(H)	wipe
108	kue_H(H)	abort spontaneously early
109	kui_L(L)(H)	cut with cutlass, slap water
110	kun_H(H)	plait, do hair
111	kʊn_H(H)	make sacrifice, put
112	kʊʊ_H(H)	make noise
113	laa_H(H)	reach, succeed in
114	lɔɔ_L(L)(H)	smear, plaster, massage
115	lee_L(L)(H)	keep eye on
116	lei_L(H)(L)	resemble
117	lɛɛ_L(L)(H)	beat, sharpen
118	lii_L(H)(L)	be out of sight
119	mɛɛ_L(L)(H)	sharp
120	mɪɛ_L(L)(H)	do, make, come to surface
121	mu_H(H)	go
122	mʊɪn_H(H)	dissolve, emaciated
123	naɪn_H(H)	be near
124	nii_L(L)(H)	smell
125	oin_H(H)	swell
126	ou_H(H)	cry
127	paa_H(H)	come out, go out, grow
128	paa_H(H)(L)	clean
129	paan_L(L)(H)	hoot at, heckle
130	paɪ_H(H)	pawn, pledge, receive
131	pɔɔ_H(H)	snatch at
132	pɔɔ_L(L)(H)	wash
133	pɔɔ_L(L)(H)	speak ill of
134	pɔɔn_L(L)(H)	voice, dialect
135	pɛɪ_L(L)(H)	break (a fragile thing)
136	piin_H(H)	become too small for
137	piin_L(H)(L)	be near
138	pɪn_H(H)	tap
139	poi_H(H)	listen, believe, obey
140	poo_H(H)	cut off the outer part
141	poo_H(H)(L)	castrate, emasculate
142	pou_H(H)	become a witch
143	pou_H(H)	lose in a game

#	Kolokuma Izon	Meaning
144	pou_L(L)(H)	press on one side, bend, brood
145	pui_H(H)	deny, refute
146	pui_L(H)(L)	separate
147	pʊn_H(H)	boil food
148	puu_H(H)	split, peel
149	saɪ_H(H)	bail, splash, sprinkle, cover
150	saɪ_L(L)(H)	take in canoe, accuse someone
151	san_H(H)	urinate
152	san_H(H)	crush, grind
153	sɔʊ_H(H)	become activated
154	sei_L(L)(H)	be bad, evil
155	sɛɛn_L(L)(H)	shave
156	sɛɛn_L(L)(H)	dash, bribe, give
157	sɛɪ_H(H)	dance
158	sii_H(H)	depart, go to bush
159	sɪɪ_L(L)(H)	move with circular rubbing
160	siin_L(L)(H)	remove, finish, complete
161	sou_H(H)	dig, harvest
162	sʊɔ_H(H)	speak ill of
163	sʊɔ_H(H)	enter, come in, rise
164	suu_H(H)(L)	be lazy, weak
165	sʊʊ_L(L)(H)	fight
166	tan_H(H)	collect, gather
167	taʊ_L(L)(H)	dip (fingers into soup)
168	tɔn_H(H)	thick, expect, plan, suggest
169	tei_H(H)(L)	play, make love
170	tein_L(L)(H)	shoot, hunt, play draughts
171	tɛɛ_H(H)	beg, implore, pray, prayer
172	tɛɪ_H(H)	escape, be free
173	tɛɪn_H(H)	flow, glide, drift with current
174	tɪɛ_H(H)	stand, tall
175	tɪɪn_L(L)(H)	suck, inhale
176	tɪɪn_L(L)(H)	call, invite
177	toi_L(H)(L)	stoop, bend head forward
178	tou_L(L)(H)	bend down, narrow down
179	tʊa_H(H)(L)	put (general light verb)
180	tʊɔ_L(L)(H)	cook
181	tun_H(H)	sing
182	tuo_H(H)	caulk, cork
183	tʊʊn_L(L)(H)	be thin, grow lean
184	vai_L(L)(H)	disappear completely
185	vɔɔ_L(L)(H)	trim off, cut off
186	vɪa_H(H)	stroke, feel
187	waa_H(H)	spread, be filled
188	waɪ_L(L)(H)	turn, stir
189	waɪn_L(L)(H)	scrape with sharp object
190	yaa_L(L)(H)	collect
191	yɔʊ_L(L)(H)	pull

#	Kolokuma Izon	Meaning
192	you_H(H)	cry, weep
193	zaʊ_L(L)(H)	small
194	zee_L(L)(H)	lay in groups for sale
195	zɛɛ_HL	spend some time
196	zii_L(H)(L)	be scratched, slack
197	zii_L(L)(H)	bear (children)
198	zoo_H(H)	gaze steadily, be preoccupied
199	zʊɔ_L(L)(H)	save, deliver, treat
200	zuu_H(H)	draw water, take out