

PLURACTIONAL VERB MORPHOLOGY IN GUDI NGAMO¹

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1. Background

Ngamo is a Chadic language spoken in northeastern Nigeria in Yobe State. It is a member of the West Chadic branch of the Chadic family (Newman 1977). Its closest nearby relatives are Bole and Karekare. All are members of the Bole-Tangale group of languages. Ngamo has two major dialects, Gudi and Yaya. This paper describes the morphology of pluractional verbs in the Gudi dialect.

Pluractional verbs indicate plural action of some kind: several subjects performing the same action repeatedly (*the children kept jumping*), one or more subjects performing an action on several objects (*the teacher(s) returned all the assignments to each of the students*), or combinations of such actions. Among Chadic languages, and languages of many other families, a common way to indicate pluractionality is to reduplicate part or all of a the verb. Ngamo does mark pluractionality by reduplication with some verbs, as in **hìndâ** ‘he stood up’, **hìhìndâ** ‘he kept standing up’, but for many verbs pluractionality is marked by infixing a consonant into the verb root. The form that consonant takes is the main topic of this paper.

A few notes on phonology and orthography are called for. Ngamo is a tone language. It has two level tones, high and low, plus a falling tone, which can appear only on utterance final syllables in the Gudi dialect. Low tone is marked with a grave accent (**à**), falling tone is marked by a circumflex accent (**â**), and syllables bearing high tone are unmarked for tone. Ngamo has distinctive vowel length. Long vowels are marked with a macron (**ā**). The only valid syllable types in Ngamo are CV (V = long or short) and CVC. Long vowels are excluded from closed syllables. The segmental representation is the standard orthography being developed for Ngamo as part of the Yobe Languages Research project. Features to be noted: **y** = IPA [j], **sh** = IPA [ʃ], **c** = IPA [tʃ], **j** = IPA [dʒ] **’** = IPA [ʔ], **nd** and **ng** [ŋg] at the beginning of a word are prenasalized units, but medial in a word, the syllable boundary falls between the nasal and the stop.

2. Verb Classes and Pluractional Verb Morphology

2.1. Verb classes and citation forms. Verbs in Ngamo, and most other Bole-Tangale languages, fall into four classes defined by a combination of stem shape, tense marking affixation, and tones.² The citation forms for verbs in this paper will the perfective as it appears with a third singular subject, where there is no overt agreement marking for subject. Tones of verbs are predictable based on stem type and tense. I will mark tone but will not comment on it since it plays no role in pluractional morphology.

Class A1: CVC- stem shape in perfective; overt perfective suffix **-ko**, e.g. **ngàr-kô** ‘tie’

Class A2: CVC-, CVCC-, and any longer stem shapes in the perfective; perfective ends in **-a** in the complete, e.g. **bìsk-â** ‘accept, take’

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² This classification system was first proposed by Lukas (1971-72) for Bole, but it applies equally well to Ngamo.

Class B: CVCa- stem shape in the perfective; no overt perfective suffix other than the stem vowel –a (which is replaced by other vowels in other tenses), e.g. **bàsâ** ‘shoot’

Class C: Cu- stem shape in perfective; overt perfective suffix –ko, e.g. **tù-kô** ‘eat’

Class D: Ca- stem shape in perfective; no overt perfective suffix other than the stem vowel –a (which is replaced by other vowels in other tenses), e.g. **sâ** ‘drink’

Verbs are inflected to mark tense/aspect/mood (TAM), singular vs. plural subject, pronominal objects, and extensions (morphemes that indicate features such as action done thoroughly, action initiated at a distance, and a couple of other features). Pluractional morphology creates stems that are inflected like any other verb, so to keep things simple all verbs cited in this paper will be perfective aspect with unexpressed third singular subject, no overt objects, and no extensions.

2.2. Pluractional Class A2 verbs. Pluractional formation of Class A2 verbs (those with CVC-, CVCC-, and longer stems) is straightforward and regular. C₁V₁- is reduplicated and prefixed to the stem. If V₁ is long in the stem, it is short on the reduplicative prefix.³

(1) Base form	Pluractional	
hìndâ	hìhìndâ	‘stand up’
bìskâ	bìbìskâ	‘accept, take’
’ùrtâ	’ù’ùrtâ	‘unload’
dòndâ	dòdòndâ	‘sew’
sàrnâ	sàsàrnâ	‘send’
jìbâ	jìjìbâ	‘beat, strike’
tùbâ	tùtùbâ	‘push, send’
hòtâ	hòhòtâ	‘break off (bark from a tree, etc.)’
sàlà	sàsàlà	‘pare, peel’
ndàkâ	ndàndàkâ	‘pound a wet substance’
ngòldâ	ngòngòldâ	‘bend’

It is worth noting that in the last two examples, the reduplicated syllable has the prenasalized consonant as its onset (rather than just the nasal or the stop). As noted in §1, prenasalized sounds are treated as phonological units only at the beginning of a word. In the middle of a word, the syllable boundary falls between the nasal and the stop. Thus, **zìngâ** ‘peep, peer’ is a Class A2 verb, showing that the first syllable is **zìn-**, not ***zìng-**, in which case the perfective would be Class A1 ***zìng-kô**. Phonologically, then, the syllabification of ‘pound a wet substance’ is **ndàn.dàk.â**, but morphologically the breakdown is **ndà-ndàkâ-â**.

The words in (1) would all have disyllabic stems, i.e. the CVC- or CVCC- base plus a stem vowel, giving C_v.CV or CVC.CV. In such Class A2 stems, the initial syllable is necessarily always *heavy* (C_v- or CVC-). Class A2 also includes all stems that have three or more syllables, and in these longer stems, the initial syllable may be *heavy* or *light*. Pluractional formation differs depending on weight of the first syllable.

³ The translations are the non-pluractional base meaning. The pluractional translation would vary depending on how the verb was used (one subject performing the same action repeatedly, several subjects performing the same action once, etc.).

(2)	Base form	Pluractional	
(a)	bìrwàntâ	bìbìrwàntâ	‘rotate’
	kòmďàtâ	kòkòmďàtâ	‘soak’
	dìdàntâ	dìdìdàntâ	‘shake’
(b)	kàràntâ	kàkràntă	‘read’
	kùhàtâ	kùkhàtâ	‘partially cook’
	gèlâmpâ	gèglâmpâ	‘lick’
	gòlàntâ	gòglàntâ	‘coax’

The verbs in (2a) have a heavy initial root syllable, and they form their pluractionals like those in (1), by reduplicating the first CV-, where the V is a short version of the initial vowel of the base. The verbs in (2b) have a light first syllable. There are two ways to interpret their pluractionals: either they reduplicate the initial CV, then syncopate the vowel of the base; or they infix the initial consonant after the first CV of the base. I favor the second interpretation because of the way verbs of Classes A1 and B form pluractionals, to be discussed in the next section. Infixation of C_1 in the verbs in (2b) gives a unified account of pluractional formation for all verbs that refers only to the weight of the initial syllable of the base: if the first syllable of the base is heavy, prefix $C_1\check{V}_1$, otherwise, infix C_1 . The “prefixation with syncope” account would introduce a third method of pluractional formation used only with stems of > 3 syllables where the first syllable is light.⁴

2.3. Pluractional Class A1 and Class B verbs. Class A1 and Class B verbs share the fact that they have C_1VC_2 - roots, i.e. a short vowel flanked by single consonants. Rather than forming their pluractionals with a *prefix* consisting of a reduplicated syllable, they *infix* a consonant before C_2 . The basic process is to infix C_1 immediately before C_2 to create a $C_1VC_1C_2$ - pluractional stem, e.g. A1 **sàl-kô** ‘build’ → **sàsl-â**. In (3) and later tables, I list representative examples. Appendix I has a list of all the A1 and B verbs for which I elicited pluractional data.

(3)	Base form	Pluractional	
A1	hòi-kô	hòpy-â	‘break’
	tòb-kô	tòtòb-â	‘pierce’
	sàl-kô	sàsl-â	‘build’
	shìr-kô	shìshr-â	‘steal’
	kòs-kô	kòks-â	‘gather up’
	làp-kô	làlf-â	‘answer’
	yàm-kô	yàym-â	‘carve wood’
B	rùb-â	rùrb-â	‘scratch (an itch)’
	kàb-â	kàkb-â	‘swell’

⁴ It turns out that all the trisyllabic A2 verbs with a light initial syllable that I checked have an initial velar, so one cannot be sure whether the second consonant of the pluractional is an infixed copy of C_1 or whether the initial consonant of the pluractional is a prefixed copy of C_1 . For a verb like **rùbùtâ** ‘write’, the analysis of a likely pluractional **rùrbùtâ** would be equally indeterminate. The verb **tìklàntâ** ‘poke in the ribs’ looks like a lexicalized pluractional of a non-existent ***tìlàntâ**, with an infixed **-k-**, which is an alternative for all A1 and B verbs (see §2.3). If, in fact, this is a lexicalized pluractional, it supports the infixation account for the verbs in (2b).

The pluractionals will be recognized as having Class A2 stem shape, and indeed, pluractionalized A1 verbs follow Class A2 inflectional patterns. In the examples, note that the base of an A1 verb has the perfective suffix **-ko**, but the pluractional has the final **-a** used with A2 verbs. Underived Class B verbs have stems with final **-a**, as do their pluractionals. These Class B verbs, too, appear to have shifted to Class A2. However, other conjugational forms show that pluractionals of Class B verbs retain Class B features. Verbal nouns of underived and pluractional Class B verbs have final **-e**, and internal root /a/ assimilates to this as in **dàmâ** ‘sweep’, **dèmè** ‘sweeping’, pluractional verbal noun **dètmè ~ dèkmè**. Most Class A1 verbal nouns end in **-a** and Class A2 verbal nouns end in **-a** or **-u** (**nàm-kô** ‘pick up’, **nàmà**, pluractional verbal noun **nànàmà/nànàmù ~ nàkmà/nàkmù**⁵). Subjunctives of Class B verbs, underived and pluractional, likewise end in **-e** and assimilate internal /a/ in their subjunctive forms, e.g. **hàt-â** ‘go out’ with subjunctive **ne ndalo hete** ‘I want him to go out’, pluractional **ne ndalo hekte** ‘I want them to go out’. Class A1 subjunctives end in **-i** (**ngàrî** ‘tie (sjn)’) and Class 2 end in **-e** but do not assimilate internal /a/ (**bàrtê** ‘seek out (sjn)'). Finally, singular imperatives of all verbs end in **-i**. Class B verbs, underived and pluractional, assimilate root internal /a/ to this vowel, other verb classes do not, e.g. Class B **bàs-â** ‘shoot’, **bìsî** ‘shoot!’, pluractional **bìpsî**, but Class A1 **ngàrî** ‘tie!’ and Class A2 **bàrtî** ‘seek!’. Pluractionals thus create a “Class B2” with CVCC-**a** stem structure, which does not exist as a lexical underived class.

When C_1 is infix, more often than not, it is subject to phonological variation. The word **hòi-kô** → **hòpy-â** in Table (3) shows one such case of variation for the voiceless labial obstruent /f/. Word initial and intervocalically, this phoneme is usually pronounced [h], though it is sometimes heard as a bilabial fricative [ɸ], esp. before [a]. Preconsonantly, however, it is always [p]. Postconsonantly, it is normally [p] after a stop and [ɸ] after other consonants (see examples in Appendix I).

With a couple of exceptions to be discussed, stops and nasals are realized as the corresponding voiceless stops when infix as C_1 in pluractionals. The phoneme [w] also behaves in this way.

(4) Base form	Pluractional	
bìd-â	bìpɸ-â	‘wash’
màt-kô	màpt-â	‘die’
mòi-kô	mòpy-â	‘see’
wàl-kô	wàpl-â	‘skin, flay’
/dùk-kô/ [dùkô]	dùtk-â	‘kill’
zòp-kô	zòsf-â	‘put, place’
ndàr-kô	ndàtr-â	‘split wood’
nzàr-â	nzàsr-â	‘leak, drip’
jùr-â	jùshr-â	‘make a notch’
gùn-â	gùkn-â	‘run’
ngàr-kô	ngàkr-â	‘tie’

When C_1 is /b/ I have transcribed [p], consistent with the pattern in (4), e.g. **bàl-kô** → **bàpl-â** ‘split (a gourd)’, but when C_1 is /d/ I have transcribed [ɸ], e.g. **/ɸàk-kô/** → **ɸàɸk-ô** ‘for termites to cover something with a crust’. Both these outcomes seem anomalous. Ngamo does allow syllable final [ɸ], e.g. **jòbtô** ‘woman’s wrapper’. On the

⁵ I did not actually elicit this form, but there are many parallel forms in the current lexical database, e.g. the lexicalized pluractional **tàksâ** ‘hobble an animal’s front feet’ has verbal nouns **tàksà ~ tàksù**.

other hand, underlying /V_idC_j/ is usually realized as [V_i'V_iC_j], e.g. /sùd̥-kô/ → [sù'ù-kô] 'feed' (cf. sùd̥à 'feeding'). More data from more verbs from more speakers may clarify the situation, or at least confirm that the transcriptions here are correct.

When C₁ is a modal (= non-glottalized) obstruent, the resulting internal sequence – C₁C₂- created by pluractional infixation fairly closely follows the regular lexical phonotactics of Ngamo:

- Modal obstruent sequences agree in voicing, ùskà 'medicine' (*uzka), gàzgò 'excrement of animals' (*gasgo), lùgdê 'gourd ladle' (*lukde), though [-voice][+voice], seems marginally acceptable as in the loanword Supdù 'Saturday'
- Otherwise, syllable-final obstruents are devoiced, e.g. màsnì 'counting' (but no *màznì), dīklī 'cornstalk bed' (but no *dīglī).

In pluractionals, if C₁ is a voiced obstruent and C₂ is a voiced obstruent or a nasal (the class [-approximate, +voice]), C₁ retains its voicing, e.g. bīd-â → bībd-â 'step on', dām-â → dādm-â 'sweep' (as distinct from lexical roots, such as dātmà 'wood stack').⁶ Otherwise, a voiced obstruent C₁ is devoiced, e.g. bīd̥-â → bīpd̥-â 'untie', nzàl-kô → nzàsl-â 'pour through hole'. Voiceless C₁ remains voiceless everywhere, even before a voiced obstruent, e.g. tūg-â → tūt̥g-â 'stab'.

Nasals as C₁ in pluractionals behave in a special way. Within roots, nasals can appear before any sound, e.g. tēm̄kâ 'sheep (pl.)', gòm̄rò 'okra'. In pluractionals, however, /m/ is always infixed as [p]. The lexicon is such that it is not clear that a rule [+nasal] → [-voice] can be extended beyond the labial. There is no velar nasal phoneme, and there are only two relevant verbs with /n/ as C₁ are nàs-kô 'spend time' and nàm-kô 'pick up'. For the former, speakers rejected both *nàts-â (devoiced infixed /n/) and *nàns-â (unchanged infixed /n/), and for the latter, they allowed only nànm-â as a dispreferred option to nàkm-â (see below for infixed –k-). Prenasalized consonants as C₁ could be considered "nasals" for purposes of infixation. Gudi Ngamo does not have prenasalized /mb/—original *mb has become /m/, but initial /nd, nz, ng/ become the corresponding voiceless obstruents -t-, -s-, -k- when infixed in pluractionals (see examples in (4) and in Appendix I).

While the basic process for pluractional formation of Ngamo verbs of Classes A1 and B is infixal reduplication of C₁, Ngamo (both Gudi and Yaya dialects) also allow an alternative default pluractional infix –k-. The default –k- is, in principle, a default replacement for any C₁. In some cases, it is obligatory. The examples in (5) repeat most of the roots from (3) and (4) with infixed –k- in place of a copy of C₁.

(5) Base form	Pluractional	
hòi-kô	hòky-â	'break'
tòb-kô	tòkb-â	'pierce'
sàl-kô	sàkl-â	'build'
shìr-kô	shìkr-â	'steal'
kòs-kô	kòks-â = C ₁ infix	'gather up'
làp-kô	làkp-â	'answer'
jùr-â	jùkr-â	'make a notch'
yàm-kô	yàkm-â	'carve wood'
rùb-â	rùkb-â	'scratch (an itch)'

⁶ An apparent exception to retention of underlying voicing of infixed C₁ before a nasal is gùn-â → gùkn-â 'run'. As we will see below, infixed –k- is a possible alternative for all infixed pluractionals, and this –k- is never voiced (except in tūg-â → tūgg-â 'stab', where the sequence *-kg- would be essentially unpronounceable). Gùkn-â, with infixed –k- seems to preempt the similar *gùgn-â.

bìd-â	bìkd-â	‘wash’
mât-kô	màkt-â	‘die’
mòi-kô	mòky-â	‘see’
wàl-kô	wàkl-â	‘skin, flay’
zòp-kô	zòkp-â	‘put, place’
ndâr-kô	ndàkr-â	‘split wood’
nzâr-â	nzàkr-â	‘leak, drip’
gùn-â	gùkn-â = C₁ infix	‘run’
ngâr-kô	ngàkr-â = C₁ infix	‘tie’

Words that have a velar as C₁ will have an infixed **-k-** in any case, which would be indistinguishable from the default **-k-**. Words whose C₁ is a laryngeal (/ʔ/ or /h/) allow only infixed **-k-**. Of verbs with initial [h], the only one that I have found where the [h] is treated as phonemic /h/ rather than /f/ is the one in (6)—see remarks following (3).⁷

(6) Base form	Pluractional	
’àn-kô	’àk-nâ (*’à’n-â)	‘say’
’òp-kô	’okp-â (*’o’p-â)	‘dig’
/hàd-kô/	hàkd-â (*hàhd-â)	‘eat (meat)’

Above I said that any Class A1 or B verb could infix **-k-** “in principle” regardless of what C₁ is, but there are constraints, some lexical, some related to particular consonant combinations. Here are some such constraints:

- Avoidance of homophony: There are homophonous roots **hùl-kô** (1) ‘boil’ and (2) ‘abuse, denigrate’. The former allows only **hùkl-â** as a pluractional and the latter only **hùpl-â**. In fact, all examples of ‘abuse’ that I have found in texts have the pluractional form, even though in most cases the context is not obviously pluractional in meaning. This suggests that this verb has become lexicalized in its pluractional form to keep it distinct from ‘boil’. Pluractionalizing ‘boil’ as **hùpl-â** would defeat the purpose of this functional lexicalization. Another example of homophony avoidance is **hât-â** ‘go out’, which has only the pluractional **hàkt-â**. A pluractional form **hàpt-â** would be homophonous with a Class A2 verb meaning ‘lift’, borrowed from Kanuri **haptə**. (Alternatively the initial **h-** in this word could be an underlying laryngeal, which would require **-k-**, but its cognates in other languages have labials, e.g. Bole **pàtā-wò**.)
- Undesirable consonant sequences: For a Chadic language, Ngamo is unusually non-restrictive in the consonant sequences that it permits, but the pluractionals ***tât-d-â** (from **/tâd-kô/** ‘hit’), ***dâd-l-â** (from **dâl-kô** ‘swallow’), and ***nâts-â** (from **nâs-kô** ‘spend time’) were rejected. Only the infixed **-k-** pluractional was acceptable for these verbs. In all these cases, infixation of C₁ results in a sequence of coronal sounds that present some sort of articulatory conflict. There do not seem to be any roots that would create comparable sequences at other points of articulation by infixing C₁, e.g. a hypothetical verb **“hòb-kô”** that would give the medial pluractional sequence **/pβ/**.
- Geminate **-kk-**: By and large, Ngamo avoids geminate consonants. There are few, if any, native Ngamo roots with internal geminates. Schuh (2005) describes some ways

⁷ The only relevant verbs with initial [h] for which I did not check pluractionals are **hâl-â** ‘happen’ and **hîr-â** ‘drop, let go’. Both these have etymological initial *f and hence probably form pluractionals with infixed [p].

in which Ngamo “repairs” cases where geminates would result from morpheme juxtapositions. One such case is seen in the word for ‘kill’ in (4), where the geminate **-kk-** that would result from juxtaposition of the root /**duk-**/ and the perfective suffix **-ko** is degeminated to give [**dùkô**]. I elicited pluractionals for five verbs with root final **-k-** and one with root final **-g-** (see Appendix I). Of these, three were deemed acceptable with infix **-k-**, e.g. /**mòk-kô**/ → [**mòkô**] ‘carry’ with pluractional **mòkk-â**, though **tùg-â** ‘stab’, with **-g-** as C₂, required voicing assimilation, giving [**tùgg-â**]. The geminate **-kk-** is tolerated since if the **-k-** were degeminated, the verb would not be recognizable as a pluractional with the canonical CVCC- stem shape—***mòk-â** would look like a simple Class B verb. However, three of the velar final stems with infix **-k-** pluractionals were deemed marginal or unacceptable, e.g. ?**bòkk-â** ‘burn’ from /**bok-**/. My interpretation is that there is a conflict between avoidance of geminates and overt pluractional marking. Except for verbs with an initial velar or laryngeal, there is always an alternative to infixing **-k-**, viz. infixing C₁, and this alternative gives a straightforward way to resolve the conflict.

2.4. Pluractional Class C and Class D verbs. Verbs of Classes C and D have a single root consonant. Like verbs in Classes A1 and B, Class C and D verbs form their pluractionals by infixation. Since there is no infixation site in the root, C and D verbs use a pluractional stem formed by adding **-y-**. Examples in (7) are representative. All the C and D verbs for which I elicited pluractional data are listed in Appendix II.

(7)	Base form	Pluractional (C ₁ infix)	Pluractional (-k- infix)	
	tù-kô	* tìty-â	tìky-â	‘eat’
	’ì-kô	* ’ì’y-â	’ìky-â	‘do’
	m-â	màpy-â	màky-â	‘return’
	ď-â	ďàďy-â	ďàky-â	‘mount, climb’
	s-â	* sàsy-â	sàky-â	‘drink’

Class C verbs apparently allow only the **-k-** infix option. I was not able to elicit any verbs of this class with infix C₁. Class D verbs, on the other hand, allow both the infix C₁ and infix **-k-** variants. When C₁ is infix, the facts regarding the phonological realization of the infix are the same as for Class A1 and B verbs. Of the Class D verbs I checked, only **sâ** ‘drink’ was explicitly rejected with C1 infixation. Pluractionals of Class C verbs become Class A2, e.g. the verbal noun of **tìky-â** is **tìkyâ**, one of the normal patterns for A2. Pluractionals of Class D may also become A2, but I was not able to directly check the crucial forms for indicating class.⁸

3. Issues

The facts of Ngamo pluractional formation raise at least two general issues. First, pluractional formation across Chadic and more generally in languages of the world is marked by reduplication of part or all of the verb. The motivation for this is iconic—morphological repetition mirrors repetition of action. What, then, is the source of the

⁸ One such crucial form is the verbal noun, where Class A2 will end in **-a** or **-u** with all low tones, whereas Class B and “B2”—see comments following (3)—end in **-e** and stem internal **a** → **e**. I did not elicit verbal nouns for any pluractionals of Classes C or D. In a text message, using the Hausa form **rurrufewa** ‘closing’, I asked Jibir Audu Janga Dole whether the verbal noun of **hàkyâ** ‘he closed (pluractional)’ is “**hakya**” (the likely A2 form) or “**hekye**” (the likely B2 form), and his response was **hakya**, i.e. he implicitly rejected **hekye**. Shift of pluractionalized Class D verbs to Class A2 is also made credible by the fact that Class D verbs that are causativized with a suffix **-t-** shift to Class A2, e.g. the causative of **ďâ** ‘mount’ is **ďât-â** ‘lift onto’ with the typical A2 verbal noun **ďâtù**.

non-iconic **-k-** infix as a marker of pluractionality? Second, why does Ngamo have two types of pluractional reduplication: prefixation for A2 verbs and infixation for all others?

The answer to the first question is that infixated **-k-** is an innovation with its origin in infixal reduplication. Just running one's eyes over the first and second columns of the verbs in the Appendices, one can see that infixation of C_1 has the effect of obscuring the base form since the reduplicative outcome changes the overall appearance of the root. Looking down the column with infixated **-k-**, however, one's eye easily extracts the recurrent **-k-**, facilitating recognition of the root. It seems that pluractional formation is being restructured with an alternative based on pluractionals of roots with initial velars, which are among the more common consonants in Ngamo.⁹ Ngamo thus has replaced/is replacing the iconicity of reduplication as a way to mark pluractionality with a morphological strategy that facilitates both production and comprehension. As an aside, one should point out that the infixation strategy is found throughout West Chadic and must have been inherited by Ngamo from its ancestor. Bole, a fairly close relative of Ngamo, still has remnants of infixation, including default infixation of a velar, e.g. Bole **pàtā-wò** 'he went out' with pluractional **pàttā-wò** < ***pàptā-wò** or ***pàktā-wò**, **'yuru-wò** 'stop' with pluractional **'yògìru-wò**.¹⁰ However, in Bole these infixated pluractionals are all lexicalized, often with specialized meanings. The productive pattern for pluractional formation is CV prefixal reduplication for all verbs, e.g. **'yo'yuru-wò** 'stop repeatedly'. That is, assimilations of infixated C_1 and analogical extension of the velar infix have obscured the iconic nature of reduplicative infixation, and Bole has moved back in the direction of an iconic method of marking pluractionality.

The second question raised here is why there are two strategies for pluractional formation. In Schuh (2009) I describe another reduplicative process in Ngamo that we can illustrate with the words **shòhò** 'wood', **shòshohò** 'wood-like, woodish' and **gòshò** 'stone', **gògòshò** 'stone-like, stonish'. This pattern reduplicates the first CV of the base to create an adjective-like word meaning something like English "X-ish". Of interest here is the fact that if the first syllable of the base is light (CV, where V is a short vowel), the reduplicated syllable has a long vowel, but if the first syllable of the base is heavy (CVC or CV where V is a long vowel), the reduplicated syllable has a short vowel. The result is a pattern of alternating heavy and light syllables. Sensitivity to syllable weight and more particularly, a tendency to favor alternating syllable weight in a word is pervasive in West Chadic.¹¹

The two reduplication patterns in Ngamo pluractional formation are another manifestation of this. Canonical A2 verbs have a heavy first syllable. C_1V_1 reduplication, where V_1 in the reduplicant is short, will assure that the reduplicated verb stem for nearly all A2 verbs will metrically be LIGHT-HEAVY. On the other hand, B verbs will always have a light first syllable and A1 verbs, more often than not, will also. (The citation form used in this paper, such as **màt-kò** 'die', with the **-kò** perfective suffix has a heavy stem syllable, but many if not most A1 forms will have a vowel-initial suffix resulting in a light stem syllable, e.g. **mà.t-àn.kò** 'they died'.) Prefixing C_1V_1 would thus usually result in two consecutive light syllables. One might ask why pluractional verb forms do not adopt the strategy of "-ish" reduplicants mentioned in the previous paragraph, varying syllable weight of the reduplicant prefix depending on the weight of the verb stem syllable. As reasonable and symmetrical as this may seem, Ngamo speakers have inherited the language from previous generations, including an infixing method for pluractional formation. Ngamo speakers may some day go the route that Bole

⁹ At the writing of this paper, there were 534 verbs in Gudi Ngamo data, of which 110—over 20%—begin in a velar consonant.

¹⁰ See Gimba (2000) for details of Bole pluractional formation and function.

¹¹ The importance of syllable weight and its effect on morphology in Chadic languages was first discussed in Newman (1972).

speakers have gone, and revise their entire pluractional forming paradigm, but as of yet, they remain faithful to their history.

4. Conclusion

This paper described two processes for verbal pluractional formation, both reduplicative. The class of verbs with a heavy stem syllable prefixes a copy of the initial CV. All other verbs infix a consonant before C₂. The infixed consonant may be C₁, usually phonetically altered in some way, or a default **-k-**. The latter is obligatory for verbs with an initial laryngeal and an option for all other verbs, subject to lexically specific restrictions. I speculated that the **-k-** is a historical analogical extension from verbs whose C₁ is a velar. This extension has been motivated by a tendency toward morphological uniformity. I further speculated that the choice of pluractional formation depending on stem shape is part of a tendency in West Chadic languages to achieve alternating syllable weight where morphology makes this possible.

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APPENDIX I

**List of All Class A1 and B Verbs
for Which Pluractional Forms Were Elicited**

These tables list all the Class A1 and Class B verbs for which I collected pluractional data, arranged by the initial consonant of the verb. The left-hand column is the non-pluractional citation form for the perfective with a singular third person subject. The second column is the pluractional with C₁ infix, often phonologically altered. The third column is the pluractional with infix –k-. Speakers were not always equally happy with both pluractional alternatives, but except for cases where speakers flatly rejected or expressed strong reservations about a form, I have made no attempt indicate degrees of acceptability, working under the assumption that there will be variability for individual speakers, individual lexical items, and context. I should note that in my notes I listed the first form volunteered first, and for the majority of words, this was the form with –k-.

- *WORD in a cell indicates that the form that would fill the cell was explicitly rejected
- ?WORD in a cell means that the speaker did not flatly reject the form but found it questionable
- ? in a cell indicates that I did not elicit the form and the speaker did not volunteer it
- Some cells have an underlying form in // followed by the citation form in []. The latter results from regular phonological processes. The segments seen in the underlying form account for the pluractional as well as other verb forms.

Initial labials

h < *p	hòi-kô	hòpy-â	hòky-â	‘break’
	/hòɸ-kô/ [hò’ò-kô]	hòpɸ-â	?	‘remove’
	hùl-kô	hùpl-â	*hùkl-â (cf. ↓)	‘abuse, denigrate’
	hùl-kô	*hùpl-â (cf. ↑)	hùkl-â	‘boil’
	hât-â	(hâpt-â ‘lift’)	hâkt-â	‘go out, exit’
b	bìd-â	bìbd-â	bìkd-â (*bìgd-â)	‘step on’
	/bùɸ-kô/ [bù’ù-kô]	bùpɸ-â	bùkd-â	‘wash’
	/bòk-kô/ [bòkô]	bòpk-â	?bòkk-â	‘burn, roast’
	bàs-â	bàps-â	bàks-â	‘shoot’
	bìɸ-â	bìpɸ-â	bìkɸ-â	‘untie’
	bìn-â	bìbn-â	bìkn-â (*bìgn-â)	‘bathe’
ɸ	ɸàl-kô	ɸàpl-â	ɸàkl-â	‘split (a gourd)’
	ɸât-kô	ɸâpt-â	ɸâkt-â	‘cut off, snap (rope)’
m	màs-kô	màps-â	màks-â	‘count’
	mât-kô	mâpt-â	mâkt-â	‘die’
	/mòk-kô/ [mòkô]	mòpk-â	mòkk-â	‘carry, transport’
	mòi-kô	mòpy-â	mòky-â	‘see’
	màɸ-kô ¹²	mòpɸ-â	màpɸ-â	‘make a small hole’
	mùn-kô	mùpn-â	mùkn-â	‘wrap up’

¹² One would expect the pronunciation [mà’âkô] as is normally the case when syllable final /ɸ/ abuts a following consonant, but this pronunciation was rejected for this word.

w	wàl-kô	wàpl-â	wàkl-â	‘skin, flay’
	/wòɸ-kô/ [wò’ò-kô]	wòpɸ-â	wòkɸ-â	‘cook’
	wùs-kô	?	wùks-â	‘release’

Initial alveolars

t	tòb-kô	tòtɸ-â	tòkɸ-â	‘pierce’
	tàm-kô	tàtm-â (*tadm-â)	tàkm-â	‘show’
	/tàɸ-kô/ [tà’â-kô]	*tàtɸ-â	tàkɸ-â	‘hit, strike’
	tùn-kô	tùtn-â (*tùdn-â)	tùkn-â	‘weave <i>faifai</i> ’
	tùg-â	tùtg-â	tùgg-â (*tùkg-â)	‘stab’
d	/dùk-kô/ [dùkô]	dùtk-â/dùdg-â ¹³	?	‘kill’
	dàm-â	dàdm-â	dàkm-â	‘sweep’
ɸ	ɸèi-kô	ɸèɸy-â	ɸèky-â	‘sit down’
	/ɸàk-kô/ [ɸàkô]	ɸàɸk-â	?ɸàkk-â	‘plaster over’
	ɸàl-kô	*ɸàɸl-â	ɸàkl-â	‘swallow’
nd	ndàr-kô	ndàtr-â	ndàkr-a	‘split wood’
	ndùw-â	ndùdw-â (?ndùtw-â)	ndùkw-â	‘mix into liquid’
s	sàl-kô	sàsl-â	sàkl-â	‘build’
z	zòp-kô	zòsf-â	zòkp-â	‘put, place’
nz	nzàb-kô	nzàsɸ-â	nzàkɸ-â	‘skewer’
	/nzàk-kô/ [nzàkô]	nzàsk-â	*nzàkk-â	‘extract’
	nzàl-kô	nzàsl-â	nzàkl-â	‘pour through hole’
	nzàr-â	nzàsr-â	nzàkr-â	‘leak, drip’
n	nàs-kô	*nàns-â/*nàts-â	nàks-â	‘spend time’
	nàm-kô	nànm-â	nàkm-â	‘pick up, take’
r	rùb-â	rùrb-â	rùkb-â	‘scratch (an itch)’
	/ròk-kô/ [ròkô]	ròrk-â	ròkk-â	‘drive off’
l	làp-kô	làlf-â	làkp-â	‘answer’

Initial alveopalatals/palatals

c, nj ¹⁴				
j	jùr-â	jùshr-â	jùkr-â	‘make a notch’
sh	shìr-kô	shìshr-â	shìkr-â	‘steal’
	shòb-kô	shòshɸ-â	shòkɸ-â	‘moisten’
’y	’yùr-â	’yù’yùr-â ¹⁵	’yùkr-â	‘strain, filter’
y	yàm-kô	yàym-â	yàkm-â	‘carve wood’

¹³ Etymologically, the root for ‘kill’ is ***duk-**. For this verb, there are alternative verbal nouns **dùkà** ~ **dùgà**. The etiology of these alternatives is the fact that the /k/ ~ /g/ distinction is neutralized before the commonly occurring perfective suffix **-ko**. It looks as if the root alternatives have been extended to the pluractional stem. If C₂ = /k/, the pluractional is **dùtk-â**, if C₂ = /g/, the pluractional is **dùdg-â**.

¹⁴ There are no Class A1 or B verbs with initial **c** or **nj** in Gudi Ngamo.

¹⁵ ’**y** is the palatal counterpart of **ɸ** and **ɸ**. As with **ɸ**, an epenthetic vowel is inserted with this sound abuts another consonant.

Initial velars

k	kòs-kô	kòks-â	=	‘gather up’
	kàb-â	kàkb-â (*kàgb-â)	=	‘swell’
	/kùḏ-kô/ [kù’ù-kô]	kùḏ-â	=	‘refuse’
g	gòp-kô	gòkp-â	=	‘bump against’
	gùn-â	gùkn-â	=	‘run’
	gàḏ-â	gàḏ-â	=	‘pass, pass by’
	gìs-kô /gis- ~ giz-/ ¹⁶	gìks-â ~ gìgz-â	=	‘forge, smith’
	gàl-â	gàkl-â	=	‘gather, collect’
ng	ngàr-kô	ngàkr-â	=	‘tie’
	ngàm-kô	ngàkm-â	=	‘fill’
	ngàt-â	ngàkt-â	=	‘fall’

Initial laryngeals¹⁷

’	’àn-kô	*	’àkn-â	‘say’
	’àt-kô	*	’àkt-â	‘bite’
	’òl-kô	*	’òkl-â	‘throw’
	’òp-kô	*	’òkp-â	‘dig’
	’ùr-kô	*	’ùkr-â	‘descend, get down’
	’ah-â	*	’àkh-â ¹⁸	‘open’
h ¹⁹	/hàḏ-kô/ [hà’à-kô]	*	hàḏ-â	‘eat (meat)’

¹⁶ Comparative evidence shows that the root of this word was ***giz-**, a root that still shows up in the verbal noun **gizò** ‘smithing’. However, it has been reanalyzed as /**gis-**/ in productive inflectional forms, e.g. singular imperative **gisi**, exactly the opposite reanalysis seen for the root ***duk-** discussed in a previous footnote. Like that root, the alternative roots still show up in alternative pluractionals. These seem to be the only two roots that show an alternation because of historical reanalysis. No Class B verbs have done this, probably because in Class B verbs, C2 will always be intervocalic *except* in pluractionals, protecting the voicing distinction. Only one modern Class A1 verb has a “stable” voiced obstruent as C2, viz. **bàd-kô** ‘be fond of’. Voiceless C2 in some verbs may have originally have been voiced. One case is **gòp-kô** ‘hit, strike’, where C2 is voiceless in all forms, but in Yaya Ngamo, it is voiced (Yaya verbal noun **gòba**).

¹⁷ All syllables must have an onset, and for words that would otherwise begin with a vowel, the onset is a glottal stop. The glottal stop does show up as the consonant in prefixal reduplication as in **’ùrt-â** ‘unload’, pluractional **’ù’ùrt-â**.

¹⁸ This form is surprising, because medial **h** is usually an allophone of /**f**/ before a vowel, whereas the allophone after a stop is usually [**p**]—see the word for ‘answer’ above. It appears that this word may be become lexicalized with medial /**h**/ even though this sound would have been inherited as a phoneme from proto-Bole-Tangale. The morphology of verbs is such that the only environment where the **-h-** would ever come next to a consonant is in the pluractional.

¹⁹ Phonetically, the initial sound of this word, which comes from an initial laryngeal (cf. Karekare **hàḏu**) or possibly a velar (cf. Bole **ngàḏu**), is indistinguishable for [**h**] that comes from ***f**—cf. /**hòḏ-kô**/ [**hò’ò-kô**] ‘remove’ above with Bole **poḏu**. However, Ngamo seems to have kept track of the original sound, since a pluractional ***hàḏ-â**, with an infix labial, is not possible.

APPENDIX II

List of Pluractionals for Class C and D Verbs

See comments at the beginning of Appendix I for notational conventions.

Class C

tù-kô	*tìty-â	tìky-â	‘eat’
ndù-kô	*	ndùky-â	‘go’
rù-kô	?	rìky-â	‘enter’
nù-kô	*nìny-â	nìky-â	‘get ripe’
jù-kô	*	jùky-â	‘migrate’
’ì-kô	*	’ìky-â	‘do’
yù-kô	*	yìky-â	‘poke’

Class D

hâ	hàpy-â	hàky-â	‘close’
bâ	bàpy-â	bàky-â	‘beat (drum)’
mâ	màpy-â	màky-â	‘return’
đâ	đàđy-â	đàky-â	‘mount, climb’
sâ	*sàsy-â	sàky-â	‘drink’
zâ	zàsy-â	zàky-â	‘put, place’
nzâ	nzàsy-â	nzàky-â	‘pull’
kâ	kàky-â	=	‘transplant’
wâ	ʔ ²⁰	wàky-â	‘get’

²⁰ I did not check this verb in the field. In a text message to Jibir Audu Janga Dole, I asked whether the pluractional of **wâ** is “**hapyâ**”, “**hakyâ**”, or something else. He responded with only **hakyâ**, implicitly rejecting the alternatives that I suggested.