A Morphophonological Analysis of Imbrication in Kuria

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Abstract

This paper describes imbrication in the Kuria language. This is a language that is spoken in Kenya and Tanzania. It has a robust agglutinative morphology that is largely regular except for verbs in the perfective tense whose forms undergo some changes resulting in an opaque form. This is the process of imbrication. Although some Bantu languages have forms that undergo imbrication, these are different in each language. The paper sets out to describe, with plenty of examples, how the regular perfective forms in Kuria undergo imbrication and the conditions necessary for imbrication to take place.

Key words: *imbrication, perfective, base, root, minimality, regular, irregular*

Introduction

This paper attempts a description and analysis of a morphophonological process, commonly known in Bantu linguistics as imbrication, in the Kuria language. This is a Bantu language spoken in Kenya and Tanzania. It is codified as E43 in Guthrie 1967-1971 classification. The Kuria verb, as in most Bantu languages, has a highly complex but regular verbal structure with morphemes that are easily segmentable, with each morpheme having a clearly identifiable function. Occasionally, however, affixation triggers some phonological processes that interfere with this organization. This paper specifically looks at the perfective verbal suffix, focusing on the differences in its surface representations. The perfective suffix which denotes completed action, is marked by /-eɾ/, and assigns /-e/ as the final vowel (see (1a)). However, in (1b & c) the /-eɾ/ is not reflected and the post-root domain morphemes are difficult to discern.

			3rd Person Plural	
(1) a.	heetok-a	'remember'	ßaa[héétók**ére**]	'they have just remembered'
b.	iɣoɾ-a	'open'	ßai[ɣó**ójé**]	'they have just opened'
c.	tuɾuuŋan-a	'welcome'	ßaa[túɾuuŋáíni]	'they have just welcomed'

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The perfective form in (1a) has been called 'regular' and those in (1b,c) 'irregular' (Givón 1970, Kula 2001). Imbrication can be viewed as resulting from fusion whereby the perfective /-eɾe/ surfaces as /-Vje/ or /-ini/.

Various terms have been used to refer to this process; 'modified base' (Ashton et al, 1954; Givón, 1970; Mould 1972), 'fusion' (de Blois, 1975), 'ablaut' (Kisseberth & Abasheik, 1976), and 'imbrication' (Bastin, 1983; Hyman, 1995; Cammenga, 2004). This paper uses the term 'imbrication'.

Imbrication is a word that is derived from Latin and it means "to cover as with tiles in a way that the edges overlap each other" (Guralnik, 2004). It is used here to refer to a morphological process that fuses the perfective with other post-root domain morphemes of the verb, making the surface form of the morphemes opaque. Specifically, in Kuria, imbrication is marked by the process where the perfective consonant /ɾ/ is weakened when preceded by a long vowel. Imbricated forms may be identified by the presence of [j] as in (1b) or [n] as in (1c) in the surface realization of the perfective suffix. This paper will demonstrate that:

a. The minimum requirement for imbrication to occur is at least a disyllabic root or base.
b. Roots or bases ending in -n or -ɾ will imbricate if they meet the minimum size requirement in (a) above.
c. Roots that end in a long vowel do not imbricate.
d. Imbrication can be well described using prosodic and morphemic circumscription.

This paper is divided into five sections. Section one is an introduction. In section two, there is a description of the theoretical framework followed by a brief section on the methodology used. In section three, a theoretical description of the data is presented by showing the non-imbricating roots and the imbricating roots. Section four discusses the imbricating and non-imbricating bases. Finally, the conclusion will be given in section five.

Theoretical Framework

The analysis of imbricating forms will be done using Prosodic Morphology Theory and particularly referring to prosodic circumscription and morphemic circumscription. Prosodic Morphology is a theory that shows how morphological and phonological forms interact with one another in grammatical systems (McCarthy & Prince, 1998). The typical morphological operation is affixation to a root or base. In most cases affixation will occur without regard to the phonological nature of the base. Once affixation takes place, phonological rules can apply. There are, however, cases in which the affixation process takes into account the phonology and even the morphology of the base. The basic idea is that morphological and phonological representations can be cut into two pieces where rules of affixation and phonological change apply to one of the pieces before they are brought back together.

In this paper, prosodic and morphemic circumscriptions are used to show how fusion and morpheme transposition takes place. Prosodic circumscription is concerned with the ordering of morphs with respect to certain phonological constituents. Morphemic circumscription allows affixes to be attached to non-peripheral morphological constituents of a word. It accounts for cases that are problematic to the theory of affixation. The theory is concerned with the ordering of morphs with respect to other morphs in the word.

Methodology

The generalizations that follow in this paper were arrived at after examining a total of 1005 verb roots. For consistency, all examples in this paper are in the Immediate Past Anterior or perfective tense. This tense is marked by a vowel prefix /- eɾ/ which is subject to assimilation. Verbs of various forms (long, short, monosyllabic, disyllabic, polysyllabic) were used in the analysis so as to ascertain whether the length and root type have an effect on imbrication. Although Kuria is a tone language and these have been marked in the examples given, suffice it to say that tone has no effect on the imbrication process and it is only used to assist the reader to pronounce the words correctly.

Non-imricating Forms

The perfective morpheme /-eɾ/ is suffixed in a regular fashion to all roots. The final /-e/ of the perfective takes the place of the regular Bantu final vowel /-a/. The data in (2) is arranged according to the shape of the root. In these examples, the perfective suffix shows up

with its basic shape phonetically intact, there is no imbrication. The morphemes can easily be parsed.

			sm-t-root	*-pf-fv*[1]	
(2) a.	C-	ʧ - a	ßa-a-[ʧ	**-ér**-é]	'they have just come'
b.	ØC	iß - a	ßa-i- [ß	**-ír**-é]	'they have just stolen'
c.	CVC	tum - a	ßa-a-[túm	**-ír**-é]	'they have just sewn'
d.	CVVC	ßiim – a	ßa-a-[ßíím	**-ír**-é]	'they have just measured'
e.	CVCVC	tɛrɛk - aßa-a-[tɛ́rɛ́k		**-eɾ**-é]	'they have just brewed'
f.	CVVCVC	heetok - a	ßa-a-[héétók	**-ér**-e]	'they have just remembered'
g.	CVCVVC	kaɾaaŋg - a	ßa-a-[káɾaaŋg	**-éɾ**-e]	'they have just fried'

As seen in (2) above, the perfective suffix has two allomorphs occurring in complementary distribution: [-eɾ] if the root has a non-high vowel and [-iɾ] if the root has a high vowel. The quality of the first perfective vowel (/i/ or /e/) is determined by the following rule of vowel height harmony.

(3) Vowel Height Harmony Rule 1

$$V \rightarrow [\alpha \text{ high}] / \underset{[\alpha \text{ high}]}{V} \; C_o]_{\text{root}} \_\_$$
$$[\text{- low}]$$

This rule states that a low vowel in the suffix changes to a high vowel if the vowel preceding it in the root is high.

The vowel height harmony rule is a general rule applying between the root and the suffixes; it is not confined to the perfective suffix only.

Imbricating Forms

The examples in (4) illustrate a surface form of the perfective that at a glance looks irregular. In the post-root domain of these examples, the morphology is invisible, that is, it is not clear where the root ends

[1] sm = subject marker; t = tense; pf = perfective; fv = final vowel

and the perfective suffix begins. I hold that these forms are not irregular. The product is an agglutination of several extension suffixes into a single form resulting in imbrication.

		sm-t-root	*-pf-fv*	*Surface Form*
(4)	a. C	/ßa-a-h	-eɾ-e/	ßaa[háájé] 'they just have given'
	b. CV	/ßa-a-ɾe	-eɾ-e/	ßaa[ɾééjé] 'they have just eaten'
	c. VCVC	/ßa-a-iɣoɾ	-eɾ-e/	ßai[ɣóójé] 'they have just opened'
	d. VCVCV	/ßa-a-ahuri	-eɾ-e/	ßaa[húújí] 'they have just shouted'
	e. CVCVC	/ßa-a-ɣoɣon	-eɾ-e/	ßaa[ɣóɣoiní] 'they have gnawed'
	f. CVVCVC	/ßa-a-ɣaaŋkan	-eɾ-e/	ßaa[ɣááŋkáíni] 'they have just trembled'
	g. CVCVVCVC	/ßa-a-tuɾuuŋan	-eɾ-e/	ßaa[túɾuuŋáíni] 'theyhave just welcomed'

In the underlying forms, the perfective /- eɾ-e/ is evident. This is however not the case in the surface forms where /- eɾ-e/ changes to [-aje], [-eje], [-uji], [-oini] and [-aini]. These are imbricated forms and they are the subject of this study.

Perfective Formation in Roots

After showing the non-imbricating and the imbricating forms in (2) and (4) respectively, there is need to find out the conditions that trigger imbrication. It has been shown that the occurrence of imbrication depends on a number of factors (Bastin, 1983; Hyman, 1995).

(5) a. the size of the base.[2]
b. the nature of the final consonant of the base.
c. the nature of the vowel preceding the final consonant of the base.
d. the identity of the last morpheme of the base.

A survey of verb forms of various root sizes is given to exemplify these factors and show how imbrication occurs in Kuria.

[2] It seems that Bastin (1983) and Hyman (1995) use the terms base and root interchangeably. This paper makes a distinction between the two; the base being used to refer to an extended root.

V-, C- and CV- Roots

There are fifteen V-, C-, and CV- verb roots in Kuria, all of which are presented in (6). These forms have a monosyllabic root. Most of these verb forms do imbricate when in the perfective (a – k) but there are four that do not imbricate (l – o). Three of the non-imbricating forms have a high back vowel, but so does *ɲua* "drink" in (6g).

verb *sm - t – root-pf - fv*

(6) a. ß-a 'be' /ßa - a - ß - eɾ - e/ ßaa[ßáájé]'they have become'

b. h-a 'give' /ßa - a - h - eɾ - e/ ßaa[háájé]'they have just given'

c. i-a 'go' /ßa - a - i - eɾ - e/ ßaa[ɣééjé][3]'they have just gone'

d. ɣo-a 'fall' /ßa - a - ɣo - eɾ - e/ßaa[ɣóójé] 'they have just fallen'

e. ɾe-a 'eat" /ßa - a - ɾe - eɾ - e/ ßaa[ɾééjé] 'they have just eaten'

f. ne-a 'defecate' /ßa - a - ne - eɾ - e/ ßaa[nééjé] 'they have just defecated'

g. ɲu-a 'drink' /ßa - a - ɲu - eɾ - e/ ßaa[ɲóójé] 'they have just drunk'

h. he-a 'burn' /ßa - a - he - eɾ - e/ ßaa[hééjé] 'they have just burned'

i. ke-a 'dawn' /ßo - a - ke - eɾ - e/ßoo[kééjé] 'it has just dawned'

j. to-a 'rain' /e - a - to - eɾ - e/ ee[tóójé] 'it has just rained'

k. se-a 'grind' /ßa - a - se - eɾ - e/ßaa[sééjé] 'they have just ground'

l. ku-a 'die' /ßa - a - ku - eɾ - e/ ßaa[kúúɾé] 'they have just died'

m. tu-a 'pick' /ßa - a - tu - eɾ - e/ ßaa[túúɾé] 'they have just picked'

[3] This perfective is unpredictable because it has a voiced velar fricative which cannot be predicted by looking at the root form of the verb.

n. ɾu-a 'leave' /ßa - a - ɾu - eɾ - e/ ßaa[ɾúúré] 'they have just left'

o. ʧ-a 'come' /ßa - a - ʧ - eɾ - e/ ßaa[ʧéré] 'they have just come'

In all the cases that imbricate in (6) above, the perfective consonant /-ɾ/ is replaced with the glide /-j/. The verb forms in (6) have a peculiar way of forming the perfective; they do not display any regularity as to when they imbricate or not imbricate. These have been treated here as exceptional cases and are not included in the analysis.

CVC- Roots

CVC- is a common root type in Kuria. It has several variants: one with an empty onset (ØVC), a similar form that ends in a glide (CVCG and ØVCG), another with a long vowel (CVVC), and one with a long vowel and ending in a glide (CVVCG). The perfective forms of these roots do not undergo imbrication.

(7) CVC- Roots

ØVC

a. aɣ-a /ßa - a - aɣ - eɾ - e/ ßaa[ɣéré] 'they have just scratched'

b. eɣ-a /ßa - a - eɣ - eɾ - e/ßae[ɣéɾé] 'they have just learned'

CVC-

c. ɾeß-a /ßa - a - ɾeß - eɾ - e/ ßaa[ɾéßéˈɾé] 'they have just paid'

d. ßun-a /ßa - a - ßun - eɾ - e/ ßaa[ßúníˈɾé] 'they have just broken'

CVCG-

e. ßaɾy-a /ßa - a - ßaɾi - eɾ - e/ ßaa[ßáárri] 'they have just raved'

f. ßohy-a /ßa - a - ßohi - eɾ - e/ ßaa[ßóhíˈɾí] 'they have just intimidated'

ØVCG-

g. aty-a /ßa - a - ati - eɾ - e/ ßaa[tíɾí] 'they have just broken'

h. iky-a /βa - a - iki - eɾ - e/ βai[kíɾí] 'they have just lowered'

CVVC-

i. ɾiin-a /βa - a - ɾiin - eɾ - e/ βaa[ɾííníɾé] 'they have just climbed'

j. hooɾ-a /βa - a - hooɾ - eɾ - e/ βaa[hóórré] 'they have just threshed'

CVVCG-

k. βiiɾy-a /βa - a - βiiɾ- eɾ - e/ βaa[βíírrí] 'they have just repeated'

l. hoony-a /βa - a - hoon - eɾ - e/ βaa[hóóníɾí] 'they have just sold'

Notice that the verbs whose roots end in a glide [j] will have /i/ as the final vowel in the perfective, as in (7e, f, g, h, k and l). The examples in (7j, k) have a long vowel and a trill. I do not consider these as imbricated since they do not undergo the complete process of imbrication. There are however seven exceptions emanating from the CVVC form which were detected in the data that was collected. These are laid out in (8).

(8) a. βɛɛɾ-a /βa - a - βɛɛɾ - eɾ - e/ βaa[βɛ́ɛ́ɾɛ́ɛje] 'they have just remained'

b. ɣeeɾ-a /ɾe - a - ɣeeɾ - eɾ - e/ ɾee[ɣéérééje] 'it has just gone into the eye'

c. ɾaaɾ-a /βa - a - ɾaaɾ - eɾ - e/ βaa[ɾáájé] 'they have just slept'

d. ʧeerr-a/βa - a - ʧeerr - eɾ - e/ βaa[ʧéérééje] 'they have just shouted'

e. ɾeerr-a/βa - a - ɾeerr - eɾ - e/ βaa[ɾéérééje] 'they have just been irritated'

f. heerr-a /βa - a - heerr - eɾ - e/ βaa[héɾeejé] 'they have just rumbled'

g. tɛɛrr-a /βa - a - tɛɛrr - eɾ - e/ βaa[tɛ́ɾɛɛjé] 'they have just slipped'

While it can be said that examples (8a – c) are just exceptions because there are many other CVVC roots ending in -ɾ that do not imbricate, the examples in (8d – g) are totally different. Their roots end in a trill. Whenever two or more flaps (ɾ) are adjacent to each other in the course of a derivation, they are collapsed into a trill (Cammenga, 2004); and whenever the root ends in a trill then imbrication takes place. Examples (8d – g) are repeated in (9) to illustrate their form more clearly.

(9) Roots ending in trills

a. ʧeeɾeɾ - a	→	ʧeerr-a	'shout'
b. heeɾeɾ - a	→	heerr-a	'rumble'
c. ɾeeɾeɾ - a	→	ɾeerr-a	'be irritated'
d. tɛɛɾeɾ - a	→	tɛɛrr-a	'add handle to'

I hold that the verbs in (9) are not basic roots. They are frozen bases whose initial roots no longer have an independent meaning. It is therefore not surprising that they undergo imbrication. They behave just like the extended roots or bases (see §3.2).

CVCVC- & ØVCVC- Roots

A look at disyllabic roots shows that there is some regularity. Some of these roots do imbricate as can be seen in (10).

(10) a. ʧanoɾ- /ßa - a - ʧanoɾ - eɾ - e/ ßaa[ʧánoojé] 'they have just combed'

b. ɣɔnɛɾ- /ßa - a - ɣɔnɛɾ - eɾ - e/ ßaa[ɣɔ́nɛɛjé] 'they have just snored'

c. iɣoɾ- /ßa - a - iɣoɾ - eɾ - e/ ßai[ɣóójé] 'they have just opened'

d. ɣoɣon- /ßa - a - ɣoɣon - eɾ - e/ ßaa[ɣóɣoiní] 'they have just gnawed'

e. sikan- /ßa - a - sikan - eɾ - e/ ßaa[síkainí] 'they have just met'

The examples in (10) show that the minimum root size required for imbrication in Kuria is disyllabic. This has been referred to as the

minimality condition (Hyman 1995) and is formulated in (11) as follows:

(11) Minimality Condition

Σ > σ : a stem must be longer than one syllable (Hyman, 1995)

This condition suggests that words (in Kuria) should be disyllabic or longer.

The condition ensures that only roots longer than a syllable are subject to imbrication.

However there are other roots that are disyllabic and do not imbricate as in the examples in (12).

(12) a. maɣak- /βa - a - maɣak - eɾ - e/ βaa[máɣákeɾé] 'they have just panicked'

b. βuɾuɣ- /βa - a - βuɾuɣ - eɾ - e/ βaa[βúɾúɣiɾé] 'they have just stirred'

c. mitit- /βa - a - mitit - eɾ - e/ βaa[mítítiɾé] 'they have become cold'

d. sukum- /βa - a - sukum - eɾ - e/ βaa[súkúmiɾé] they have just pushed'

The fact that the examples in (12) do not imbricate forces us to have a closer look at those in (10) to see whether there is another difference that aids in the imbrication. The examples in (10) show that the roots end in –n or -ɾ while those in (12) end in different consonants. This is proof that disyllabic roots imbricate if the final consonant of the root is a flap /-ɾ/ or a nasal /-n/. So, apart from the minimality condition, another factor necessary for imbrication, as mentioned in (5), is the nature of the final consonant of the root.

Polysyllabic Roots

Just like in the disyllabic roots in (10) above, polysyllabic roots that end with a nasal /-n/ and are followed by the perfective will undergo imbrication. The perfective final vowel /-e/ surfaces as /-i/.

(13) a. hakan- /βa - a - hakan - eɾ - e/ βaa[hákainí] 'they have just paid back'

b. kiinan- /ßa - a - kiinan - eɾ - e/ ßaa[kíínáíni] 'they have just wrestled'

c. ɣaaŋkan- /ßa - a - ɣaaŋkan - eɾ - e/ ßaa[ɣááŋkáíni] 'they have just trembled'

d. tuɾuuŋan- /ßa - a - tuɾuuŋan- eɾ - e/ ßaa[túɾuuŋáíni] 'they have just welcomed'

For the roots ending with a nasal /-n/, the practice is to delete the last consonant of the root together with the perfective and add /-ini/.

Prosodic circumscription can be used to explain clearly what is happening in the data in example (13). Prosodic circumscription is concerned with the ordering of morphs with respect to certain phonological constituents. Circumscription takes place when the final consonant of the root or base is –n. One of the rules of Prosodic circumscription that is necessary to derive the imbrication outputs given in (13) is stated in (14) below.

(14) Prosodic circumscription rules

$$n \rightarrow \langle n \rangle / \_\_\_]_{\text{base or root}}$$

At the right edge of a verb base or root, circumscribe (i.e. mark as invisible) the final C if it is a nasal -n, subject to the minimality condition.

This essentially hides the root final –n and the remaining part of the root is able to interact with the perfective through a rule of Perfective Suffixation (suffix the perfective -eɾ onto the base). After the process is through, the final –n is reinstated and the final vowel is added. A number of other rules such as Vowel Assimilation, Perfective R-Gliding and Vowel Coalescence will also apply before the final form is arrived at. These last rules are stated below in full.

Vowel Assimilation

$$e \rightarrow a / a \_\_$$

Perfective R-Gliding

$$\begin{bmatrix} + \text{son} \\ + \text{cor} \end{bmatrix} \rightarrow \begin{bmatrix} - \text{cons} \\ + \text{high} \end{bmatrix} / [+ \text{syll}] \_\_\_ \quad \overset{x \quad x}{\diagdown\!\diagup}$$

+ cont ± front

— —

This rule states that change the liquid /-ɾ/ of the perfective suffix into a high front

vowel /i/, if it is preceded by a long vowel.

Vowel Coalescence

$V_1V_1V_2 \rightarrow V_1V_2$

In a sequence of three vowels, if the first two are similar, they coalescence into one

vowel.

The rules above can be illustrated by the following derivation using the words *turuuŋana* 'welcome' and *hakana* 'pay back'.

(15)

UR	/turuuŋan-/ "welcome"	/hakan-/ "pay back"
Prosodic Circumscription	turuuŋa< n >haka< n >	
Perfective Suffixation	turuuŋa-eɾ < n >	haka-eɾ < n >
Final Vowel	turuuŋa-eɾn-e	haka-eɾn-e
Vowel Assimilation	turuuŋa-aɾn-e	haka-aɾn-e
Perfective R-Gliding	turuuŋa-ain-e	haka-ain-e
Vowel Coalescence	turuuŋaine	hakaine
Vowel Height Harmony	turuuŋaini	hakaini
SR	[turuuŋaini]	[hakaini]

Two roots: *turuuŋan*-"welcome" and *hakan*- "pay back" have been put through a derivation in (15). There is no special rule intended only for imbrication. The final consonants of the verb roots *turuuŋan*- and *hakan*- are circumscribed at the right edge leaving *turuuŋa*- and *haka*- which are longer than a syllable (see minimality condition in

(11). The perfect suffix is then added, followed by the final vowel to give the word a final -ire form.

On the basis of the examples in (10) and (13), two types of imbrication in Kuria can be distinguished: the first one replaces the perfective suffix /-ere/ with a /V:jV/ ending (see (10)), and the other replaces the last consonant of the verb and the perfective with an /-ini/ ending (see (10 & 13)). These different types are the result of different phonological processes.

Although the minimality condition in (11) implies that polysyllabic roots will imbricate, there are exceptions. The polysyllabic roots in (16) do not imbricate when they are in the perfective unless they have a trill. In each of the verb pairs below, the first example shows a non-imbricating form while the second imbricates because it has a trill.

(16) Polysyllabic Roots

CVCVVC-

a. ɣahaaʧ-a /ßa - a - ɣahaaʧ - eɾ - e/ ßaa[ɣáhaaʧére] 'they have just built'

b. tɛɣɛɛrr-a /ßa - a - tɛɣɛɛrr - eɾ - e/ ßaa[tɛ́ɣɛɛrɾɛ́ɛ́je] 'they have just listened'

ØVCVVC-

c. aɣaaɣ-a /ßa - a - aɣaaɣ - eɾ - e/ ßaa[ɣááɣére] 'they have just stroked'

d. imeerr-a /ßa - a - imeerr - eɾ - e/ ßai[méérɛ́ɛje] 'they have just stopped'

CVCVVCG-

e. siɾiiŋgy-a /ßa - a - siɾiiŋgi - eɾ - e/ ßaa[síɾiiŋgíɾi] 'they have just sang'

f. saɣiirry-a /ßa - a - saɣiirri - eɾ - e/ ßaa[sáɣiirríiji] 'they have just stirred'

ØVCVVCG-

g. imaaɾy-a /ßa - a - imaari - eɾ - e/ ßai[máárri] 'they have just ignored'

i. aɾiirry-a/ßa - a - aɾiirri - eɾ - e/ ßaa[ɾíírrííji]'they have just placed on top of'

CVVCVVC-

j. taandaas-a /ßa - a - taNɾaas - eɾ - e/ ßaa[táándááséɾe] 'they have just spread'

k. taaŋgoorr-a /ßa - a - taNɣoorr - eɾ - e/ ßaa[tááŋgóórrééje] 'they have just lead'

CVVCVVCG-

m. ɲaamuuɾy-a /ßa - a - ɲaamuuɾi - eɾ - e/ ßaa[ɲáámúúrri] 'they have just scattered'

n. suukiirry-a /ßa - a - suukiirri - eɾ - e/ ßaa[súúkíírrííji] 'they have just shamed'

A closer look at these examples with polysyllabic roots in (16) shows that the last vowel of the root is long in all cases. All verb roots that end in a long syllable will not imbricate unless they end in a trill. So, the size of the root, and the nature of the final consonant of the root are not the only conditions for imbrication. The nature of the vowel preceding the final consonant of the root is also important. For a verb form to imbricate, the final syllable of its root must be short. All other polysyllabic verbs not described in (13) and (16) undergo imbrication.

Summing up the discussion of perfective formation in roots, it can be said that when the perfective is added to disyllabic and polysyllabic roots that end with /-n/ or /-ɾ/ and have a short vowel in the final syllable, imbrication occurs. Verbs which end in a trill will always imbricate. Also, verbs that end in a glide [j] will have /i/ as their final vowel instead of /e/.

Perfective Formation in Bases

As seen above, suffixation of the perfective alone is not enough to create imbrication: also, -n or -ɾ must be the last consonant of the root. Thus, if the root is extended with the reversive transitive /-oɾ/, applicative /-eɾ/ or reciprocal /-an/, imbrication will occur (see (17)).

(17) a. /-oɾ/ /ßa - a - ɾaNɾ - oɾ - eɾ - e/ → ßaa[ɾáándóóje] 'they have just pulled off

sm - t - creep - rt - pf - fv (e.g. vines)'

b. /-eɾ/ /ßa - a - ɾom - eɾ - eɾ - e/→ ßaa[ɾómééjé] 'they have just bitten for' sm - t - bite - ap - pf - fv

c. /-an/ /ßa - a - ɾom - an - eɾ - e/→ ßaa[ɾómainí] 'they have just bitten each

sm - t - bite - rec - pf - fv other'

In the examples in (17), the root has the reversive transitive /-oɾ/, applicative /-eɾ/ or reciprocal /-an/ added onto it. According to Bastin (1983) and Hyman (1995), the identity of the last morpheme of the base is important in the formation of imbrication. Similarly, these morphemes end in -n and -ɾ, consonants that trigger imbrication. The extensions therefore create a base that meets the conditions necessary for imbrication to occur.

In the examples that follow (18), it is shown that verbs with the perfective suffix alone may not imbricate but once the perfective is combined with an extension like the applicative, imbrication occurs.

root root+perf sm-t-root-ap-pf-fv Surface Form

(18) a. maɲ- aa[máɲéˈɾé] /a-a-maɲ -eɾ-**eɾ**-e/ aa[máɲeejé] 'he has known for'

b. saamb- aa[sáámbéɾé]/a-a-saNß-eɾ-**eɾ**-e/ aa[sáámbééje]'he has burnt for'

c. keɲ- aa[kéɲéˈɾé] /a-a-keɲ -eɾ-**eɾ**-e/ aa[kéɲeejé] 'he has run for'

d. sɔm- aa[sɔ́m éˈɾé] /a-a-sɔm- eɾ-**eɾ**-e/ aa[sómiijí] 'he has just educated for'

The examples in (18) show that we cannot consider imbrication to be an inherent property of a particular set of verbs, since the non-imbricating verb roots in (18) undergo imbrication when they are extended.

Example (18d), which has an applicative morpheme, will be used to illustrate how morphemic circumscription is used to explain imbrication. In the word *aa[sómiijí]* "he has just educated for", the default order of the morphemes is /a-a-sɔm-eɾ-i-eɾ/ but since the perfective can detect the liquid -ɾ in the base, a transposition takes

place to put the applicative and the perfective morphemes next to each other and in this way imbrication takes place. This is illustrated below:

(19) /a - a - sɔm - eɾ - i - eɾ/ order of morphemes

a - a - sɔm - eɾ - eɾ - i/ transposition

Output: aa[sómiijí] "he has just educated for"

For the output in (19) to be realized, a number of rules apply. These are explicated below.

(20) a. Morphemic circumscription rule

$$\text{-i} \rightarrow \langle\, \text{i} \,\rangle \,/\, \underline{\quad} \,]_{\text{base}}$$

This rule states that at the right edge of a verb base or root, circumscribe the final morph of the applicative.

b. Perfective Suffixation

Suffix the perfective -eɾ onto the base.

c. Pre-Perfective R-Deletion

$$\begin{bmatrix} \text{+ son} \\ \text{+ cor} \end{bmatrix} \rightarrow \emptyset \,/\, [\text{+ syll}]\ \underline{\quad}\ [_{\text{perf}}\, \text{eɾ}$$

$$\begin{matrix} \text{+ cont} \\ \text{—} \qquad \text{—} \end{matrix}$$

This rule deletes the postvocalic liquid /-ɾ/ that precedes the perfective suffix.

d. Perfective R-Gliding

$$\begin{bmatrix} \text{+ son} \\ \text{+ cor} \end{bmatrix} \rightarrow \begin{bmatrix} \text{- cons} \\ \text{+ high} \end{bmatrix} \,/\, [\text{+ syll}]\ \underline{\quad}$$

+ cont + front

— — — —

The rule turns the lateral liquid /ɾ/ of the perfective suffix into a high front

vowel /i/ whenever this suffix is preceded by a long vowel.

e. Glide Formation

$$\begin{bmatrix} \overline{+\text{syll}} \\ \underline{+\text{high}} \end{bmatrix} \quad [+\text{syll}] \rightarrow [-\text{syll}]\ [+\text{syll}]$$

1 2 1 2

Changes the front vowel /i/ into a glide /j/ if followed by another vowel.

f. Vowel Height Harmony 2

$$V \rightarrow [\alpha \text{ high}] / \_\_ C_o \quad V$$

[- low] [α high]

This rule states that a low vowel changes to a high vowel if it precedes (a consonant and) another high vowel.

The rules above can be illustrated by the following derivation.

(21) UR /a-a-sɔm-i-eɾ/ "he has just educated for"

Morphemic circumscription	aasɔmeɾ < i >
Perfective Suffixation	aasɔmeɾ-eɾ < i >
Pre-Perfective R-Deletion	aasɔme-eɾi
Perfective R-Gliding	aasɔmeeii
Glide Formation	aasɔmeeji
Vowel Height Harmony 2	aasomiiji
SR	aa[sómiijí]

These set of rules show the process which a form goes through for imbrication to be fully realized in the bases or extended roots.

Imbricating Bases

Table 1 gives a comprehensive list of the imbricating bases in Kuria. These forms are a result of fusion of the extension suffixes, the perfective suffix, and the final vowel. The endings applicative-reciprocal-passive, reversive intransitive-passive, and the reciprocal-passive do not occur because they are not semantically viable. In causative perfectives, the causative suffix /-i/ always functions as the final vowel. This then means that in passive causative perfectives the suffix order changes to passive-causative.

Table 1: Extension Suffixes and the Imbricating Perfective

	Verbal Type	*UR*[4]	*SR*	*Examples*	*Gloss*
1.	st-rec	/-ek-an-**eɾ**-e	[-ekaini]	/e-a-kɔɾ-ek-an-**eɾ**-e/ → ee[kɔ́ɾɛ́kaíni]	"it has happened"
2.	Rt	/-oɾ-**eɾ**-e/	[-ooje]	/a-a-ɾiNɣ-oɾ-**eɾ**-e/ → aa[ɾééŋgóóje]	"s/he has just unfolded"
3.	rt-pas	/oɾ-**eɾ**-o-e/	[-oojwe]	/ɾo-a-ɾiNɣ-oɾ-**eɾ**-o-e/ → ɾoo[ɾééŋgóójwe]	"it has just been unfolded"
4.	Ap	/eɾ-**eɾ**-e/	[-eeje]	/ßa-a-sɔm-eɾ-**eɾ**-e/ → ßaa[sómeejé]	"they have just read for"
5.	ap-pas	/-eɾ-**eɾ**-o-e/	[-eejwe]	/ßi-a-sɔm-eɾ-**eɾ**-o-e/ → ßii[sómeejwé]	"they have just been read for"
6.	ap-rec	/-eɾ-an-**eɾ**-e/	[-eraini]	/ßa-a-sɔm-eɾ-an-**eɾ**-e/ → ßaa[sɔ́mɛ́raíni]	"they have just read for each other"
7.	ap-rec-pas			does not occur	

[4] UR = Underlying Representation, SR = Surface Representation, ap = applicative, cau = causative, pas = passive, rec = reciprocal, rev = reversive.

	Verbal Type	*UR*[4]	*SR*	*Examples*	*Gloss*
8.	ap-cau	/eɾ-**eɾ**-i/	[-iiji]	/ßa-a-sɔm-eɾ-eɾ-i/ → ßaa[sómiijí]	"they have just been educated for"
9.	ap-cau-pas	/-eɾ-**eɾ**-o-i/	[-eɾiißwi]	/ßa-a-sɔm-eɾ-**eɾ**-o-i/ → ßaa[sómíɾiíßwi]	"they have just been educated for" (lit. caused to learn for)
10.	ap-rec-cau	/-eɾ-an-**eɾ**-i/	[-eɾaini]	/ßa-a-sɔm-eɾ-an-**eɾ**-i/ → ßaa[sóméɾaíni]	"they have just read while doing something else simultaneously"
11.	ap-rec-cau-pas	/-eɾ-an-**eɾ**-o-i/	[-eɾaniißwi]	/ßa-a-sɔm-eɾ-an-**eɾ**-o-i/ → ßaa[sɔ́mɛ́ɾanííßwi]	"they have just been read while something else is going on simultaneously"
12.	ri-pas			does not occur	
13.	Rec	/-an-**eɾ**-e/	[-aini]	/ßa-a-maah-an-**eɾ**-e/ → ßaa[mááháíni]	"they have just seen each other"
14.	rec-cau	/-an-**eɾ**-i/	[-aini]	/ßa-a-sɔm-an-**eɾ**-i/ → ßaa[sɔ́mainí]	"they have just observed each other" (lit. caused to learn each other)
15.	rec-cau-pas	/-an-**eɾ**-o-i/	[-aniißwi]	/ßa-a-maah-an-**eɾ**-o-i/ → ßaa[mááhániíßwi]	"they have just been made to see each other"
16.	rec-pas			does not occur	

	Verbal Type	*UR*[4]	*SR*	*Examples*	*Gloss*
17.	cau-pas	/-**eɾ**-o-i/	[-iiβwi]	/a-a-sɔm-**eɾ**-o-i/ → aa[sómiiβwí]	"s/he has just been educated" (lit. caused to learn)

The summary provided in Table 1 confirms the two types of imbrication in Kuria earlier illustrated in (10) and (13): the first one replaces the perfective suffix /-eɾe/ with a /V:jV/ ending (see (22)).

(22) a. oɾ-eɾ-e → -ooje

b. eɾ-eɾ-e -eeje

c. eɾ-eɾ-i → -iiji

d. eɾ-o-i → -iiβwi

The second type of imbrication replaces the last consonant of the verb and the perfective with an /-ini/ ending (see (23)).

(23) a. an-eɾ-i → -aini

b. an-eɾ-e → -aini

As stated before, these different types of imbrication are a result of different phonological processes and can be accounted for using the Prosodic Morphology Theory.

Non-imbricating Bases

As Cammenga (2004) has shown, some extended roots imbricate and others do not. A summary of the forms that do not imbricate is provided in Table 2 below.

Table 2: Extension Suffixes and the Non-Imbricating Perfective

	Verbal Type	*UR*	*SR*	*Examples*	*Gloss*
1.	basic	/-**eɾ**-e/	[-eɾe]	/a-a-sɔm-**eɾ**-e/ → aa[sómeˈɾé]	"s/he has just read"
2.	passive	/-**eɾ**-o-e/	[-eɾwe]	/ke-a-sɔm-**eɾ**-o-e/ → kee[sómeˈɾwé]	"it has just been read"
3.	stative	/-ek-**eɾ**-e/	[-ekeɾe]	/ke-a-sɔm-ek-**eɾ**-e/ → kee[sómékeɾé]	"it has just been legible"
4.	reversive-intransitive	/-ok-**eɾ**-e/	[-okeɾe]	/ke-a-ɾiNɣ-ok-**eɾ**-e/ → kee[ɾééŋgókéɾe]	"it has just unfolded"
5.	causative	/-**eɾ**-i/	[-iɾi]	/a-a-sɔm-**eɾ**-i/ → aa[sómíˈɾí]	"s/he has just educated"

It is evident from Table 2 that imbrication does not occur where a verb has these extensions: passive only (2), stative only (3), reversive-intransitive only (4), and a causative (5). The extended verbs in Table 2 do not have -n or -ɾ as the last consonant of the root or base, which is one of the conditions for imbrication.

Conclusion

This paper has discussed the morphophonological process commonly known in Bantu linguistics as imbrication. It has shown that there are both imbricating and non-imbricating forms in the perfective forms of the Kuria verb. It is clear that some of these morphemes that undergo fusion or imbrication result in opacity. Imbrication is a synchronically active phenomenon in Kuria as evidenced in the examples given. The paper has verified that the size of the root or base is important for imbrication to occur. The root has to be at least disyllabic. It has also shown that imbrication occurs where the final consonant of the root or base is either a flap -ɾ or a nasal -n. Also, verb roots or bases that end in a trill will imbricate when the perfective /eɾ-/ is added. As in other languages, the monosyllabic words have a peculiar way of forming the perfective, thus they were excluded from this analysis.

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