



Kisi

Phonology and Morphophonology

Hazel Gray

Kisi
Phonology and Morphophonology

Hazel Gray

SIL International®
2018

© 2018 SIL International®

ISSN 1939-0785

Fair Use Policy

Documents published in the Language and Culture Documentation and Description series are intended for scholarly research and educational use. You may make copies of these publications for research or instructional purposes (under fair use guidelines) free of charge and without further permission. Republication or commercial use of Language and Culture Documentation and Description or the documents contained therein is expressly prohibited without the written consent of the copyright holder.

Orphan Works Note

Data and materials collected by researchers in an era before documentation of permission was standardized may be included in this publication. SIL makes diligent efforts to identify and acknowledge sources and to obtain appropriate permissions wherever possible, acting in good faith and on the best information available at the time of publication.

Series Editor

Lana Martens

Content Editor

Lynn Frank

Compositor

Margaret González

Abstract

Kisi (Bantu G67, Tanzania) is a seven-vowel language with contrastive vowel length and predictable stress on the penultimate syllable of the word. The consonant inventory includes prenasalised consonants, syllabic nasals and aspirated nasals. Morphophonological processes include asymmetric vowel height harmony, anticipatory vowel copying, vowel coalescence, vowel length transfer, syllable elision, and consonant and vowel metathesis.

Contents

Abbreviations

1 Introduction

- 1.1 The Kisi people
- 1.2 Classification
- 1.3 Dialects
- 1.4 Previous research on Kisi
- 1.5 The present study

2 Consonants

- 2.1 Phoneme Inventory
 - 2.1.1 Plosives
 - 2.1.2 Fricatives
 - 2.1.3 Nasals
 - 2.1.4 Other phonemes
 - 2.1.5 Minimal pairs
- 2.2 Phoneme Distribution
- 2.3 Prenasalisation
- 2.4 Glides /^w/ and /^j/
 - 2.4.1 C^wV and C^wV sequences
 - 2.4.2 C^jV and C^jV sequences

3 Vowels

- 3.1 Phoneme Inventory
- 3.2 Vowel length
 - 3.2.1 Contrastive vowel length
 - 3.2.2 Compensatory vowel length
- 3.3 Vowel distribution
 - 3.3.1 Sequences of directly adjacent vowels
 - 3.3.2 Sequences of vowels separated by consonants

4 Syllable Structure

5 Stress

6 Morphophonology

- 6.1 Consonantal processes
 - 6.1.1 /mu-/ prefixes interacting with stem-initial consonants
 - 6.1.2 The prefixes N- and /ni-/ interacting with stem-initial consonants
 - 6.1.3 Interaction of clitics and prefixes with other prefixes
 - 6.1.4 Stem-final consonantal processes
- 6.2 Vocalic processes
 - 6.2.1 Vowel alternations
 - 6.2.2 Vowel hiatus resolution
- 6.3 Syllabic processes
 - 6.3.1 Consonant and vowel metathesis
 - 6.3.2 Syllable elision

References

Abbreviations

AG	agentive	OP	object prefix
ANT	anterior	P	plural
APPL	applicative	PASS	passive
APU	antepenultimate syllable	POSS	possessive
C	consonant	PP	possessive prefix
CAUS	causative	PROG	progressive
cl.	class	PSI	pre-stem initial (mora)
DEM	demonstrative	PST1	past (ka-)
DIS	distributive	PST2	past (a-)
DIST	distal demonstrative	PTR	transitive progressive (ka-)
DP	demonstrative prefix	PU	penultimate syllable
FUT	future (la-)	RECP	reciprocal
FV	final vowel	REFL	reflexive
G	glide	REL	relative
IMPOS	impositive	S	seconds
INF	infinitive	S	singular
IPFV	imperfective	SEP	separative
ITV	itive	SP	subject prefix
N	nasal	SUBJ	subjunctive
NAR	narrative	TAM	tense-aspect-mood
NEUT	neuter	U	ultimate syllable
NMLZ	nominaliser	V	vowel
NP	noun prefix	VB	verbal base

Numbers in glosses refer to person when followed by SG or PL, and to noun class otherwise.

1 Introduction

1.1 The Kisi people

Kisi is a Bantu language classified with the ISO 639-3 language code [kiz] in the SIL *Ethnologue* (Lewis et al. 2013) and in the Guthrie system (Guthrie 1948), as G.67. It is spoken in the south-west of Tanzania, in the district of Ludewa in Njombe Region (Maho 2009). Most of the Kisi people reside along the north-east shore of Lake Nyasa (Lake Malawi) and on the steep western slopes of the Livingstone Mountains. The Kisi people have an ethnic population of around fifteen thousand, but it is estimated by survey researchers (Liddle et al. 1999:1; Gray 2017:8) that only ten thousand of those speak what is considered by the Kisi themselves to be a pure form of the language, that is, the form least influenced by the neighbouring languages. The people groups bordering the Kisi are the Nyakyusa and Kinga to the North, the Pangwa to the East, and the Manda to the South.

The Kisi people are fishermen and subsistence farmers. They grow their crops (mainly cassava) on the steep slopes of the Livingstone Mountains and trade with neighbouring people groups for other staple foods. Kisi men often travel temporarily to other parts of Tanzania to earn extra money by fishing. The Kisi people are also well known for making pottery, which they trade with the Nyakyusa (Liddle et al. 1999:3).

Map 1 shows the Kisi villages along the shore of Lake Nyasa from Nkanda to Lupingu, as well as the mountain villages of Nindi and Nkumbati as noted by Liddle et al. (1999:iii).

Map 1. The Kisi language area



© 2017 SIL International, Used by permission, redistribution not permitted.

1.2 Classification

Kisi is classified as Narrow Bantu, Central, G, Bena-Kinga (G.67) (Maho 2009). Nurse and Philippson (1980:57) classify Kisi as Southern Highlands, with the following cognition percentages: 62.75 percent with Pangwa (G.64), 54.75 percent with Kinga (G.65), 52.5 percent with Sangu (G.61), 51.5 percent with Vwanji (G.66) and 47.25 percent with Bena (G.63).

1.3 Dialects

Liddle et al. (1999:18) cite Kubik (1978) and Wilson (1958) as claiming that Kisi has been influenced by the neighbouring languages in the villages closest to those language areas. Wilson (1951:255) also makes this claim. Liddle et al. state that pure Kisi is reportedly spoken only in the villages of Makonde, Lifuma, Lupingu and Nindi, but claim that there is some disagreement about Lupingu (1999:1). The 2016 SIL

dialect survey discovered that, indeed, pure Kisi is only spoken in the central villages of the area, namely in Makonde, Lifuma and Nsisi, and that the varieties spoken in other villages are the result of Pangwa, Nyakyusa or Manda influence. Kisi is not spoken further north than Kirondo; Nyakyusa is used instead. More details about the dialect differences are detailed in the report of the 2016 survey carried out by SIL, (Gray 2017).

1.4 Previous research on Kisi

Kisi has been included in studies of comparative linguistics by a few researchers over the years, that is, by Johnston (1899), Guthrie (1967–71), Nurse and Philippson (1975, 1980) and Nurse (1988). Sociolinguistic and anthropological studies which mention the Kisi language include Wilson (1951) and three studies (Wilson 1958; Waane 1976; Kubik 1978), as cited in Liddle et al. (1999). Liddle et al.'s (1999) survey report resulted from a sociolinguistic survey of the Kisi people and language undertaken by SIL in March 1999, and Gray's (2017) survey report resulted from the Kisi dialect survey undertaken by SIL in September 2016. At the time of writing, Dr Deogratias Ngonyani of Michigan State University is in the process of publishing a short grammar of Kisi.

1.5 The present study

This study is based on a corpus of around eighteen hundred words. The main language consultants were Bertha Mwinuka, born in Ileje (Mbeya); Elfrida Mwinuka, also born in Ileje; Harison Ngoye, born in Makonde; Simon Njuyuwi, born in Lifuma; Victoria Nyamasi, born in Lifuma; Huna Mwamasimbi, born in Lifuma; and Benedict Ngalawa, born in Makonde.

Two workshops focused on investigating more specific aspects of the phonology and grammar of the Kisi language were conducted in September 2013 and May 2014. As a result of these workshops some changes and additions were made to the corpus. Athanas Nsangu joined returning participants at the September 2013 workshop and Anatalia Ngoye, Clement Haule and Denis Kaluwa participated in the May 2014 workshop. These four participants reside in Makonde.

Several ad hoc research sessions have been conducted in Mbeya town with the help of John Kaluwa, a retired teacher originating from Makonde.

All figures in this paper were created by the author from voice recordings of the above mentioned participants.

Transcriptions will be in the IPA, with phonemic transcriptions in slanted brackets // and phonetic transcriptions in square brackets [].

2 Consonants

2.1 Phoneme Inventory

Below is the consonant phoneme chart for Kisi. Cells which are highlighted grey contain phonemes which only occur through morphophonological interaction.

Table 2.1. Consonant phonemes in Kisi

	Bilabial	Labio-dental	Alveolar	Post-alveolar / Palatal	Velar	Glottal
Aspirated voiceless plosives	p ^h		t ^h		k ^h	
Prenasalised voiceless plosives	^m p ^h		ⁿ t ^h		^ŋ k ^h	
Voiced plosives	b		d	ɟ	g	
Prenasalised voiced plosives	^m b		ⁿ d	^ɲ ɟ	^ŋ g	
Voiceless fricatives		f	s			h
Prenasalised voiceless fricatives		^ɱ f	ⁿ s			
Voiced fricatives	β			ʝ	ʁ	
Voiceless affricates				tʃ		
Prenasalised voiceless affricates				ⁿ tʃ		
Nasals	m		n	ɲ	ŋ	
Aspirated nasals	m ^h		n ^h	ɲ ^h	ŋ ^h	
Liquids			l			

2.1.1 Plosives

Aspirated and unaspirated voiceless plosives are in free variation, depending on the individual speaker. Aspirated voiceless plosives are more common than their unaspirated counterparts.

Likewise, there is also free variation between implosives and voiced plosives, with implosives occurring more often than voiced plosives overall. Since the airstream mechanism in the production of the stops in neither a prenasalised voiced stop nor a syllabic nasal plus voiced stop in Kisi have been analysed fully in this study, these are written as /^mb, ⁿd, ^ɲɟ, ^ŋg/ and /ɱb, ɳd, ɲɟ, ŋg/, respectively, in this write-up. In order to not create a distinction between stops in a (V)CV environment and those in NCV or ÑCV environments in the write-up where there may in fact be no phonetic difference, all (V)CV stops are written as plosives in the rest of this write-up. Implosives are less common than voiceless plosives, that is voiceless plosives occur in almost three times as many lexical stems in the database as do implosives or voiced plosives.

Figures 2.1 and 2.2 show the relevant parts of the oscillogram (top) and spectrogram (bottom) for the words /da:di/ ‘father’ and /k^hubeha/ ‘to spit’. Olson (2001:132) quotes findings from Lindau (1984) regarding what regular acoustic patterns exist for implosives across Niger-Congo languages as follows: “First, the signal amplitude of the implosives either increases gradually during the oral closure period or it is level and sizeable throughout the closure, whereas plosives exhibit a gradual decrease in signal amplitude during closure.” In Kisi the implosives are characterised by an increase in signal amplitude during the oral closure period. In addition to this there is often a sharp drop in pitch during release, though this did not seem to happen in all cases examined. The pitch is marked on the spectrogram with a blue line.

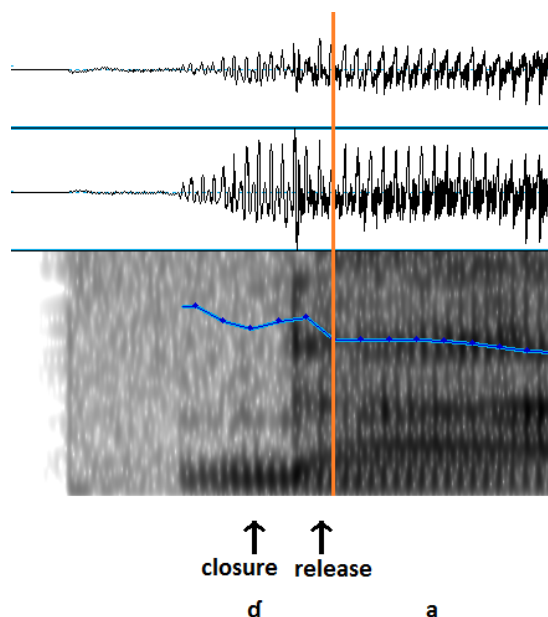


Figure 2.1. Oscillogram and spectrogram for the first syllable of /da:di/ 'father'.

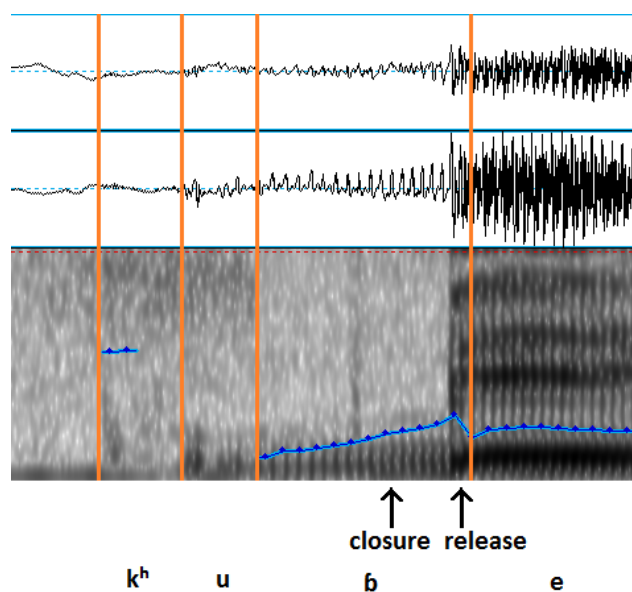


Figure 2.2. Oscillogram and spectrogram for the first two syllables of /kʰubeha/ 'to spit'.

The phoneme /j/ rarely seems to be produced as a pure voiced palatal implosive, but rather is accompanied by some degree of palatalisation, as [jʰ]. This can be seen on the oscillogram and spectrogram of /kʰujʰuᵐba/ 'to run' in figure 2.3. Measuring the mean formant values (shown as red dots on the spectrogram) of the section marked with /j/ gives results consistent with the production of a high front vowel (F1:386Hz, F2:2331Hz).

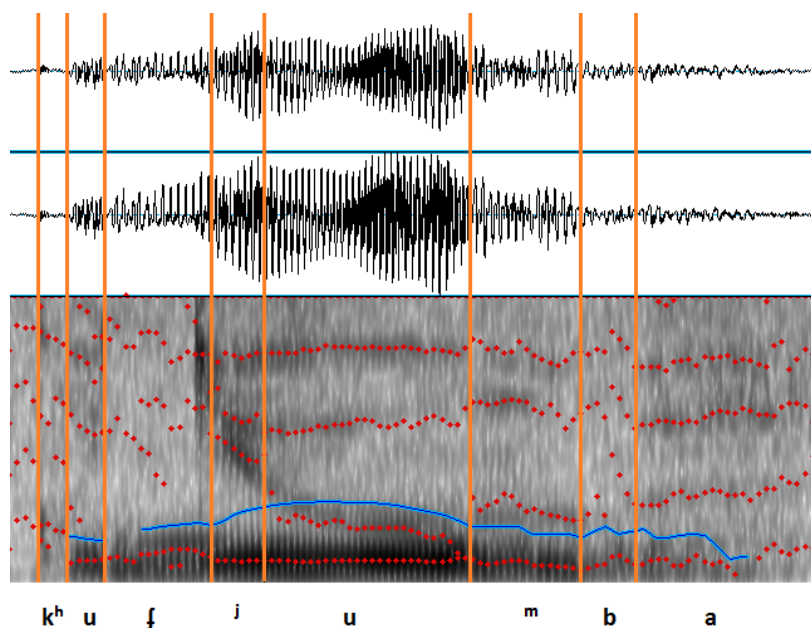


Figure 2.3. Oscillogram and spectrogram for the word /kʰuɟuᵐba/ 'to run'.

This slight palatalisation of the voiced palatal plosive will not be written in IPA transcriptions for the rest of this paper.

2.1.2 Fricatives

Fricatives in Kisi may be produced with varying degrees of oral obstruction, and therefore varying degrees of friction, depending on the speaker. This means for example that /ɣ/ may be produced with very little oral obstruction, as a near-approximant [uɟ], or with greater obstruction close to total closure, sounding more like a plosive. Figures 2.4 and 2.5 show the oscillograms and spectrograms of recordings taken from two speakers as examples of this variation.

Figure 2.4 shows /ɣ/ produced with a high degree of closure more like a plosive than a true fricative by speaker one. The dark line on the spectrogram shows the sudden release of a higher degree of closure than would be expected from a true fricative, however the closure does not reach total obstruction as can be seen by the absence of any stop gap in the oscillogram. Likewise, speaker two also pronounces /ɣ/ with a higher degree of closure than is expected from a fricative, as seen in figure 2.5. For this speaker the release is not so pronounced as for speaker one, as evidenced by the absence of the dark line that is seen in figure 2.4.

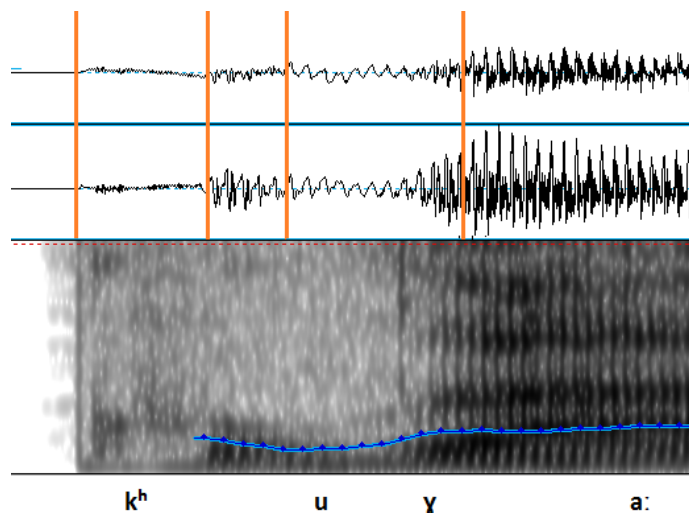


Figure 2.4. Speaker one: high degree of closure for /ɣ/ in /k^huɣa:la/ 'to be drunk'.

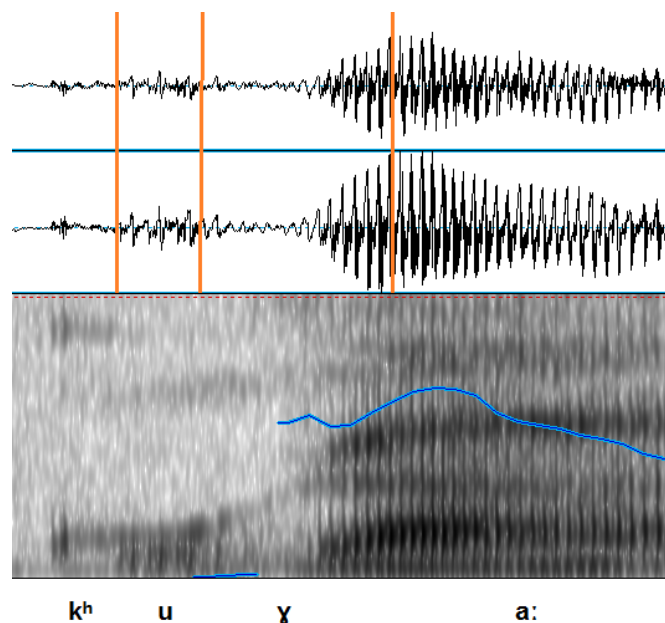


Figure 2.5. Speaker two: /k^huɣa:la/ 'to be drunk'.

Figure 2.6 shows /ɣ/ produced by speaker one without the degree of closure seen in figure 2.4, but rather as would be expected for a voiced fricative. The darker shading on the spectrogram shows the friction generated as the speaker approaches, but never reaches, oral closure. Again, this is compared with the pronunciation of speaker two in figure 2.7 where the pronunciation of /ɣ/ is similar to figure 2.5.

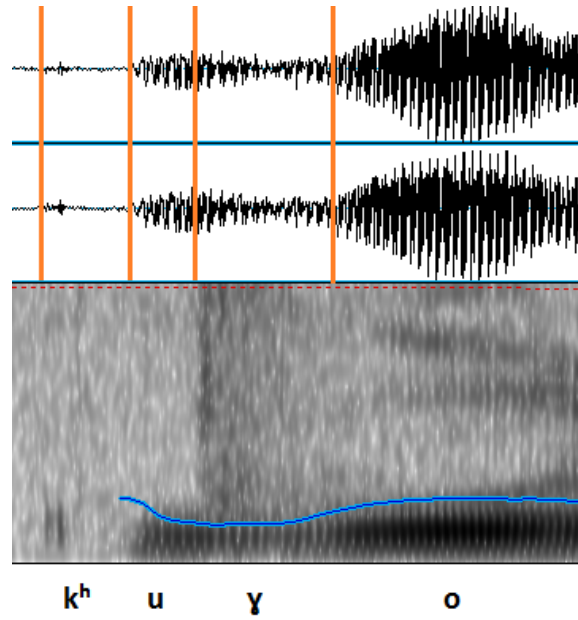


Figure 2.6. Speaker one: /ɣ/ pronounced as a fricative in /k^huɣona/ ‘to sleep’.

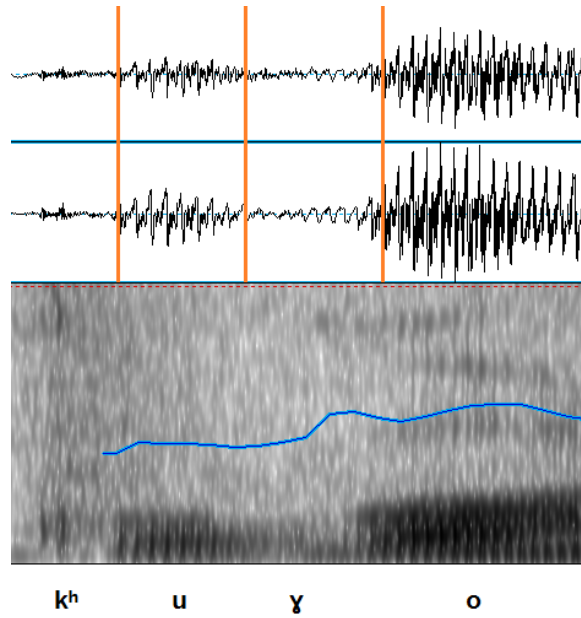


Figure 2.7. Speaker two: /ɣ/ pronounced in /k^huɣona/ ‘to sleep’ with less friction than speaker one.

Finally, we have /k^huɣula/ ‘to buy’ produced by speaker one with very little friction, sounding much more like an approximant than the preceding words. There is no recording of speaker two pronouncing /k^huɣula/ for comparison.

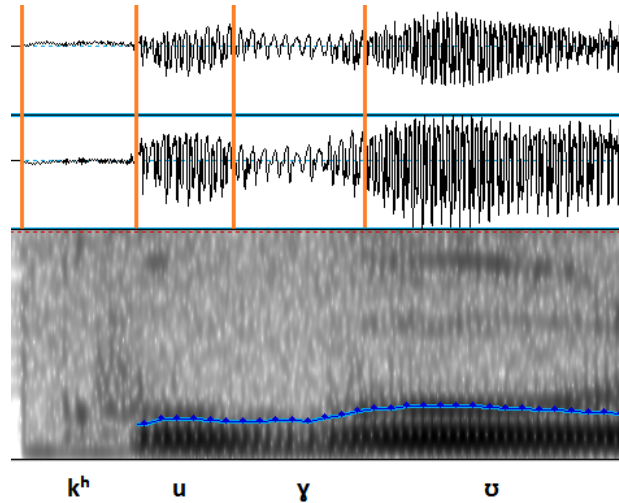


Figure 2.8. Speaker one: /ɣ/ pronounced with little friction in /kʰuɣula/ ‘to buy’.

The variation of friction in the production of these consonants as described above occurs for all voiced fricatives, /β, ɟ, ɣ/, not only /ɣ/. For these fricatives, neither full approximant nor full plosive are considered proper Kisi, with the exception of /ɟ/, for which some Kisi speakers consider [j] an acceptable alternative. The production of fricatives by one speaker is not necessarily consistent, as proved by the recordings of /kʰuɣula/, /kʰuɣona/ and /kʰuɣa:la/ from speaker one examined above. The manner of production of the fricative is therefore not dependent on the age or dialect of the speaker. It is possible that the manner of production of the fricative is affected by the features of the subsequent vowel however current recordings do not provide evidence to support this theory.

In addition to this variation in friction during production, the phoneme /ɟ/ is also in free variation with [ʒ]. Example (1) shows some examples of how words containing /ɟ/ may be pronounced:

- | | | | | | |
|-----|----|-----------|-----------|-----------|-----------------|
| (1) | a. | /ja:ja/ | [ʒa:ʒa] | [ja:ja] | ‘uncle’ (cl.1a) |
| | b. | /kʰa:ja/ | [kʰa:ʒa] | [ka:ja] | ‘town’ (cl.9) |
| | c. | /kʰijuni/ | [kʰiʒuni] | [kʰijuni] | ‘bird’ (cl.7) |

As mentioned previously, some speakers pronounce /ɟ/ as the approximant [j], however other speakers consider [j] to be unacceptable as a variant of [ɟ].

The affricate [tʃ] is attested in very few words in the database—only approximately 1% of the total number of words. Despite this infrequency of use in the language, those Kisi speakers asked considered it to be a genuine Kisi sound. It has therefore been left in the phoneme chart, despite the fact that many of the lexical items containing [tʃ] currently in the database can be found in Swahili, or in neighbouring Manda and Nyakyusa, and could therefore be seen as loan words from these languages. These words which are also found in neighbouring languages have synchronically been accepted as genuine Kisi words, if they were indeed not originally part of the lexicon. Examples of /tʃ/ in potential loan words are: from Swahili, /mtʃele/ ‘rice’; from Manda, /kʰutʃapʰa/ ‘to wash clothes’ and from Nyakyusa, /litʃuˈndu/ ‘guinea fowl’.

The phoneme [ʃ], while present in the database, is rare and only found in loan words from Swahili. It is not considered to be a genuine Kisi sound by Kisi speakers interviewed during research sessions. The four words currently in the Kisi database that include [ʃ] are /ɲʃale/ ‘arrow’, /ʃaba/ ‘copper’, /maʃalikʰi/ ‘east’ and /kʰuʃauli/ ‘to advise’. Due to its rarity, the type of words it is found in, and because it is not considered as a genuine Kisi sound, [ʃ] has not been included in the phoneme chart.

2.1.3 Nasals

Aspirated nasals /mʰ/, /nʰ/ and /ɲʰ/ only occur at morpheme boundaries as a result of morphophonological processes (see 6.1.2.2), however /ɲʰ/ occurs stem-initially and stem-medially (see

tables 2.2 and 2.3). This can be seen as a modern-day reflex of Proto-Bantu *nk,¹ which is found stem-medially in a limited number of words.²

(2) *nùnk /k^hunu:ŋ^ha/ ‘to stink’

Aspiration of nasals is disappearing from the Kisi language according to the Kisi interviewed. They report that a member of the younger generation is less likely than an older Kisi speaker to pronounce aspiration on a nasal. They consider the aspiration of nasals to be a distinctive feature of the language that identifies a good Kisi speaker. Figure 2.9 shows the oscillogram and spectrogram for the word /ŋ^{hw}ap^ha/ ‘armpit’ as pronounced by three different speakers. Aspiration is indicated by a gap in the spectrogram. For the first spectrogram (speaker one) note that there is no gap, indicating a lack of aspiration. For the second spectrogram (speaker two) the gap showing aspiration falls between the nasal /ŋ/ and the labialisation /w/, which is where it would be expected for an aspirated nasal. For the final spectrogram (speaker three), note that the presence of the “gap” is indicated by the blue pitch line which starts prior to the production of the nasal, showing that speaker three apparently pre-aspirates the nasal.

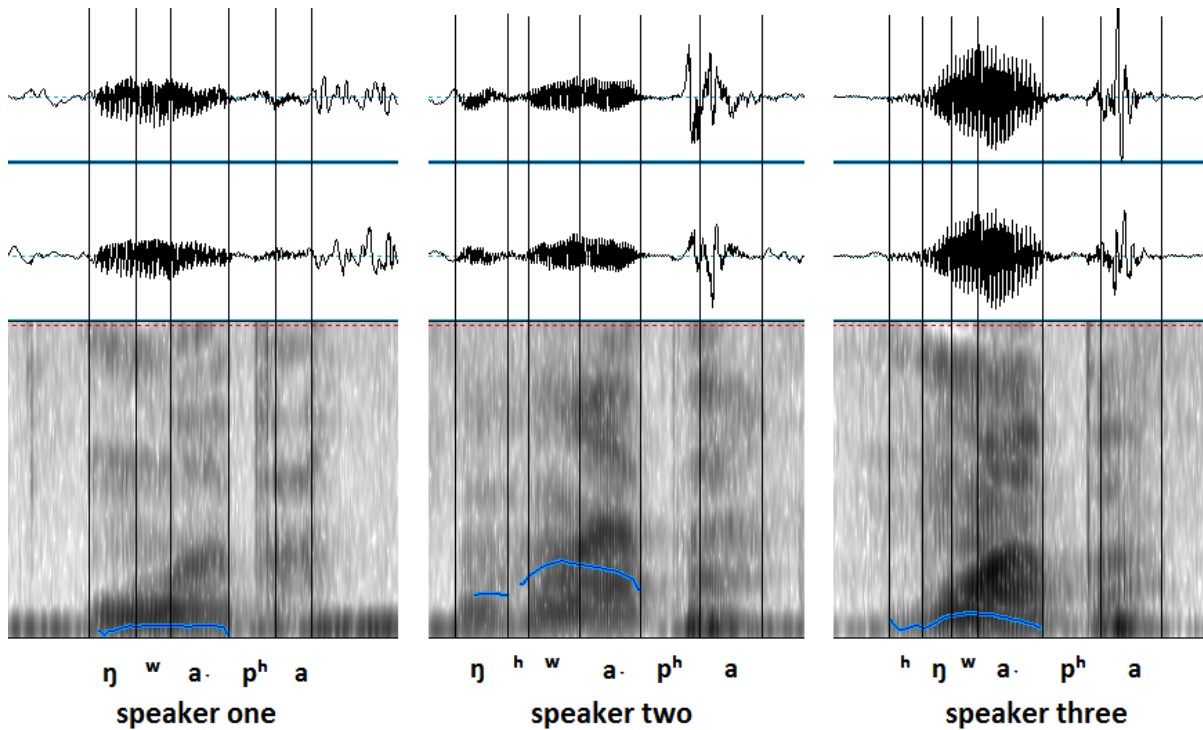


Figure 2.9. Oscillogram and spectrogram of the word /ŋ^{hw}a:p^ha/ ‘armpit’ for three speakers.

It appears as though even among the older generation (to which these three speakers belong, speaker one being the oldest at fifty-eight and speaker three the youngest at fifty) production of aspirated nasals varies. There could be some dialectal variation influencing the pronunciation of these

¹ In this paper, * will refer to reconstructed Proto-Bantu forms taken from the Bantu Lexical Reconstructions database BLR3 compiled by Bastin et al. (2003). In this database the symbols [p, t, c, k, b, d, j, g, m, n, ny, ŋ, mb, nd, nj, ng, i, ɪ, e, a, o, u, u] are used for IPA [p, t, c, k, b, d, ɟ, g, m, n, ɲ, ^mb, ⁿd, ^ɲɟ, ^ɲg, i, ɪ, e, a, o, u, u] respectively.

² The Proto-Bantu word *ntù has become /muⁿdu/ ‘person’ in Kisi rather than ^x/mun^hu/ as expected. It is not clear why this is the case.

aspirated nasals in Kisi, however since these speakers are all residents of Makonde (a village central in the Kisi language area) that is clearly not the reason behind the variation seen in figure 2.9.

2.1.4 Other phonemes

The phonemes [r] and [l] are in free variation, with [l] occurring more frequently overall. Data will be written only with /l/ in this paper.

[w] and [j] are not included in the phoneme chart for Kisi as they only occur as glide insertions between historically or morphologically adjacent vowels, Cu^wV and Ci^jV, which in fast speech are reduced to consonant glide sequences, C^w and C^j (see 2.4). [w] does not occur otherwise, and [j] only occurs as a free variant of [j] for some speakers (which is considered incorrect by other speakers).

2.1.5 Minimal pairs

The data in tables 2.2 to 2.5 illustrate minimal pairs between consonant phonemes which are considered to be phonetically similar. These illustrations help to prove that similar sounds are separate phonemes rather than allophones of one underlying phoneme.

Table 2.2. Minimal pairs for voicing

Voiceless example	Gloss	Voiced example	Gloss
k ^h up ^h e:la	to give	k ^h ube:la	to refuse
lidet ^h e	reed	lidede	locust
k ^h uhok ^h ola	to beat (with fists)	k ^h uhogola	to give birth

Table 2.3. Minimal pairs for manner of articulation

Example 1	Gloss	Example 2	Gloss
k ^h ubu:la	to dig	k ^h uβu:la	to tell
k ^h uju ^m ba	to run	k ^h uju ^m ba	to sway; be on the point of losing balance
k ^h uga ⁿ da	to coagulate	k ^h uya ⁿ da	to become emaciated
k ^h uheβa	to boil	k ^h uhema	to escape
ju ^m ba	build!	ju ^m ba	house
ligo:si	male (cl.5)	liŋo:si	sheep
k ^h use ⁿ ga	to make smooth/ soft	k ^h ut ^h e ⁿ ga	to prepare
k ^h udr ⁿ da	to close	k ^h ulr ⁿ da	to protect
k ^h ulola	to see	k ^h unola	to sharpen (knife)

Table 2.4. Minimal pairs for place of articulation

Example 1	Gloss	Example 2	Gloss
k ^h uk ^h op ^h a	to borrow	k ^h uk ^h ot ^h a	to ask
k ^h up ^h e:la	to give to	k ^h uk ^h e:la	to believe
k ^h ubak ^h ula	to unload	k ^h udak ^h ula	to chew
liba ^ɲ ga	it is going towards (cl.5 subject)	liga ^ɲ ga	stone
k ^h uk ^h ofa	to deceive	k ^h uk ^h os'a	to send
k ^h uhop ^h a	to swallow	k ^h usop ^h a	to pour out
k ^h umema	to be full	k ^h umena	to belch
k ^h umela	to germinate	k ^h upela	to leave without explanation
k ^h uneyela	to itch	k ^h uneyela	to draw water for someone

Table 2.5. Minimal pairs for place and manner of articulation

Example 1	Gloss	Example 2	Gloss
k ^h ufik ^h a	to arrive	k ^h ufi ^h a	to hide
k ^h ufi ^ɲ a	to paddle	k ^h ufi ^h a	to hide
k ^h ut ^h i ^ɱ ba	to crush	k ^h ufi ^ɱ ba	to swell

2.2 Phoneme Distribution

Of the phonemes listed in table 2.1, the majority can be found both stem-initially and stem-medially. As mentioned at the beginning of section 2.1, apart from /ŋ^h/, aspirated nasals and prenasalised voiceless consonants only occur as a result of morphophonological processes. There are not many instances of /ŋ^h/ stem-medially in the data, even though it does occur. According to current data, it does not occur stem-initially.

Prenasalised consonants /^ɱb, ^ɲd, ^ɲj, ^ɲg, ^ɲs, ^ɲk^h, ^ɲt^h/ all seem to occur stem-initially in nouns, which is unexpected.

- (3) a. /li^ɱba^ɱba/ /li^ɱba^ɱba/ 'spirit' (cl.5)
b. /li^ɲdoli^ɲdoli/ /li^ɲdoli^ɲdoli/ 'bat' (cl.5)
c. /k^hi^ɲjaga^ɲji/ /k^hi^ɲjaga^ɲji/ 'mongoose' (cl.7)
d. /li^ɲgak^ha/ /li^ɲgak^ha/ 'pangolin' (cl.5)
e. /li^ɲsa^ɲga/ /li^ɲsa^ɲga/ 'species of small animal' (cl.5)
f. /li^ɲk^ho^ɲgo^ɲt^hela/ /li^ɲk^ho^ɲgo^ɲt^hela/ 'praying mantis' (cl.5)
g. /k^hi^ɲt^hu^ɲdu/ /k^hi^ɲt^hu^ɲdu/ 'underwater swimming' (cl.7)

These examples of prenasalised consonants appearing stem-initially are analysed here as the result of double prefixing and the apparent lexicalisation of an original noun class prefix. While these stems can be said to have a prenasalised consonant as their initial consonant according to the synchronic data, this prenasalised initial consonant is likely to have arisen via lexicalisation of the stem plus its original prefix, meaning that in most cases the original stem, and therefore the original stem-initial consonant, cannot be determined without reference to diachronic data. This stem-initial consonant can be seen when comparing these Kisi lexical items with the Proto-Bantu forms (Bastin et al. 2003), where these exist. Thus, we have the following:

- (4) a. *kákà /li^ŋgak^ha/ ‘pangolin’ (cl.5)
 b. *tùngá /k^hi^ŋdu^ŋga/ ‘basket’ (cl.7)

Of the prenasalised consonants which are found stem-initially in nouns, the prenasalised fricative /^ŋs/ and prenasalised voiceless plosives /^mp^h, ⁿt^h, ^ŋk^h/ are only included in table 2.1 based on their stem-initial presence synchronically. Their use is very restricted; like prenasalised voiced plosives they are found stem-initially in nouns but not in verbs, but unlike prenasalised voiced plosives they are not found stem-medially in either nominal or verbal roots.³ Although there are currently no data providing evidence of this, it seems reasonable to assume that since /^ŋs, ^ŋk^h, ⁿt^h/ appear stem-initially in nouns, /^mp^h, ^ŋf/ may likewise be found in such positions. The prenasalised consonants /^mb, ⁿd, ^ŋj, ^ŋg, ^ŋs, ^ŋf/ all commonly occur through the interactions of verbal morphemes with the initial consonant of various verb stems.

Tables 2.6 and 2.7 illustrate the phonemes from table 2.1, those which have not been created only as a result of morpheme interaction, appearing stem-initially and stem-medially. Table 2.6 shows the phonemes occurring stem-initially in nouns and verbs, while table 2.7 shows the phonemes occurring stem-medially in nouns and verbs. All examples for the nouns for these tables have been taken from class 5 where possible, or class 7 where no class 5 example exists in the database. These classes have noun class prefixes /li-/ (cl.5) and /k^hi-/ (cl.7).

Table 2.6. Phonemes stem-initially in nouns and verbs

	Noun	Gloss	Verb	Gloss
p ^h	lip ^h e ^ŋ ba	sorghum	k ^h up ^h ɪ ^ŋ da	to carry
t ^h	lit ^h ama	cheek	k ^h ut ^h a:ma	to dwell
k ^h	lik ^h a ^ŋ da	shell	k ^h uk ^h ot ^h a	to ask
b	libala	spot	k ^h ube:la	to refuse
d	lidede	locust	k ^h udada	to hate
j	lijoβa	sun	k ^h ujuf ^h a	to chase
g	liga ^ŋ ga	stone	k ^h ugega	to marry
^m b	li ^ŋ ba ^ŋ ba	spirit		
ⁿ d	li ^ŋ doli ^ŋ doli	bat		
ŋj	k ^h i ^ŋ jaga ^ŋ ji	mongoose		
ŋg	li ^ŋ gak ^h a	pangolin		
β	liβey ^h a	shoulder	k ^h uβala	to count
j	lijoja	feather	k ^h ujat ^h a	to greet
y	liyono	day	k ^h uyana	to love
f	lifup ^h a	bone	k ^h ufup ^h a	to give a gift
s	lisey ^h a	honeycomb	k ^h usop ^h a	to put in
h	lihona	tobacco	k ^h uha:la	to inherit
m	limelela	shoot	k ^h umena	to belch
n	linu ^ŋ gu	porcupine	k ^h unana	to live
ɲ	liɲa:ɲa	tomato	k ^h uɲa:k ^h a	to snatch
ŋ	liŋoma	drum	k ^h uŋa:la	to shine
ŋ ^h	liŋ ^h alaŋ ^h ala	crab		
l	lileme	abdomen	k ^h ulola	to ferment

³ That is, roots as defined synchronically. Unless stated otherwise, this paper will be discussing synchronic evidence.

Table 2.7. Phonemes stem-medially in nouns and verbs

	Noun	Gloss	Verb	Gloss
p ^h	lihop ^h i	vegetables	k ^h usop ^h a	to put into
t ^h	lidet ^h e	reed	k ^h uk ^h ot ^h a	to ask
k ^h	lihok ^h a	ancestors	k ^h uβik ^h a	to crow
b	lidebe	small (cl.5)	k ^h ugubik ^h a	to cover
d	lidede	locust	k ^h udada	to hate
ʃ	ligoʃi	epilepsy	k ^h uhrʃja	to steal
g	lisuga	demon	k ^h ugiga	to marry
^m b	lip ^h e ^m ba	sorghum	k ^h uβo ^m ba	to work
ⁿ d	lik ^h a ⁿ da	shell	k ^h udr ⁿ da	to close
ɲʃ	lihr ^ɲ ja	bad girl	k ^h uhr ^ɲ ja	to slaughter
ŋg	liga ^ŋ ga	stone	k ^h ula ^ŋ ga	to stare
β	liloβi	word	k ^h ufuβa	to wither
ʃ	lijoʃa	feather	k ^h uboʃja	to crawl
ʏ	liliyʏ	insult	k ^h unoʏa	to taste
f	lififi	hyena	k ^h use:fa	to sift
s	lisosolo	louse	k ^h uk ^h asa	to cut hair
h	libihɪ	tree	k ^h uyo:ha	to look after
m	lileme	stomach	k ^h uluma	to bite
n	liyono	day	k ^h uyona	to sleep
ɲ	liɲa:ɲa	tomato	k ^h ut ^h o:ɲa	to rain
ŋ	lif ^w e:ŋeɲe	maggot	k ^h uʃoɲa	to suckle
ŋ ^h	lik ^h oŋ ^h oni	bedbug	k ^h unu:ŋ ^h a	to smell
l	lik ^h olo	tree trunk	k ^h ulula	to ferment

2.3 Prenasalisation

As can be seen from table 2.1, the Kisi language has four phonemic prenasalised consonants. These are illustrated in (5) in stem-medial position.

- (5) a. /^mb/ /so^mba/ 'fish' (cl.9)
 b. /ⁿd/ /k^hiloⁿda/ 'ulcer; wound' (cl.7)
 c. /^ɲʃ/ /m^hir^ɲja/ 'girl' (cl.1)
 d. /^ŋg/ /so^ŋga/ 'paternal aunt' (cl.1a)

As noted in 2.2, Kisi does have /ⁿs, ⁿt^h, ^ɲk^h/ apparently root-initially in nouns. These are assumed to have been created by morphophonological processes and are not found root-medially in nouns or at all in verbs, and therefore are not included as phonemic prenasalised consonants.

The prenasalised consonants exemplified in (5) also surface as a result of morphophonological processes upon the addition of class 9/10 prefix N- or 1st person singular subject and object prefixes /ni-/ attaching to voiced plosive, voiced fricative, and /l/-initial stems. These interactions will be discussed further in 6.1.2.

2.4 Glides /w/ and /j/

Bantuists have reconstructed Proto-Bantu as having a small number of vowel sequences which can often be seen in the Bantu languages of today as post-consonant glides C^wV or C^jV (Hyman 2003:55).

Comparing the Proto-Bantu examples of words with adjacent vowels with the Kisi forms, it can be seen how these forms have developed in Kisi.

(6)	a.	*gúim	/k ^h ufu ^w ima/	/k ^h u-fu ^w ima/	‘to hunt’
	b.	*jóídí	/ɲju ^w ili/	/N-ju ^w ili/	‘hair’ (cl.9)
	c.	*dúad	/k ^h ulu ^w ala/	/k ^h u-lu ^w ala/	‘to be ill’
	d.	*diàngò	/lilij ^a ɲgu/	/li-li ^j a ^ɲ gu/	‘doorway’ (cl.5)
	e.	*píagid	/k ^h up ^h ajila/	/k ^h u-p ^h ajila/	‘to sweep’
	f.	*jígùà	/mu ^w if ^w a/	/mu-if ^w a/	‘thorn’ (cl.3)

Thus, it appears Kisi has Cu^wV and Ci^jV rather than C^wV and C^jV in the PU syllable,⁴ and C^wV and C^jV elsewhere. These glides will be analysed separately in the following subsections, with supporting evidence provided for the analysis presented here that Proto-Bantu adjacent vowels have surfaced in Kisi as Cu^wV and Ci^jV.

2.4.1 Cu^wV and C^wV sequences

The analysis of Proto-Bantu adjacent vowels as Cu^wV sequences in Kisi is based on the audible presence of a high back vowel prior to the glide in recorded examples. Comparing the length of each element of u^wV shows this back vowel clearly.

(7)	a.	/k ^h ufu ^w ima/	‘to hunt’	u: 0.056s	w: 0.064s	i: 0.067s
	b.	/k ^h uk ^h u ^w ela/	‘to climb’	u: 0.055s	w: 0.069s	e: 0.101s
	c.	/m ^b u ^w ele/	‘mosquito’	u: 0.089s	w: 0.057s	e: 0.154s

In order to see visual proof of the presence of the vowel /u/ (to see that it is indeed produced distinctly from the glide), the spectrogram of one of these words can be examined. The glide is visually represented in the upward sweep of the black line showing the second formant, F2. The upward sweep shows the transition from a lower F2 value for the back vowel [u] to a higher F2 value for the front vowel [e]. Note the definite presence of /u/ intervening between /m^b/ and the glide.

⁴ In reality, only ^wV constitutes the PU syllable, however for ease of reference the whole Cu^wV sequence will be referred to as being in PU syllable position.

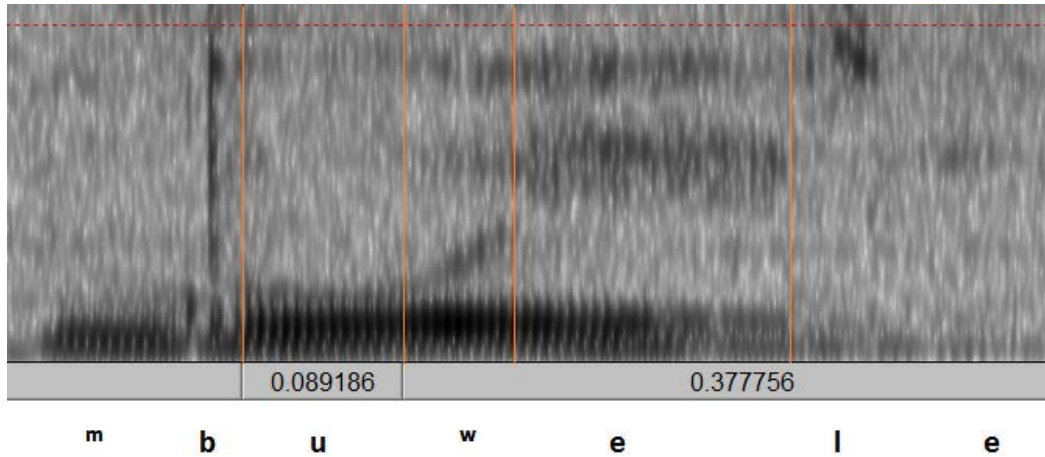


Figure 2.10. Spectrogram of the word /^mbu^we/ ‘mosquito’.

The Kisi themselves perceive these consonants followed by vowel sequences to be no different from Swahili Cw sequences, found in Swahili words such as *kubweka* ‘to bark’ and *mwanga* ‘light’.

Current data recordings point to such sequences found in syllables prior to the PU syllable as more frequently produced as a consonant-glide sequence followed by a vowel, C^wV. If Cu^wV is the form Kisi has inherited from Proto-Bantu adjacent vowels in PU syllable position, then it is logical to conclude that C^wV is a more quickly pronounced form of a Cu^wV sequence, since pre-PU syllables are pronounced more quickly than the PU syllable in general. Should the entire word be pronounced more slowly, it is reasonable to assume that C^wV sequences would not occur, all Cu^wV sequences would remain as such, irrespective of their position in the word. An example of Cu^wV in a pre-PU syllable can be seen in figure 2.12, with the vowel measurements shown in (8).

- (8) Figure 2.11 /nt^{hw}a^ŋgilu/ ‘pestle’ w: 0.039s a: 0.089s
 Figure 2.12 /k^hufu^wilik^ha/ ‘to die’ u: 0.057s w: 0.044s i: 0.095s

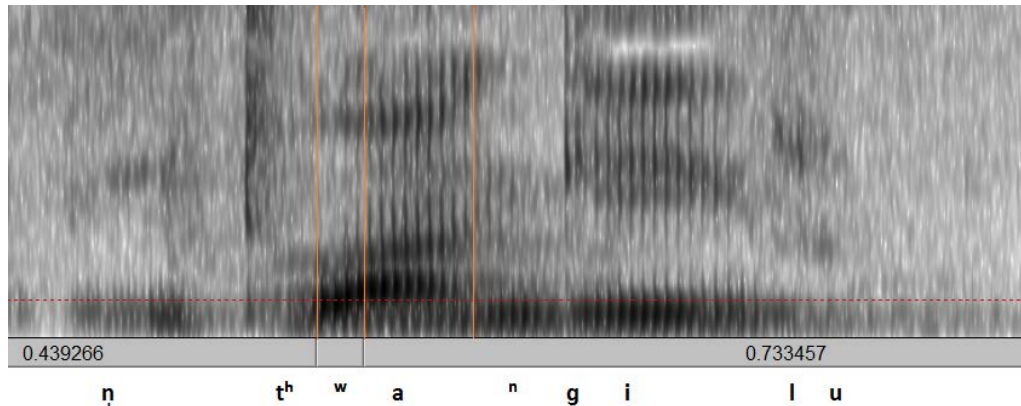


Figure 2.11. Spectrogram of the word /nt^{hw}a^ŋgilu/ ‘pestle’.

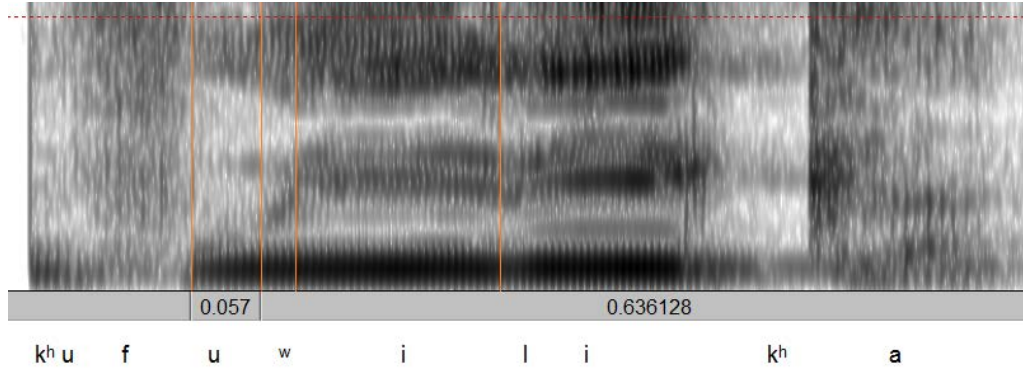


Figure 2.12. Spectrogram of the word /kʰufuʷilikʰa/ 'to die'.

Cu^w sequences in the final syllable of a word are produced consistently as labialised consonants C^w. Currently, recorded data show no evidence of them being alternatively produced as Cu^w sequences.

In order to show the difference in production of these sequences in the PU syllables compared to in pre-PU syllables in normal speech, they will be written as Cu^wV in the PU syllable and as C^wV in non-PU syllables in this description.

Tables 2.8 and 2.9 demonstrate which consonants can precede [w] in Kisi to form Cu^w or C^w sequences stem-initially and stem-medially.

Table 2.8. Cu^w or C^w sequences stem-initially

	Noun	Gloss	Verb	Gloss
p ^h u ^w /p ^h w	-	-	-	-
bu ^w /b ^w	libu ^w eha	jackal	-	-
t ^h u ^w /t ^h w	t ^h u ^w iya	giraffe	k ^h ut ^h u ^w it ^h a	to pant
du ^w /d ^w	(ⁿ du ^w a ^ŋ ga	axe) [†]	-	-
ɟu ^w /ɟ ^w	(ⁿ ɟu ^w ili	hair) [†]	k ^h uɟu ^w it ^h a	to squeak
k ^h u ^w /k ^h w	ŋk ^h u ^w aju	tamarind tree	k ^h uk ^h u ^w ela	to ascend
gu ^w /g ^w	ligu ^w a ^ŋ da	shirt	k ^h ugu ^w es'a	to drop
βu ^w /β ^w	-	-	k ^h uβu ^w es'a	to conquer
ɟu ^w /ɟ ^w	-	-	k ^h uɟu ^w a ^ŋ ga	to make a noise
ɣu ^w /ɣ ^w	liyu ^w ina	crocodile	k ^h uɣu ^w is'a	to drop
fu ^w /f ^w	lif ^w e ^ŋ epe	maggot	k ^h ufu ^w ala	to wear
su ^w /s ^w	kisu ^w is ^w i	nest	-	-
hu ^w /h ^w	muh ^w a	termite	k ^h uhu ^w ina	to jump
mu ^w /m ^w	-	-	k ^h um ^w e ^m e ^t hek ^h a	to speak carelessly
nu ^w /n ^w	-	-	-	-
ɲu ^w /ɲ ^w	k ^h iɲu ^w esi	wet place	k ^h uɲ ^w i ^l ila	to harden
ŋu ^w /ŋ ^w	liŋ ^w e ^ŋ elu	corncob	k ^h uŋu ^w ala	to scratch
ŋ ^h u ^w /ŋ ^h w	-	-	-	-
lu ^w /l ^w	lilu ^w eβe	hawk	k ^h ulu ^w as'a	to nurse someone

[†] These words, /ⁿdu^wa^ŋga/ and /ⁿɟu^wili/, are currently the only nominal examples of /du^w/ and /ɟu^w/ found stem-initially. Since these are class 9/10 nouns, the C in NC^w here may not be the original stem-initial consonant but may have been formed morphophonologically from any of /l, t^h, d/ and /ɟ, ɟ/, respectively.

There is no clear pattern to observe regarding which consonants may be a part of Cu^w sequences stem-initially, however it seems that there are slightly more Cu^w sequences stem-initially in verbs than in nouns, if the examples for /ɟ, d/ plus /w/ are discounted since they are not clear examples of /ɟ^w, d^w/

stem-initially. In theory, all those C^w/Cu^w sequences found in verbs would also be possible in nouns if nouns could be derived from these verbs.

There are significantly fewer Cu^w sequences found stem-medially. Those that are not stem-medial as a result of reduplication, or potentially caused by compounding are all nouns: /mi:f^wa/ ‘thorns’, /mu^wip^{hw}a/ ‘nephew’ and /lisek^{hw}a/ ‘duck’.

Table 2.9. C^w and Cu^w sequences stem-initially

	Example	Gloss	Note
p ^{hu} ^w /p ^{hw}	mu ^w i·p ^{hw} a	nephew	
k ^{hu} ^w /k ^{hw}	lisek ^{hw} a	duck	
ɣu ^w /ɣ ^w	ɲsiɣu ^w ana	illegitimate child	possible compound
f ^u ^w /f ^w	mi:f ^w a	thorns	
s ^u ^w /s ^w	k ^h is ^u ^w i:s ^w i	nest	reduplication
mu ^w /m ^w	k ^h um ^w e·m ^w e·t ^h ek ^h a	to speak carelessly	reduplication
ŋu ^w /ŋ ^w	luŋ ^w a·luŋu ^w alu	desert	reduplication

2.4.2 CiⁱV and CⁱV sequences

As with Cu^wV sequences, front vowel glide sequences are more consistently produced as CiⁱV rather than CⁱV when that V occurs in the PU stressed syllable of a word, or in slow speech. As with Cu^wV sequences, CiⁱV sequences are produced more often as CⁱV in syllables preceding the PU syllable, but may also remain as CiⁱV in this position if the syllable is pronounced more slowly. Figures 2.13 and 2.14 show examples of CiⁱV and CⁱV.

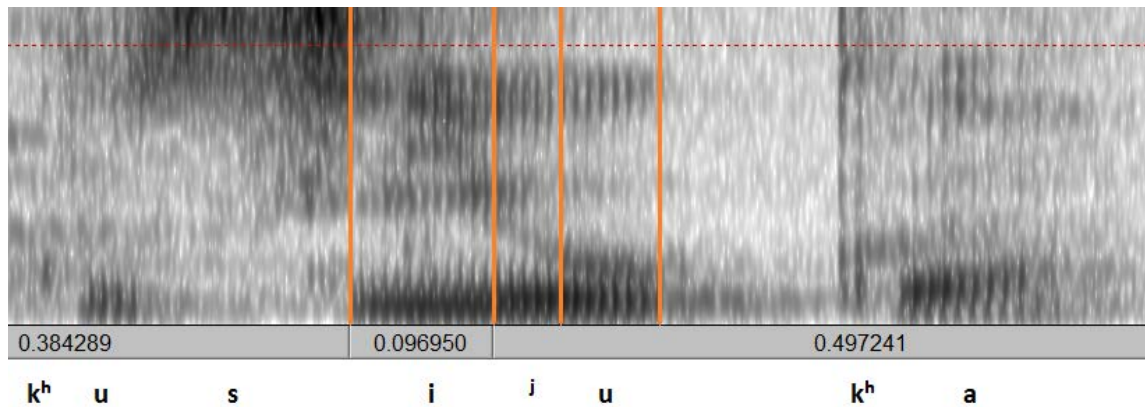


Figure 2.13. Spectrogram for the word /k^husiⁱuk^ha/ ‘to be resurrected’.

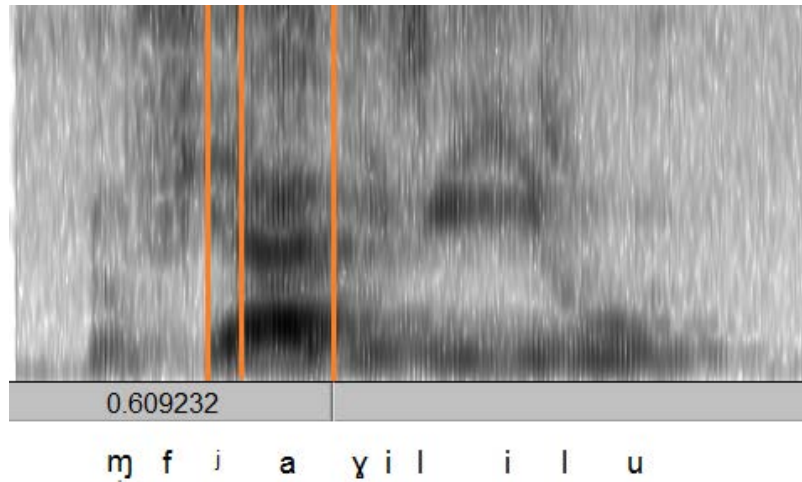


Figure 2.14. Spectrogram for the word /mpʰaːyililu/ ‘broom’.

C^j sequences in the final syllable of a word are produced as a consonant followed by a palatal glide, C^j.

In this paper CⁱV sequences will be written as CⁱV when V is in the PU syllable and C^jV when V is in a syllable other than the PU syllable.

Tables 2.10 and 2.11 give examples for stem-internal consonant plus [j] sequences in Kisi.

Table 2.10. C^j and Cⁱ sequences stem-initially

	Noun	Gloss	Verb	Gloss
p ^h /p ^h i	mp ^h aːyililu [†]	broom	k ^h up ^h iːala	to touch lightly
t ^h /t ^h i			k ^h ut ^h iːeːlela	to slide
k ^h /k ^h i	p ^h ak ^h iːaːna	top		
d ⁱ /d ⁱ i			k ^h ud ⁱ uːk ^h ula	to pinch
f ⁱ /f ⁱ i	mp ^h aːyililu [†]	broom	k ^h uf ⁱ iːoːya	to knead
s ⁱ /s ⁱ i	lis ⁱ aːβala	groundnut	k ^h usiːiːona	to suck
m ⁱ /m ⁱ i			k ^h umiːiːaːnːga	to lick
n ⁱ /n ⁱ i			k ^h uniːiːaːfːa	to decorate
l ⁱ /l ⁱ i	liliːiːaːnːgu	doorway	k ^h uliːiːusːa	to blow away

[†] /mp^haːyililu/ and /mp^haːyililu/ are said to both be acceptable.

Table 2.11. C^j and Cⁱ sequences stem-medially

	Noun	Gloss	Verb	Gloss
f ⁱ /f ⁱ i			k ^h useːiːfa	to comfort
s ⁱ /s ⁱ i	nsisːiːa	obstinate person	k ^h usisːiːa	to be obstinate

The only consonants found stem-medially in a C^j or Cⁱ sequence are the fricatives /s, f/. It is possible that both of these arise as a result of some causative suffixation, as they are mostly found stem-finally in verbs (see 6.1.4.3 for a discussion of the evidence for causative suffixation in similar verbs). Those other consonants which are currently found as Cⁱ or C^j stem-initially are /p^h, t^h, k^h, d, m, n/. These are all found quite rarely in the data. There is currently no evidence that /j/ can form C^j or Cⁱ stem-initially or stem-medially; /j/ and /ji/ appear not to occur as an output of morphophonemic interactions (see 6.2.2.4 for more details).

CⁱV and C^jV, like Cu^wV and C^wV, also occur as a result of prefixes meeting vowel-initial stems at a morpheme boundary. This morphophonology will be discussed in 6.2.2.2.

3 Vowels

3.1 Phoneme Inventory

Table 3.1 shows the vowel phonemes of Kisi.

Table 3.1. Vowel phoneme chart

		Front	Central	Back
high	degree 1	i i: [†]		u u:
	degree 2	ɪ ɪ:		ʊ ʊ:
mid		e e:		o o:
low			a a:	

[†] Length has been marked in sections 2–6 of this paper according to where it is contrastive or not. In order to show those syllables in which length is contrastive and obligatory as different from those syllables where length is conditioned and optional, conditioned length is marked with /·/ and contrastive length with /:/ . This does not necessarily reflect a difference in the length of production, as will be discussed in 3.2.

Short vowel phonemes are theoretically possible anywhere within a stem or root. However, since vowel-initial stems may cause glide formation in the vowel of the prefix attaching to it, and this in turn may cause compensatory lengthening of that stem vowel, especially for stems which are trisyllabic or longer, it is not clear whether the initial vowels in such stems or roots are underlyingly long or short. Evidence from stem-initial vowels which fall in PU syllable position, which by not causing glide formation therefore also do not cause compensatory lengthening, implies that stem-initial vowels are always short (see examples in (9)). The conditions of compensatory lengthening will be discussed in 3.2.2.2. The data in (9) show these potentially ambiguous vowel phonemes in stem initial position. This is followed by unambiguous examples of short vowels stem-medially in (10).

- | | | | | |
|------|---|--------------------------------------|---------------------------------------|-------------------------------|
| (9) | i | /mu ^w ik ^h u/ | /mu-ik ^h u/ | ‘taboo’ (cl.3) |
| | ɪ | /m ^w ɪrgɪɪ/ | /mu-ɪrgɪɪ/ | ‘shadow’ (cl.3) |
| | e | /mu ^w ela/ | /mu-ela/ | ‘current’ (cl.3) |
| | a | /mu ^w ak ^h a/ | /mu-ak ^h a/ | ‘year’ (cl.3) |
| | o | /m ^w oɣofi/ | /mu-oɣofi/ | ‘coward’ (cl.1) |
| | ʊ | /li ⁱ ʊlu/ | /li-ʊlu/ | ‘abscess’ (cl.5) |
| | u | /li ⁱ uma/ | /li-uma/ | ‘iron’ (cl.5) |
| (10) | i | /βuk ^h ifu/ | /βu-k ^h ifu/ | ‘courage’ (cl.14) |
| | ɪ | /k ^h iβɪɾa/ | /k ^h i-βɪɾa/ | ‘cooking pot’ (cl.7) |
| | e | /liseɾa/ | /li-seɾa/ | ‘beeswax’ (cl.5) |
| | a | /βup ^h ala/ | /βu-p ^h ala/ | ‘cliff’ (cl.14) |
| | o | /βudopi/ | /βu-dopi/ | ‘type of small fruit’ (cl.14) |
| | ʊ | /βusulu/ | /βu-sulu/ | ‘tribute’ (cl.14) |
| | u | /βuk ^h ut ^h u/ | /βu-k ^h ut ^h u/ | ‘rust’ (cl.14) |

The pairs of words in table 3.2 demonstrate that phonetically similar vowels in Kisi are separate phonemes.

Table 3.2. Contrasting the vowel phonemes

Contrasted vowels	Example with V1	Gloss	Example with V2	Gloss
V1: /i/, V2: /ɪ/	k ^h ujima	to withhold	k ^h ujima	to stand
V1: /i/, V2: /ɪ/	fi ^ɳ gi	other (cl.8)	fi ^ɳ gi	many (cl.8)
V1: /ɪ/, V2: /e/	k ^h ulɪla	to cry	k ^h ulela	to bring up
V1: /ɪ/, V2: /e/	lilime	it (cl.5) should cultivate	lileme	stomach
V1: /ʊ/, V2: /o/	k ^h ulola	to ferment	k ^h ulola	to see
V1: /ʊ/, V2: /o/	so ^ɳ ga	joke	so ^ɳ ga	aunt
V1: /u/, V2: /ʊ/	ŋk ^h ufu	navel	ŋk ^h ufu	necklace
V1: /u/, V2: /ʊ/	k ^h ulu ^ɰ mba	to thank; praise	k ^h ulo ^ɰ mba	to sew nets

3.2 Vowel length

3.2.1 Contrastive vowel length

The minimal pairs (or near minimal pairs) in table 3.3 demonstrate that vowel length is contrastive in Kisi.

Table 3.3. Contrasting long and short vowel phonemes

Vowel	Short vowel example	Gloss	Long vowel example	Gloss
/i/	k ^h it ^h it ^h u	black thing	k ^h it ^h i:t ^h u	native
/i/	^ɳ gisi	species of freshwater fish	^ɳ gi:si	darkness
/ɪ/	k ^h uβɪk ^h a	to crow	k ^h uβɪ:k ^h a	to put; store
/e/	k ^h uhema	to escape	k ^h uhe:ma	to breathe quickly
/a/	k ^h uhala	to choose	k ^h uha:la	to inherit
/a/	k ^h ulap ^h a	to take an oath	k ^h ula:p ^h a	to be thirsty
/o/	k ^h uhok ^h a	to make a mistake	k ^h uho:k ^h a	to recover
/o/	^ɳ doβo	bucket	^ɳ do:βo	wedding
/ʊ/	lik ^h ʊ ^ɰ bulu	hoe	lik ^h ʊ ^ɰ gu:lʊ	crow
/ʊ/	k ^h uk ^h ola	to grow up	k ^h uk ^h ʊ:βa	to beat
/u/	k ^h uk ^h ut ^h a	to have pain	k ^h uk ^h u:t ^h a	to call
/u/	lifufu	skull	lifu:t ^h u	gathering place for a funeral

Table 3.4 shows the difference in length for phonemically short and long vowels in the PU syllable.

Table 3.4. Contrastive vowel length in the PU syllable

APU	PU	U	Gloss	APU	PU	U	Gloss
	^ɳ gi 0.099s	si	species of fish		^ɳ gi: 0.188s	si	darkness
	^ɳ do 0.099s	βo	bucket		^ɳ do: 0.196s	βo	wedding
k ^h u	da 0.118s	da	to hate		da: 0.164s	di	father
k ^h u	ho 0.119s	la	to dig	k ^h u	ho: 0.244s	la	to think deeply

Apart from a restriction on word-final long vowels, there are no other restrictions on long vowels currently obvious from the data. Word-initial long vowels are permissible as a result of the juxtaposition of V-shaped prefixes, for example, /i:βone/ /a-i-βon-e/ 1SP-REFL-SEE-SUBJ ‘he should see himself’. Indeed, vowel length in the initial syllable of a verb with an anterior suffix is contrastive for subject prefixes of the shape (C)a-. The long vowel is a result of the juxtaposition of two vowels underlyingly, one from the subject prefix and one from the far past prefix /a-/, whereas a short vowel simply comes from the subject prefix.

- (11) a. /a:joβile/ /a-joβ-ile/ 1SP-say-ANT ‘he has said’ a: 0.079s
 b. /a:joβile/ /a-a-joβ-ile/ 1SP-PST2-say-ANT ‘he said’ (far past) a: 0.161s

See table 3.5 for examples of where long vowels are permitted in the stem. The first column shows the number of syllables in the stem, the second column shows the position of the long vowel in the stem as penultimate (PU), antepenultimate (APU) or pre-antepenultimate (pre-APU) as well as whether the long vowel is stem-initial or stem-medial. In the final columns, which show example words for nouns and verbs, any prefixes are separated off from the stem by a hyphen in order to show the stem more clearly. Verbs which are known to have extensions as part of the stem are in brackets, however even if a stem does not have an unextended form synchronically, all stems longer than two syllables are suspected to have some form of extension, whether lexicalised or not. According to Schadeberg (2003a:72), all Bantu verbs longer than CVC can be shown to result from derivational processes.

Table 3.5. Vowel length in different syllables of the stem

Syllables	Position of long vowel	Syllable structure of stem	Noun	Verb
2	PU stem-initial	CV:CV	k ^h i-βe:le ‘udder’	k ^h u-ba:p ^h a ‘to carry on one’s back’
3	PU stem-medial	CV.(N)CV:C(G)V	li-hu ^m bu:su ‘hardship’	(k ^h u-hugu:s ^j a ‘to shake’)
4	PU stem-medial	CV.(N)CV.CV:CV	li-βa ^ŋ gala:la ‘wild banana’	(k ^h u-p ^h ep ^h elu:k ^h a ‘to soar’)
3	APU stem-initial [†]	CV:CV.CV	li-k ^h o:βela ‘intestinal worm’	(k ^h u-ha:t ^h ula ‘to tear’)
4	APU stem-medial	CV.(N)CV:CV.CV		(k ^h u-je ^ŋ ge:lula ‘to skim liquid’)
4	pre-APU stem-initial	CV:CV.CV.C(G)V		(k ^h u-ha:t ^h uliβ ^w a ‘to be torn’)

[†] Vowel length only seems to occur in this APU position (or in pre-APU) in words which are verbs or derived from verbs containing extensions.

It should also be noted that long vowels can occur in adjacent syllables, especially as a result of morpheme interaction (see (12)). There is therefore no restriction on length in adjacent syllables.

- (12) /βa:hi:je:ne/ /βa-a-hi:j-an-ile/ ‘they stole from each other’
 2SP-PST2-steal-RECP-ANT

Vowels are pronounced longer the closer they are in the word to the PU syllable. Thus, a short vowel in the PU syllable will be pronounced longer than a short vowel in the APU syllable. The same is true for long vowels in different syllables. A vowel in the PU syllable of the word will phonetically be the longest vowel in the word if the word contains all short vowels.

In tables 3.6 and 3.7 the column headings refer to the number of syllables in the word, labelled from the final syllable backwards. The PU syllable is therefore represented by the number 2. The numbers given below each syllable represent the duration of the vowel in seconds and the length of the vowel compared as a ratio to the length of the vowel in the PU syllable. The first table shows how the distance a vowel is from the end of the word affects its length in words with only short vowels. As can be seen from this table, the length of a vowel in a certain column varies wildly from word to word, since one word may have been pronounced faster or slower overall than another. It is therefore more useful to compare vowel lengths within the word, seeing where vowels are longer than expected within a word, that is, where vowels further to the left in a word are longer than the vowel in the syllable immediately following it. A vowel being longer than the vowel in the following syllable is a good indication that there is phonetic length in that vowel. Conversely, if a vowel is a similar length or shorter than the vowel following then this can be considered a phonetically short vowel.

Table 3.6. Comparing length of short vowels in different syllables

5	4	3	2	1	Gloss
	k ^h u	gu 0.057s 0.65	bi 0.088s 1	k ^h a	to cover
	k ^h u	ge 0.105s 0.91	gi 0.115s 1	β ^w a	to be married
k ^h u	li 0.092s 0.80	mu 0.095s 0.83	li 0.115s 1	β ^w a	to be harvested

Table 3.7 shows how the distance of a vowel from the end of the word affects the length of phonemically long vowels in different syllables of a word. A long vowel in any particular syllable will be longer than a short vowel would be in that syllable. A long vowel in any particular syllable will not be as long as it would be if that syllable were closer to the end of the word. Comparing /k^huha:ɣula/ ‘to choose’ and /k^huha:ɣuliβ^wa/ ‘to be chosen’ gives a clear example of the effect position in the word has on the length of a phonemically long vowel.

The effect of syllable position of the realisation of vowel length is such that a phonemically long vowel may indeed be shorter than a phonemically short vowel if that short vowel is in the stressed PU syllable of the word: see /k^huha:t^huliβ^wa/ ‘to be torn’ in table 3.7 and compare the length of /a:/ and /i/ to see this. The Kisi themselves are aware of phonemic contrast in vowel length in this word and consider /a/ to be long, but /i/ to be short, despite the evidence that /i/ is longer than /a/ in terms of actual length.

Table 3.7. Comparing long vowels in different positions in the word

5	4	3	2	1	Gloss
k ^h u	ha: 0.111s 1.05	ɣu 0.074s 0.70	li 0.106s 1	β ^w a	to be chosen
	k ^h u	ha: 0.123s 1.5	ɣu 0.082s 1	la	to choose
k ^h u 0.045s 0.42	ha: 0.085s 0.80	t ^h u 0.043s 0.41	li 0.106s 1	β ^w a	to be torn

5	4	3	2	1	Gloss
	k ^h u	hu: 0.175s 1.34	βɪ 0.131s 1	la	to hope
k ^h u 0.038s 0.32	ho 0.073s 0.61	βe: 0.11s 0.92	le 0.12s 1	s'a	to provoke

3.2.2 Compensatory vowel length

Compensatory vowel lengthening has been acknowledged in IPA transcriptions in this paper so far by the use of /·/ following the vowel. As will be shown in this section, while all vowels lengthened in compensation and marked with /·/ may be as long as phonemically long vowels, they may also be produced as short vowels, which is why they are marked differently from phonemically long vowels which are marked with /:/.

3.2.2.1 Vowel lengthening before prenasalised consonants

Compensatory vowel lengthening in Kisi occurs before prenasalised consonants. While vowels preceding prenasalised consonants may be lengthened to the extent that they are as long as phonemically long vowels, they also may be no longer than a phonemically short vowel. In table 3.8, phonemically long vowels are contrasted with vowels affected by compensatory lengthening and phonemically short vowels. In each example the vowel under observation is in the syllable in column 2.

Table 3.8. Conditioned length compared to phonemic length in disyllabic stems

	3	2	1	Gloss
Phonemically long	k ^h u	ba: 0.155s	p ^h a	to carry
Phonemically long		ⁿ do: 0.184s	t ^h o	dream
Conditioned length	lu	[t ^h o] 0.120s	ⁿ do	star
Conditioned length	k ^h u	dr 0.226s	ⁿ da	to close
Phonemically short	k ^h u	ge 0.107s	ga	to marry
Phonemically short	k ^h u	da 0.118s	da	to hate

As with phonemically long or short vowels, compensatory lengthened vowels earlier in the word are comparatively shorter than vowels in the same compensatory length environment which are closer to the end of the word. As mentioned previously, the ultimate syllable in the word is always short. In table 3.9, as in 3.2.1, the numbers given below each syllable represent the duration of the vowel in seconds and the length of the vowel compared as a ratio to the length of the vowel in the PU syllable. The first three examples look at length in the APU syllable, the next three look at length in the pre-APU syllable, and the final example shows conditioned length and phonemic length co-occurring in the same word. As mentioned previously, it is difficult to compare vowels from one word to another without having minimal pairs and where the speed of pronunciation of the words under comparison is so different. Due to this, the best way to examine vowel length in Kisi is to compare the length of vowels within a word to

each other, and notice where a vowel does not follow the pattern of being shorter than the vowel following it in the word.

Table 3.9. Conditioned length in syllables prior to the PU syllable

	5	4 (Pre-APU)	3 (APU)	2 (PU)	1	Gloss
Phonemically short		k ^h u	lɪ 0.072s 0.63	mu 0.115s 1	la	to harvest
Conditioned length		k ^h u	hr̥ 0.125s 1.29	ɲɪ 0.097s 1	k ^h a	to be easy to butcher
Phonemically long		k ^h u	ha: 0.123s 1.5	ɣu 0.082s 1	la	to choose
Phonemically short	k ^h u	lɪ 0.092s 0.77	mu 0.095s 0.79	li 0.119s 1	β ^w a	to be harvested
Conditioned length	k ^h u	dr̥ 0.115s 1.35	ɲdɪ 0.066s 0.78	lɪ 0.085s 1	s ^j a	to force open
Phonemically long	lu	ha: 0.180s 0.99	lu 0.097s 0.53	li 0.182s 1	lu	grinding stone
Conditioned length (Pre-APU) and phonemic length (PU)	li	βa: 0.064s 0.26	ɲga 0.049s 0.20	la: 0.250s 1	la	wild banana

As can be seen for the word /liβa^ɲgala:la/ ‘wild banana’, the presence of phonemic length in one syllable does not prevent the /a/ in the syllable /βa/ that precedes the prenasalised velar plosive /ɲg/ from being lengthened such that it is longer than the /a/ in syllable /ɲga/ which follows it. Currently there is no evidence to indicate that there is a limit on the number of phonetically long vowels in the same word.

3.2.2.2 Vowel lengthening after consonant plus glide sequences

As Hyman (2003:48) states, in Bantu, gliding is accompanied by compensatory lengthening. Since gliding in Kisi only occurs in non-PU syllables or when the whole word is produced in fast speech, compensatory lengthening is also only found in these environments. Where consonant-glide sequences occur in Kisi, compensatory lengthening of the vowel is optional.

Just as contrastive vowel length does not occur in the final syllable of a word, so there is also no compensatory length in word-final syllables containing a consonant plus glide, for example in both /k^hubes'a/ ‘to obstruct’ and /k^hulem^wa/ ‘to be defeated’, the final /a/ is short.

Table 3.10 gives examples of C^jV and C^wV and compares them with words containing phonemically long and short vowels in the same syllable position. The first three examples look at length in the APU syllable, the last three examples look at length in the pre-APU syllable.

As before, the best way to recognise vowel length in Kisi is not by comparison to the length of a vowel in the same syllabic position in another word, but by comparison of the relevant vowel with neighbouring vowels in within the same word. Phonetically long vowels are those which are longer than

a short vowel in the following syllable (or of a similar length if in the APU syllable and compared to the PU vowel).

Table 3.10. Compensatory lengthening following C^j or C^w

	5	4	3	2 (PU)	1	Gloss
Phonemically short		k ^h u	ge 0.105s 0.91	gi 0.115s 1	β ^w a	to be married
Conditioned length		k ^h u 0.074s 0.33	[t ^h wa] 0.122s 0.55	ju 0.221s 1	la	to shoot
Phonemically long		k ^h u	hu: 0.175s 1.34	β _ɪ 0.131s 1	la	to hope
Phonemically short	k ^h u	li 0.092s 0.80	mu 0.095s 0.82	li 0.115s 1	β ^w a	to be harvested
Conditioned length	m̩	f ^h a: 0.103s 0.99	yi 0.086s 0.83	li 0.104s 1	lu	broom
Phonemically long	k ^h u 0.045s 0.42	ha: 0.085s 0.80	t ^h u 0.043s 0.41	li 0.106s 1	β ^w a	to be torn

As for all syllables preceding the PU syllable, post-glide vowels are shorter when they occur earlier in the word.

3.2.2.3 Lengthening of ‘to be’ plus imperfective /-aɣ/

There is at present only one root in the database which is made up on a single consonant only, /j/ ‘be’, infinitive form /k^huja/ ‘to be’. This verb is the only one currently found which interacts with imperfective /-aɣ/ in the subjunctive to form a long vowel, /-ja:ɣe/. It could be that if there are other consonant-only roots they would act in the same way, but this cannot be proved at present. It is not clear why this lengthening occurs, as Kisi ordinarily allows short vowels in this position in words the same length. The only possibility is that underlyingly the root is actually /jV/ and that this vowel only shows up on the addition of a suffix -VC. This would certainly help to explain why ‘to be’ plus the anterior morpheme /-ile/ results in /-je:le/ rather than /-jile/ as would be expected.

(13)	/k ^h uja/	/k ^h u-j-a/	INF-be-FV	‘to be’
	/aja:ɣe/	/a-j-aɣ-e/	1SP-be-IPFV-SUBJ	‘he should be’
	/ji:ja:ɣe/	/ji-j-aɣ-e/	9SP-be-IPFV-SUBJ	‘it should be’
	/aje:le/	/a-j-ile/	1SP-be-ANT	‘he was’

3.2.2.4 Stylistic lengthening

Stylistic lengthening occurs in Kisi when there is emphasis placed on a particular word. This is shown in (14).

(14)	/βala/	/βa-la/	2DP-DIST.DEM	‘those (people)’
	/βa:la/	/βa-la/	2DP-DIST.DEM	‘those (people) far away’

The first demonstrative in example (14) is a normal distal demonstrative whereas the second is used in situations where the speaker wishes to emphasise that the person referred to is very far away. The initial vowels of distal demonstratives can undergo stylistic lengthening to emphasise the distance of the person or item referred to from the speaker.

3.3 Vowel distribution

3.3.1 Sequences of directly adjacent vowels

As discussed in 2.4, sequences of directly adjacent vowels in the reconstructed language Proto-Bantu have become in Kisi what has been analysed in this paper as u^wV and iⁱV sequences, where the two vowels are separated by a glide. These CVGV sequences are shortened to CGV sequences in fast speech, thus creating C^wV and CⁱV sequences. The reasons for analysing these sequences as such rather than as directly adjacent vowels were outlined in 2.4, and will not be reiterated here.

Certain Swahili words have been borrowed into Kisi which orthographically in Swahili contain directly adjacent vowels. Whether these words are pronounced with an intervening glottal or glide in Swahili may depend upon individual speaker pronunciation and is not the focus of this paper. However, when these words are borrowed into Kisi, the orthographically adjacent vowels are pronounced with an intervening glide, as shown in (15).

(15)	/i/-/a/	/ja ^m bi ^a /	‘machete’	(Swahili: jambia)
	/i/-/o/	/misi ⁱ oni/	‘missionary’	(English: missionary)
	/a/-/i/	/k ^h uta ⁱ ili/	‘to circumcise’	(Swahili: kutaili)
	/a/-/u/	/k ^h u ^f a ^w uli/	‘to advise’	(Swahili: kushauri)
	/u/-/i/	/ju ^w isi/	‘juice’	(Swahili: juisi/ English: juice)

The words in (16) are pronounced with a diphthong in Kisi:

(16)	/e/-/i/	/be ⁱ /	‘price’	(Swahili: bei)
	/a/-/o/	/ᵐga ^o /	‘shield’	(Swahili: ngao)

Other than stem-internal examples of vowel adjacency in the reconstructed proto-language or orthographic vowel adjacency in the source language being resolved in Kisi as VGV (or as a diphthong), the only other situation which may be described as vowel adjacency arises through vowels meeting at a morpheme boundary and will be dealt with in 6.2.2, “Vowel Hiatus Resolution.”

3.3.2 Sequences of vowels separated by consonants

Table 3.11 shows the frequency of combinations of vowels separated by consonants in roots of words in the data set.

Table 3.11. Sequences of vowels separated by consonants

V1↓ V2→	i	ɪ	e	a	o	ʊ	u
i	54 [†]		1	51		7	51
ɪ	2	32		21		1	20
e	9		84	34			38
a	102	1	3	149		3	82
o	36	1		35	109		2
ʊ	19	6 ^{*‡}		26		61	1 [*]
u	40		2 [*]	36	1	2	69

[†] The cells with italicised numbers are those where the two vowels are identical.

The blacked out squares are combinations for which there are no examples, the dark grey squares are combinations that are not disallowed but are rarely found.

[‡] The numbers marked with an asterisk are dubious, possibly including an extension not just the bare root.

There seems to be a trend that vowels in adjacent syllables will be the same height and front or back quality as each other, that is, the two vowels are identical. There is a clear preference for back vowels /o, ʊ/ to follow only /o, ʊ/ respectively, and front vowels /e, ɪ/ to follow /e, ɪ/ respectively. In the case of these vowels especially, the preference is for V1CV2 where V1 = V2. This is consistent with vowel harmony in verbal suffixes: first degree suffixes /-uk^h/ and /-ul/ harmonise only with back vowels in the root and therefore /ʊ, o/ will only be found in extensions when the root contains /ʊ, o/ respectively. The suffixes containing front vowel /i/ such as the applicative /-il/ and impositive /-ik^h/ harmonise with vowels of any front or back quality in the root. These harmony processes will be looked at in more detail in 6.2.1.

While /a, i, u/ follow any vowel within a root, few or none of the vowels /e, ɪ, o, ʊ/ occur as the second vowel of a root following /a, i, u/ as the first vowel. This is also consistent with what can be seen across morpheme boundaries from the root into extensions as a result of vowel harmony: /a/ in a root does not cause vowel harmony, so extensions following the root will remain in their underlying degree-1 form. Likewise, extension vowels following /i, u/ in the root remain as degree-1 vowels since the vowels are already of the same height, and so harmony does not result in /e, ɪ, o, ʊ/ following /i, u/ in a root.

4 Syllable Structure

Table 4.1 shows which syllable types are permissible in Kisi, and table 4.2 gives examples of each of these syllable structures. The lightly shaded cells are only possible as a result of the interaction of a morpheme with a stem, or the interaction of multiple prefixes: either two noun prefixes on a single noun stem or multiple verbal prefixes. Closed syllables are included in table 4.2 as a result of such interactions, however it is debatable whether these should in fact be counted as two syllables, namely CV.C. The Kisi themselves do not divide these into two syllables when asked to consider syllable boundaries, instead choosing a CVC structure, however in slower speech such a division into CV.C can sometimes be heard.

The cell shaded a darker colour is found only as a result of analysing CVGV as such, rather than as CGV. Since compensatory length following palatalised or labialised consonants is optional and not contrastive, only CGV(C) will be listed for syllable-initial CG, and not CGV(C).

Tables 4.1 and 4.2 provide a picture of syllable structure as seen in words defined phonologically, rather than grammatically, orthographically or semantically.

Table 4.1. Syllable types in Kisi

Syllable type	Description	Word-initial	Word-medial	Word-final
CV	Plain CV syllable, no length, no prenasalisation	✓	✓	✓
CV:	Long vowel, no labialisation	✓	✓	X
CVC	All closed syllables with onsets	✓	✓	X
CV:C	All closed syllables with onsets, long vowel	✓	??	X
(G)V	No length	✓	✓	X [†]
V:	Long vowel	✓	X	X
VC	All closed syllables without onsets	✓	X	X
V:C	All closed syllables without onsets, long vowel	✓	X	X
CwV•	C + w onset, no coda, compensatory length	✓	✓	✓
C ^w V•C	C + w onset, with coda, long vowel	✓	✓	X
CjV•	C + j onset, no coda, compensatory length	✓	✓	✓
C ^j V•C	C + j onset, with coda, long vowel	✓	✓	X
NCV	Prenasalised onset, no coda, short vowel	✓	✓	✓
NCV:	Prenasalised onset, no coda, long vowel	✓	✓	X
NCwV•	Prenasalisation + w, no coda, compensatory length	✓	✓	✓
NCjV•	Prenasalisation + j, no coda, compensatory length	✓	✓	✓
ŋ	Syllabic nasal	✓	X	X

[†] This syllable type only occurs in loan words. It is not found in any current Kisi data.

Table 4.2. Examples of syllable types

Syllable type	Word-initial	Word-medial	Word-final
CV	k ^h i.βɪ.ɣa CV.CV.CV 'cooking pot'	k ^h i.βɪ.ɣa CV.CV.CV 'cooking pot'	k ^h i.βɪ.ɣa CV.CV.CV 'cooking pot'
CV:	da:.di CV:.CV 'father'	li.go:.si CV.CV:.CV 'male'	-
CVC	βam.bu:.li.le CVC.CV:.CV.CV 'they told him'	a.k ^h aŋ.k ^h o.t ^h a V.CVC.CV.CV 'he asked him'	-

Syllable type	Word-initial	Word-medial	Word-final
CV:C	βa:ŋ.ga.ni.le CV:C.CV.CV.CV 'they loved him'	βa.βa:ŋ.ga.ni.le CV.CV:C.CV.CV.CV 'they who loved him'	-
(G)V	u.k ^h o.si V.CV.CV 'nape of neck'	^m bu. ^w e.le NCV.GV.CV 'mosquito'	-
V:	i:.βo.ne V:.CV.CV 'he should see himself'	-	-
VC	an.t ^h o.βe VC.CV.CV 'he should hit him'	-	-
V:C	a:ŋ.k ^h o.t ^h i.le V:C.CV.CV.CV 'he asked him (far past)'	-	-
CwV·	t ^{hw} a.k ^h a.t ^h o.βa CwV·CV.CV.CV 'we hit'	k ^h u.t ^h wa.ɟu.la CV.CwV·CV.CV 'to shoot'	li.se. k ^h wa CV.CV.CwV 'duck'
C ^w V·C	k ^{hw} a.n.su:.ma C ^w V·C.CV:.CV 'you are begging him'	ɟu.t ^{hw} a.n.t ^h o.βi.le CV.C ^w V·C.CV.CV.CV 'we who hit him'	-
CjV·	k ^h jo.lo.lo CjV·CV.CV 'domesticated animal'	k ^h u.dju.k ^h u.la CV.CjV·CV.CV 'to pinch'	k ^h u.be.sja CV.CV.CjV 'to forbid'
CjV·C	ɸa'n.du.mi.le CjV·C.CV.CV.CV 'it (cl.5) bit him'	li.ɸa'n.du.mi.le CV.CjV·C.CV.CV.CV 'that (cl.5) which bit him'	-
NCV	^m bi.li NCV.CV 'two'	k ^h i.lo'. ^ŋ go.si CV.CV·NCV.CV 'leader'	k ^h r. ⁿ du CV:. NCV 'thing'
NCV:	ⁿ do:t ^h o NCV:.CV 'dream'	li.t ^h e'. ⁿ de:fu CV.CV·NCV:.CV 'mud wasp'	-
NCwV·	ⁿ ɟ ^w i.k ^h i.le NCwV.CV.CV 'I have got wet'	a'. ^m f ^w r.mi.le V·NC ^w V·CV.CV 'he should hunt for me'	ⁿ di'. ^m b ^w a NCV· NCGV 'calm'
NCjV·	ⁿ sɟr.li.le NCjV·CV.CV 'I have buried'	a. ⁿ sɟr.li.le V.NCjV·CV.CV 'he has buried me'	(This syllable type is theoretically possible, but there are no examples of it in the database.)
N	ŋ.go:si N.CV:.CV 'husband'	-	-

The data so far leads to the conclusion that Kisi only permits syllables with codas through the interaction of multiple morphemes. Likewise, contrastive vowel length in syllables without an onset only occurs through the juxtaposition of V- prefixes.

Syllabic nasals only occur word-initially in nouns with the affixation of the class 1/3 noun prefix or in verbs with the affixation of the 2PL subject or class 1 object prefixes. All of these prefixes are underlyingly /mu-/. In prefixing to consonant-initial roots, the prefix loses its vowel and attaches to the stem as a syllabic nasal. This does not happen with the noun class 9/10 prefix N-, or 1SG subject or object prefixes however. The interactions of these prefixes with consonant-initial roots will be described in more detail in 6.1.

There are multiple situations where minimal pairs for syllabic nasals versus prenasalised consonants arise. Some examples follow.

(17) a.	/ ⁿ du:su/	/N-du:su/	9NP-small	'small' (cl.9)
	/ṇdu:su/	/mu-du:su/	1NP-small	'small person'
b.	/ ^m balafu/	/N-βalafu/	9NP-white	'white' (cl.9)
	/ṁbalafu/	/mu-βalafu/	1NP-white	'white/holy person'
c.	/ ^m balile/	/ni-βal-ile/	1SG.SP-count-ANT	'I have counted'
	/ṁbalile/	/mu-βal-ile/	2PL.SP-count-ANT	'you (PL) have counted'

5 Stress

Kisi, like its northern neighbour Nyakyusa, does not have contrastive pitch. It is purely a stress language where stress is always realised on the penultimate syllable of the word. This stress is realised as an increased intensity⁵ over the relevant syllable and added length in the vowel of the stressed syllable. The intensity increase may be seen by examining the yellow line in figure 5.1, which shows the spectrogram of the word /liso'solo/ 'louse'. Pitch may play a part in indicating the stressed syllable however it is not always the case that the highest pitch is found during the stressed syllable.

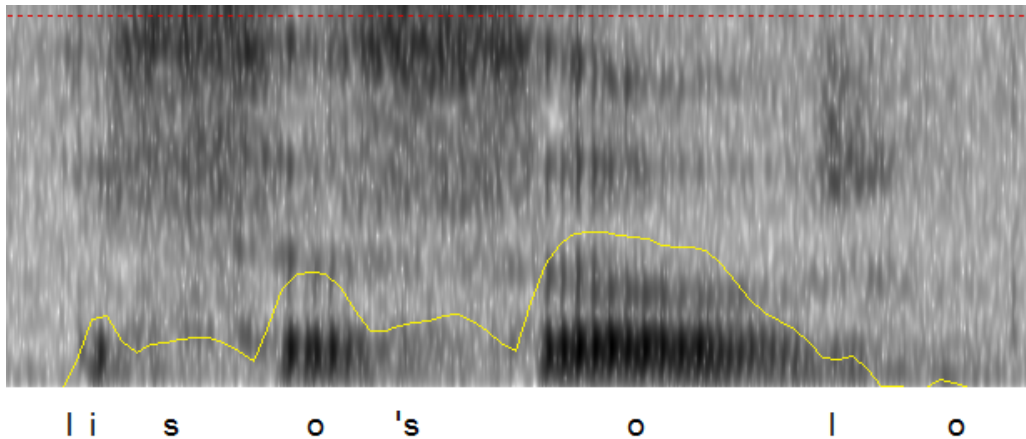


Figure 5.1. Spectrogram showing intensity for the word /liso'solo/ 'louse'.

⁵ Intensity is a measurement of loudness used in acoustic phonetics which takes into account amplitude and frequency of a sound.

6 Morphophonology

6.1 Consonantal processes

The majority of consonantal processes in Kisi affect stem-initial consonants. Some however relate to stem-final consonants. The interactions affecting stem-final consonants will be discussed in 6.1.4.

Sections 6.1.1 and 6.1.2 will deal with stem-initial consonantal processes. Hyman (2003:52) notes that many Bantu languages have introduced new sequences of nasal N plus consonant C, which are not inherited from Proto-Bantu. Kisi is a language for which all prefixes of the shape /mu-/ are reduced to /m-/ in interactions with non-monosyllabic consonant-initial stems. Class 18 appears to be an exception to this statement, but more data are needed to investigate this. What is currently known about class 18 clitics will be discussed in 6.1.3. Where there is evidence of how the class 18 prefix attaches to certain consonants which are stem-initial in adjectives, this will be mentioned in the relevant section. These prefixes (class 1, class 3 and class 18 nominal prefixes, 2PL subject prefix, and class 1 object prefix) are analysed as /mu-/ underlyingly because of the retention of the prefix vowel when interacting with monosyllabic stems and the fact that Bantuists have reconstructed the class 1, 3 and 18 nominal prefixes, the 2PL subject prefix and class 1 object prefix as *mu- (Schadeberg 2003b:149). Prefix reduction in Kisi affects all of these prefixes with the exception of the class 18 prefix. As a consequence of vowel elision in these /mu-/ prefixes, the remaining prefix consonant interacts with the root or stem-initial consonant in a variety of ways, depending on the manner of production of the consonant. All of these /mu-/ prefixes interact in the same way after reduction, and so will be discussed together in 6.1.1. The 1SG verbal prefixes /ni-/ (subject and object) will be discussed in 6.1.2 along with the behaviour of class 9/10 nominal prefix N-.

6.1.1 /mu-/ prefixes interacting with stem-initial consonants

In all cases where reduction of the vowel of the prefix /mu-/ occurs, the nasal remaining undergoes homorganic assimilation to the place of articulation of the following stem consonant under certain conditions. As Hyman (2003:53) states, this nasal is typically syllabic in Bantu languages, and does not condition the same alternations on the following consonant as does N- or /ni-/. This section will therefore focus on the behaviour of /mu-/ separately from N-. It will be divided into three parts, the first discussing those stem consonants which are unaffected by the attachment of /mu-/, the second those which are affected, and the third will touch on situations where the prefix vowel is not deleted.

6.1.1.1 Unaffected stem consonants

Those stem consonants which are unaffected by the attachment of /mu-/ are: /p^h, t^h, k^h, b, d, ɟ, g, f, s, h, m, n, ɲ, ŋ/, namely the voiceless and voiced plosives, the voiceless fricatives and the nasals. The examples in (18)–(20) show this process.⁶

⁶ Note that, as in (20d), it is difficult to determine whether /mu-/ assimilating to the place of articulation of a stem-initial nasal results in N:, where N: is the onset of a syllable; or NN, where the first nasal is in the coda of one syllable and the second nasal is in the onset of the following syllable. Kisi speakers who were asked about how they would divide up the syllables in the word /ammapile/ ‘he knows him’ gave the division /am.ma.ɲi.le/, hence I have chosen to write “NN” rather than “N:.”

- | | | | | | |
|------|----|-------------------------------------|---------------------------------------|-----------------|---------------------|
| (18) | a. | /mp ^h r ^u ga/ | /mu-p ^h r ^u ga/ | 3-headpad | 'headpad' |
| | b. | /nt ^h ima/ | /mu-t ^h ima/ | 3-heart | 'heart' |
| | c. | /ŋk ^h ifu/ | /mu-k ^h ifu/ | 1-courageous | 'courageous person' |
| | d. | /mbi ^h i/ | /mu-bi ^h i/ | 3-tree | 'tree' |
| | e. | /ndala/ | /mu-dala/ | 1-wife | 'wife' |
| | f. | /ɲjine/ | /mu-jine/ | 1-companion.3SG | 'his/her companion' |
| | g. | /ŋga ^u ga/ | /mu-ga ^u ga/ | 1-medicine.man | 'medicine man' |
| | h. | /mfi ^m ba/ | /mu-fi ^m ba/ | 3-corpse | 'corpse' |
| | i. | /nsafi/ | /mu-safi/ | 3-group.animals | 'group of animals' |
| | j. | /mhaβi/ | /mu-haβi/ | 1-sorcerer | 'sorcerer' |
| | k. | /mma ^u ga/ | /mu-ma ^u ga/ | 1-fat.person | 'fat person' |
| | l. | /nna:si/ | /mu-na:si/ | 3-coconut | 'coconut tree' |
-
- | | | | | | |
|------|----|--|--|-------------------|-------------------------|
| (19) | a. | /mp ^h ili:k ^h e/ | /mu-p ^h ilik ^h -ile/ | 2PL.SP-hear-ANT | 'you (PL) have heard' |
| | b. | /mbe:lile/ | /mu-be:l-ile/ | 2PL.SP-refuse-ANT | 'you (PL) have refused' |
| | c. | /nsu:mile/ | /mu-su:m-ile/ | 2PL.SP-beg-ANT | 'you (PL) have begged' |
| | d. | /ɲna:ɲile/ | /mu-ɲa:ɲ-ile/ | 2PL.SP-burn-ANT | 'you (PL) have burned' |
-
- | | | | | | |
|------|----|---|--|--------------------|----------------------|
| (20) | a. | /amp ^h ili:k ^h e/ | /a-mu-p ^h ilik ^h -ile/ | 1SP-1OP-hear-ANT | 'he has heard him' |
| | b. | /ambe:lile/ | /a-mu-be:l-ile/ | 1SP-1OP-refuse-ANT | 'he has refused him' |
| | c. | /ansu:mile/ | /a-mu-su:m-ile/ | 1SP-1OP-beg-ANT | 'he has begged him' |
| | d. | /ammaɲile/ | /a-mu-maɲ-ile/ | 1SP-1OP-know-ANT | 'he knows him' |

The prefix nasal assimilates to the place of articulation of the following consonant in all cases except for /h/-initial stems when it remains as a bilabial nasal.

In order to demonstrate the syllabicity of the nasal, it is necessary to look at some measurements taken of the length of production of the nasal before the onset of following consonant and compare them to the length of the nasal in a prenasalised consonant. In each instance, the syllabic nasal is significantly longer, from twice to three times as long in these examples.

- | | | | | |
|------|----|--|----------------------|-----------|
| (21) | a. | /mbili/ | 'body' (cl.3) | m: 0.315s |
| | | / ^m bu ^w ele/ | 'mosquitoes' (cl.10) | m: 0.102s |
| | b. | /ndomo/ | 'mouth' (cl.3) | n: 0.232s |
| | | / ⁿ dup ^h uk ^h a/ | 'earthworm' (cl.9) | n: 0.118s |
| | c. | /ŋgo:si/ | 'husband' (cl.1) | ŋ: 0.183s |
| | | / ^u gi:si/ | 'darkness' (cl.9) | ŋ: 0.088s |

The measurements in (22) look at the length of onset of the nasal before the plosive or fricative, or the total length of the nasal (in the case of nasal-initial stems). It also compares the length of the subject prefix vowel /a/.

- | | | | | | |
|------|----|--------------------------------------|----------------------|-----------|-----------------------|
| (22) | a. | /a ^m be:lile/ | 'he has refused me' | a: 0.191s | ^m : 0.104s |
| | | /ambe:lile/ | 'he has refused him' | a: 0.104s | m: 0.273s |
| | b. | /a ⁿ su:mile/ | 'he has begged me' | a: 0.148s | ⁿ : 0.104s |
| | | /ansu:mile/ | 'he has begged him' | a: 0.090s | n: 0.125s |
| | c. | /a ^m fi ^h ile/ | 'he has hidden me' | a: 0.145s | ^m : 0.145s |
| | | /amfi ^h ile/ | 'he has hidden him' | a: 0.099s | ɱ: 0.180s |

d.	/amapile/	‘he knows’	a: 0.107s	m: 0.100s
	/aˈmˈapile/	‘he knows me’	a: 0.182s	m: 0.127s
	/ammaɲile/	‘he knows him’	a: 0.101s	mm: 0.323s
e.	/aˈɲʊkʰiːle/	‘he has washed for me’	a: 0.172s	ɲ: 0.101s
	/aɲɲʊkʰiːle/	‘he has washed for him’	a: 0.119s	ɲɲ: 0.182s

From these measurements we can see that not only is the syllabic nasal longer in every case (though only marginally so for fricative-initial stems), but that the prenasalisation or elision of the first person singular prefix results in compensatory lengthening of the preceding vowel, the subject prefix vowel in this case. This extra vowel length is present even in the case of /aˈmˈapile/ ‘he knows me’ where either the prefix nasal or the stem-initial nasal appears to be elided. The extra length can be seen by comparing the length of the /a/ in /aˈmˈapile/ ‘he knows me’ with the same vowel in the form /amapile/ ‘he knows’ where no object is present. There also appears to be a slight lengthening of the remaining nasal as a result of the attachment and subsequent loss of the /ni-/ prefix.

Class 18 /mu-/ attaching to the adjective /tʰiːtʰu/ ‘black’ results in /mutʰiːtʰu/ ‘a black place (inside)’ rather than /ntʰiːtʰu/ which means instead ‘black person/thing’ (cl.1/3). In this case it appears that the vowel of class 18 /mu-/ does not elide.

6.1.1.2 Affected stem consonants

The stem-initial consonants affected by the attachment of the /mu-/ prefix are /l, β, ɟ, ɣ/. These consonants all become stops at their respective places of articulation. As occurs in the interaction of /mu-/ with most of the other consonants, regressive assimilation causes the nasal of the prefix to assimilate to the place of articulation of the stem-initial consonant. Examples are as follows.

(23)	a.	/ɱbɪlɪ/	/mu-βɪlɪ/	3-body	‘body’
	b.	/ɲɟine/	/mu-ɟine/	1-companion.1SG	‘my companion’
	c.	/ɲɟʊˈda/	/mu-ɣʊˈda/	3-field	‘field’
	d.	/ɲɟɪmi/	/mu-lɪmi/	1-farmer	‘farmer’
(24)	a.	/ɱbalile/	/mu-βal-ile/	2PL.SP-count-ANT	‘you (PL) have counted’
	b.	/ɲɟisile/	/mu-ɟis-ile/	2PL.SP-come-ANT	‘you (PL) have come’
	c.	/ɲɟanile/	/mu-ɣan-ile/	2PL.SP-love-ANT	‘you (PL) have loved’
	d.	/ɲdekʰile/	/mu-lekʰ-ile/	2PL.SP-leave-ANT	‘you (PL) have left’
(25)	a.	/ambr˩gile/	/a-mu-βr˩g-ile/	1SP-1OP-drive.away-ANT	‘he has driven him away’
	b.	/aɲɟepʰile/	/a-mu-ɟepʰ-ile/	1SP-1OP-avoid-ANT	‘he has avoided him’
	c.	/aɲɟanile/	/a-mu-ɣan-ile/	1SP-1OP-love-ANT	‘she has loved him’
	d.	/andekʰile/	/a-mu-lekʰ-ile/	1SP-1OP-leave-ANT	‘she has left him’

6.1.1.3 Retention of the vowel of the prefix

There are a few situations where the vowel of the prefix is not elided. One of these is when the prefix is attached to a monosyllabic stem, be it a nominal, adjectival or verbal stem.

(26)	a.	/mu˩ˈdu/	/mu-˩ˈdu/	1-person	‘person’
	b.	/mutʰu/	/mu-tʰu/	3-head	‘head’
	c.	/muh˩ˈwa/	/mu-h˩ˈwa/	3-termite	‘termite’
	d.	/mupʰiːa/	/mu-pʰiːa/	1/3NP-new	‘new person/thing’
	e.	/mulʰe/	/mu-li-e/	2PL.SP-eat-SUBJ	‘you (PL) should eat’

Another situation where the vowel of the prefix is retained arises when the prefix is attached to a stem with an initial prenasalised consonant, such as the compound stem /ⁿjilima/ which becomes /muⁿjilima/ ‘a person who is invited to cultivate another person’s farm’, not ^x/mⁿjilima/.⁷

Vowel-initial stems also do not allow reduction of the prefix. These interactions will be dealt with in depth in 6.2.

6.1.2 The prefixes N- and /ni-/ interacting with stem-initial consonants

Hyman (2003:49) notes that in most Bantu languages the class 9/10 nasal N- produces single prenasalised consonants across morpheme boundaries equivalent to those that exist stem-medially. This is true in Kisi and extends to the 1SG subject and object prefixes, both of which are /ni-/ which lose their syllabicity in most interactions with consonant-initial stems, resulting in nasalisation of the original stem-initial consonant. This stem-initial consonant undergoes various processes depending on the manner of its articulation.

The Proto-Bantu class 9/10 prefix has been reconstructed as N- rather than NV- by the majority of historical linguists (Maho 1999:248, citing Welmers 1973:163ff). It is based on this reconstructed form of the noun class prefix that it is written as N- in this paper, though it could be argued that it is underlyingly /ɲ-/ rather than an unspecified nasal based on the fact that on attaching to vowel-initial stems it becomes /ɲ/ despite there being no obvious phonetic motivation for it to do so.

It seems as though the 1SG subject and object prefixes have been unanimously reconstructed as /n-/ rather than /ni-/ by Bantuists (Schadeberg 2003b:151), however they will be presented as /ni-/ underlyingly in this paper since it is easier to explain the deletion of /i/ in the contexts where /i/ is not present than to posit the intrusion of an epenthetic vowel /i/ where there is no consistent motivation for it to appear, such as in the word /nik^hat^hoɓile/ /ni-k^ha-t^hoɓ-ile/ ‘I hit’ (near past).

Subsections 6.1.2.1 to 6.1.2.4 will treat each of these groups of consonants in turn, beginning with voiced plosives, then turning to voiceless plosives, then voiced fricatives and /l/, and finally voiceless fricatives and nasals. Exceptions to the creation of a desyllabified homorganic nasal involving monosyllabic stems and vowel-initial stems will be dealt with in 6.1.2.5.

6.1.2.1 Voiced plosives /b, d, ɟ, g/

These consonants become prenasalised on the attachment of N- or /ni-/ prefixes. As was stated in section 2.1, the airstream mechanism in the production of prenasalised consonants has not been analysed, so it is not possible to say whether these are prenasalised plosives or implosives.

(27)	a.	/ ^m bip ^h i/	/N-bip ^h i/	10-body.hair	‘body hairs’
	b.	/ ⁿ depek ^h a/	/N-deɲ-ik ^h -a/	9-break-NEUT-FV	‘miscarriage’
	c.	/ ⁿ je:je/	/N-je:je/	10-jaw	‘jaws’
(28)	a.	/ ^m be:lile/	/ni-be:l-ile/	1SG.SP-refuse-ANT	‘I have refused’
	b.	/ ⁿ di:mile/	/ni-di:m-ile/	1SG.SP-herd-ANT	‘I have herded’
	c.	/ ⁿ je ⁿ gile/	/ni-je ⁿ g-ile/	1SG.SP-build-ANT	‘I have built’
	d.	/ ⁿ gegile/	/ni-geg-ile/	1SG.SP-marry-ANT	‘I have married’
(29)	a.	/a ^m be:lile/	/a-ni-be:l-ile/	1SP-1SG.OP-refuse-ANT	‘he has refused me’
	b.	/a ⁿ di:mile/	/a-ni-di:m-ile/	1SP-1SG.OP-herd-ANT	‘he has herded me’
	c.	/a ⁿ je ⁿ gi:le/	/a-ni-je ⁿ g-il-ile/	1SP-1SG.OP-build-APPL-ANT	‘he has built for me’
	d.	/a ⁿ gegile/	/a-ni-geg-ile/	1SP-1SG.OP-marry-ANT	‘he has married me’

⁷ Since * is used to mark reconstructed Proto-Bantu forms in this paper, incorrect or ungrammatical forms of Kisi will be marked with ^x.

As was noted in 6.1.1.1, the desyllabification of the prefix resulting in a prenasalised obstruent also results in compensatory lengthening of any preceding prefix vowel.

6.1.2.2 Voiceless plosives /p^h, t^h, k^h/

Apart from /ŋ^h/, which occurs stem-medially in Kisi, aspirated nasals only occur as a result of a morphophonological process. That is, they are a result of the attachment of class 9/10 prefix N-, 1SG subject /ni-/ or object prefix /ni-/ to stems with an initial voiceless plosive. Such aspiration has been analysed as a step in the following chain: NC > NCh > Nh (> N) (Hyman 2003:50), which Hyman describes as characteristic of many southern Tanzanian languages, including nearby languages Vwanji, Pangwa and Kinga. The Kisi prefixes N- and /ni-/ in combination with voiceless plosives in stem-initial position result in an aspirated nasal which has assimilated to the place of articulation of the original voiceless plosive.

(30)	a.	/m ^h ɔɲa/	/N-p ^h ɔɲa/	10-baby	‘babies’
	b.	/n ^h e ^ˈ nde/	/N-t ^h e ^ˈ nde/	10-worry	‘worries’
	c.	/ŋ ^h op ^h i/	/N-k ^h op ^h i/	10-eyelid	‘eyelids’
(31)	a.	/m ^h i ^ˈ alile/	/ni-p ^h i ^ˈ alile/	1SG.SP-touch-ANT	‘I have touched’
	b.	/n ^h eli:k ^h e/	/ni-t ^h elek ^h -ile/	1SG.SP-cook-ANT	‘I have cooked’
	c.	/ŋ ^h omile/	/ni-k ^h om-ile/	1SG.SP-kill-ANT	‘I have killed’
(32)	a.	/am ^h i ^ˈ alile/	/a-ni-p ^h i ^ˈ alile/	1SP-1SG.OP-touch-ANT	‘he has touched me’
	b.	/an ^h oβile/	/ni-t ^h oβ-ile/	1SP-1SG.OP-beat-ANT	‘he has beaten me’
	c.	/aŋ ^h omile/	/ni-k ^h om-ile/	1SP-1SG.OP-kill-ANT	‘he has killed me’

6.1.2.3 Voiced fricatives and /l/

The prefixes /ni-/ and N- attaching to voiced fricatives in stem-initial position cause the fricative to become a stop, while the nasal undergoes homorganic assimilation. The data in (33) to (35) illustrate this.

(33)	a.	/m ^ˈ bɔ ^ˈ mba/	/N-βɔ ^ˈ mba/	9-wall	‘wall’
	b.	/n ^ˈ ʝuk ^h i/	/N-ʝuk ^h i/	9-bee	‘bee’
	c.	/n ^ˈ ge ^ˈ ndelo/	/N-ye ^ˈ ndelo/	9-movement	‘movement’
(34)	a.	/m ^ˈ brk ^h ile/	/ni-βrk ^h -ile/	1S.SP-put-ANT	‘I have put’
	b.	/n ^ˈ ʝimile/	/ni-ʝim-ile/	1S.SP-stand-ANT	‘I have stood’
	c.	/n ^ˈ ganile/	/ni-yan-ile/	1S.SP-love-ANT	‘I have loved’
(35)	a.	/a ^ˈ mbɾ ^ˈ ngile/	/a-ni-βɾ ^ˈ ng-ile/	1SP-1SG.OP-chase.away-ANT	‘he has chased me away’
	b.	/a ^ˈ ɲjasi:s ^ˈ e/	/a-ni-ʝay-isi-ile/	1SP-1SG.OP-lose-caus-ANT	‘he has lost me’
	c.	/a ^ˈ nganile/	/a-ni-yan-ile/	1SP-1SG.OP-love-ANT	‘he has loved me’

Similar to the behaviour of voiced fricatives, the prefixes /ni-/ or N- attaching to /l/ in stem-initial position will result in a prenasalised stop, in this case a prenasalised voiced alveolar stop, /n^ˈd/.

- (36) a. /ⁿdima/ /N-lima/ 10-bean ‘beans’
 b. /ⁿdek^hile/ /ni-lek^h-ile/ 1SG.SP-leave-ANT ‘I have left’
 c. /aⁿdek^hile/ /a-ni-lek^h-ile/ 1SP-1SG.OP-leave-ANT ‘he has left me’

6.1.2.4 Voiceless fricatives and nasals

The morphophonological interaction of voiceless fricatives with class 9/10 N- is not the same as their interaction with the nasal remaining after the verbal prefix /ni-/ is reduced to /n-/.⁸ The interaction of N- with /s, f/ in stem-initial position results in nasal effacement, as the data in (37) shows. /h/-initial stems behave differently and so will be discussed separately.

- (37) a. /fu^mbalu/ /N-fu^mbalu/ 10-calf ‘calves (of leg)’
 b. /soyolo/ /N-soyolo/ 10-shin ‘shins’

In contrast to this, stem-initial voiceless fricatives interacting with /ni-/ result in a prenasalised fricative rather than nasal effacement. The prenasalisation of /f/ is at times barely audible.⁹ The nasal assimilates to the place of articulation of /f, s/.

- (38) a. /^mf^wrmile/ /ni-f^wrm-ile/ 1SG.SP-hunt-ANT ‘I have hunted’
 /a^mfihiile/ /a-ni-fih-ile 1SP-1SG.OP-hide-ANT ‘he has hidden me’
 b. /ⁿs^jrlile/ /ni-s^jrl-ile/ 1SG.SP-bury-ANT ‘I have buried’
 /aⁿsu:mile/ /a-ni-su:m-ile/ 1SP-1SG.OP-beg-ANT ‘he has begged me’

In (39), the prenasalisation on these fricatives can be compared with syllabic nasals preceding the same fricatives. The measurements comparing the length of the subject prefix vowel and the length of production of the nasal are repeated here from 6.1.1.1.

- (39) a. /aⁿsu:mile/ ‘he has begged me’ a: 0.148s n: 0.104s
 /ansu:mile/ ‘he has begged him’ a: 0.090s n: 0.125s
 b. /a^mfihiile/ ‘he has hidden me’ a: 0.145s ŋ: 0.145s
 /amfihiile/ ‘he has hidden him’ a: 0.099s ŋ: 0.180s

/h/-initial noun stems do not cause nasal effacement of the class 9/10 prefix. The word shown in (40) has the singular /luhu:βi/ ‘hope’ which clearly shows the /h/-initial stem.

- (40) /^hu:βi/ /N-hu:βi/ 10-hope ‘hopes’

The verbal prefixes /ni-/ interacting with /h/-initial stems also result in an aspirated palatal nasal.

- (41) a. /^ho^mbile/ /ni-ho^mb-ile/ 1SG.SP-pay-ANT ‘I have paid’
 b. /a^ho^mbile/ /a-ni-ho^mb-ile/ 1SP-1SG.OP-pay-ANT ‘he has paid me’

Since Kisi does not have a voiceless palatal plosive [c], /^h/ is not created as a result of the interaction of either /ni-/ or N- with stem-initial [c].

Since verbal stems can take either 1SG or class 1 objects, it is possible to analyse the interaction of object prefix /ni-/ with nasal-initial stems by examining the differences between a verb with a 1SG

⁸ This is another reason why posing class 9/10 prefix as /n-/ underlyingly is problematic since there would be no way to explain why it then interacts differently with fricative-initial stems from how 1SG /n-/ (reduced from /ni-/) interacts.

⁹ Some Kisi speakers seemed to omit it entirely, however for other speakers this was not acceptable.

object, and with a class 1 object, and then comparing them to the verb with no object. The differences can be described as follows: for verbs with a 1SG object there is compensatory lengthening of prefix vowels preceding the object. The object itself disappears, leaving a trace of its presence by slightly lengthening the stem-initial nasal.¹⁰ For verbs with a class 1 object, extra length (greater than that caused by the 1SG object) can be heard in the stem-initial nasal with no extra length in the vowel preceding the object. See (43) for example measurements. Kisi speakers divide the Kisi word /ammapile/ ‘he knows him’ into the following syllabic divisions: /am.ma.ni.le/. The words /amapile/ ‘he knows’ and /a’m’apile/ ‘he knows me’ are divided /a.ma.ni.le/ and /a’.m’a.ni.le/ respectively.

(42)	a.	/amapile/	/a-map-ile/	1SP-know-ANT	‘he knows’
		/a’m’apile/	/a-ni-map-ile/	1SP-1SG.OP-know-ANT	‘he knows me’
		/ammapile/	/a-mu-map-ile/	1SP-1OP-know-ANT	‘he knows him’
	b.	/apuk ^h ile/	/a-ɲuk ^h -ile/	1SP-wash-ANT	‘he has washed’
		/a’ɲuk ^h i:le/	/a-ni-ɲuk ^h -il-ile/	1SP-1SG.OP-wash-APPL-ANT	‘he has washed for me’
		/aɲɲuk ^h i:le/	/a-mu-ɲuk ^h -il-ile/	1SP-1OP-wash-APPL-ANT	‘he has washed for him’
(43)	a.	/amapile/	‘he knows’	a: 0.107s	m: 0.100s
		/a’m’apile/	‘he knows me’	a: 0.182s	m: 0.127
		/ammapile/	‘he knows him’	a: 0.101s	mm: 0.323
	b.	/a’ɲuk ^h i:le/	‘he has washed for me’	a: 0.172s	ɲ: 0.101s
		/aɲɲuk ^h i:le/	‘he has washed for him’	a: 0.119s	ɲɲ: 0.182s

The examples in (44) show the 1SG subject interacting with the nasal of the stem to produce a simple nasal. Since there is no vowel preceding the resulting nasal, it cannot be evaluated whether the loss of the prefix results in compensatory lengthening of a preceding vowel, though in theory this could be tested by recording and measuring this verb with a relative prefix. It is also assumed that, like the 1SG object, the 1SG subject leaves a trace of its presence by a slight lengthening of the stem-initial nasal, but this is also not possible to measure since there is no equivalent form with only the bare stem with which to compare the measurements of the nasal.

(44)	a.	/m’apile/	/ni-map-ile/	1SG.SP-know-ANT	‘I have known’
	b.	/n’eyile/	/ni-neɣ-ile/	1SG.SP-draw.water-ANT	‘I have drawn water’
	c.	/ɲuk ^h ile/	/ni-ɲuk ^h -ile/	1SG.SP-wash-ANT	‘I have washed’
	d.	/ɲa:lile/	/ni-ɲa:l-ile/	1SG.SP-shine-ANT	‘I have shone’

The results of interactions of the prefixes N- with nasal-initial noun stems are difficult to determine, since just like subject prefix interaction with nasal-initial stems, there are no vowels preceding the noun prefix which can be measured for compensatory lengthening caused by desyllabification or elision of the prefix nasal. However, unlike the subject prefixes there is also not minimal pair for syllabicity with which to compare these nouns. There are few nasal-initial class 9 or class 10 words in the database in any case, shown in (45), only the final two of which are known to have nasal-initial stems by comparison with their singular form which takes class 11 agreement.

(45)	a.	/mot ^h a/	9.abundant.harvest	‘abundant harvest; blessing’	
	b.	/ni ^ɔ gu/	9.fish (species)	‘species of freshwater fish’	
	c.	/mili/	10.tongue	‘tongues’	(s. /lumili/ ‘tongue’)
	d.	/muli/	10.light	‘lights’	(s. /lumuli/ ‘light’)

¹⁰ Alternative analyses are possible but have not been explored here.

Since /s/ and /f/ stem-initially interact differently with the nominal prefix N- than with verbal subject and object prefix /ni-/, it is possible that nasals also interact differently. Thus, evidence of compensatory lengthening in verbal subject prefixes prior to the nasal-initial verb stem is not enough to suggest that nominal class 9/10 prefixes interact in the same way. Evidence to show how they do interact is hard to obtain.

6.1.2.5 Monosyllabic and vowel-initial stems

As with the prefix /mu-/, the behaviour of the prefixes /ni-/ and N- with monosyllabic stems is different from their behaviour with polysyllabic stems. Just like the prefix /mu-/, when 1SG subject prefix /ni-/ attaches to a monosyllabic verb stem the vowel of the prefix is retained.

(46) /ni^le/ /ni-li-e/ 1SP-eat-SUBJ

The 1SG object prefix /ni-/ does not seem to ever retain its vowel like this. It currently appears as if monosyllabic stems are lengthened by the addition of the suffix /-ay/ when they occur in the subjunctive, which is the only circumstance where the vowel of /ni-/ might have been retained. Thus, we have /aⁿdi^laye/ ‘he should eat me’ rather than ^x/ani^le/.

Since the class 9/10 prefix N- does not include a vowel, a vowel is inserted in monosyllabic stem environments in order to avoid the formation of a monosyllabic noun. The prefix takes the form /ni-/ in such environments. This is not argued to be the underlying form based on the fact that of four oft-cited lists of reconstructed Proto-Bantu noun prefixes given by Maho (1999:247), only Meinhof’s 1932 Ur-Bantu list claimed that the Proto-Bantu class 9/10 prefix included a vowel, *ni-; Bleek’s 1869 grammar and Meeusen’s 1967 paper simply stated that the prefix was *n-, and Guthrie’s 1971 volume stated it was *ny-.

(47) /ni^hwa/ /N-h^{wa}/ 9-termite ‘termite hill’

Vowel-initial stems constitute another context giving rise to different forms of the class 9/10 prefix. Since there are no vowel-initial verb stems, this only applies to class 9/10 nouns. In this environment the prefix becomes /n-/.

(48) a. /naⁿda/ /N-aⁿda/ 10-crevice ‘crevices’
b. /ni^{ji}/ /N-ji/ 10-door ‘doors’

There are some words in Kisi where it is unclear whether the stem of the word is underlyingly vowel-initial or /j/-initial. There are instances in the database where these stems appear as /j/-initial verbs and as vowel-initial de-verbal nouns.

Understanding where this /j/ variation comes from becomes easier when the data is compared to the Proto-Bantu forms from which these vowel or /j/-initial roots descend (Bastin et al. 2003).¹¹ On the whole, it seems as though verbs retain Proto-Bantu *j, in Kisi as /j/, but nouns delete it. See the examples in (49) for examples of *j-deletion in nouns and (50) for *j as the modern-day reflex /j/ in verbs. For exceptions to these generalisations, see (51).

(49) a. /lu^wr^mbu/ /lu-r^mbu/ ‘song’ (cl.11) *jimb
b. /naⁿja/ /N-aⁿja/ ‘lake’ (cl.9) *jànjá
c. /nu^mba/ /N-u^mba/ ‘house’ (cl.9) *jùmbá
d. /βu^woya/ /βu-oya/ ‘fear’ (cl.14) *jógà
e. /mu^wi^jnu/ /mu-i^jnu/ ‘salt’ (cl.3) *jínyò

¹¹ Note that the *j in the Proto-Bantu forms represents [j].

- (50) a. /k^hujoya/ /k^hu-joy-a/ ‘to be afraid’ *jóg
 b. /k^hujima/ /k^hu-jim-a/ ‘to stand up’ *jím
 c. /lujaju/ /lu-jaju/ ‘sole’ (cl.11) *jàjò
 d. /ⁿjat^hi/ /N-jat^hi/ ‘buffalo’ (cl.9) *játí
 e. /lijani/ /li-jani/ ‘baboon’ (cl.5) *jàní
- (51) /k^hujeⁿga/ /k^hu-jeⁿga/ ‘to build’ *jéng

The result of such varied behaviour in the reflexes of *j is that, viewed synchronically, stems will sometimes vary. One example of this is in the nominalisation of ‘to sing’.

- (52) a. /l^wi^mbu/ /lu-i^mb-u/ 11-sing-NMLZ ‘song’ *jimb
 b. /k^hujr^mba/ /k^hu-jr^mb-a/ INF-sing-FV ‘to sing’

6.1.3 Interaction of clitics and prefixes with other prefixes

The locative clitics /p^ha-/ , /k^hu-/ , and /mu-/ attach to the noun stem plus its prefix, rather than just the bare noun stem. All of these clitics may interact with the class 5 prefix /li-/ by causing the elision of /l/. In each case, both elided and unelided forms are acceptable. Reduction is only not an option for disyllabic class 5 words such as /li:hu/ ‘eye’. In cases such as these the clitic attaches without interaction, for example /mul:hu/ ‘in the eye’, not ^x/m^wi^hu/ or ^x/mu^wi^hu/.

- (53) a. /p^hi^boⁿdi/ ~ /p^haliboⁿdi/
 /p^ha = li-boⁿdi/
 16 = 5-valley
 ‘at the valley’ (specified location)
- b. /k^hwi^boⁿdi/ ~ /k^huli-boⁿdi/
 /k^hu = li-boⁿdi/
 17 = 5-valley
 ‘at the valley’ (unspecified or distant location)
- c. /m^wi^boⁿdi/ ~ /m^wi^boⁿdi/
 /mu = li-boⁿdi/
 18 = 5-valley
 ‘in the valley’

The behaviour of the class 18 clitic /mu-/ is different to that of the /mu-/ of class prefixes in that the vowel /u/ is elided in only a few contexts. The interaction of this clitic with most nouns results in /mu-/ attaching to the beginning of the noun with no changes to the noun or prefix, as in (54).

- (54) a. /mupaⁿja/ /mu = N-aⁿja/ 18 = 9-lake ‘in the lake’
 b. /muluk^hama/ /mu = lu-k^hama/ 18 = 11-milk ‘in the milk’
 c. /munt^hima/ /mu = mu-t^hima/ 18 = 3-heart ‘in the heart’

The classes of nouns with which this clitic does interact are classes 4, 5, 6 and 14. The class 5 prefix /li-/ interacts with /mu-/ as shown in (53). Unlike the interaction of /mu-/ with class 5 nouns, when /mu-/ attaches to class 4, 6 or 14 nouns, the consonant of the class prefix does not elide, rather the vowel of the prefix may elide. Some Kisi consider both reduced and unreduced forms acceptable still whereas other Kisi only accept the reduced form of the clitic.

- (55) a. /ṁma:si/ /mu = ma-asi/ 18 = 6-water ‘in the water’
 b. /ṁbu^wat^hu/ /mu = βu-at^hu/ 18 = 14-canoe ‘in the canoe’
 c. /ṁmi^jat^hu/ /mu = mi-at^hu/ 18 = 4-canoe ‘among the canoes’

In addition to the reduction of 1SG subject prefix /ni-/ on attaching directly to a verb stem, some Kisi find it acceptable for this same prefix to reduce to /n-/ on attaching to /kV-/ shaped prefixes. This was not accepted by all the Kisi interviewed, some of whom claimed that this is borrowed from neighbouring Nyakyusa and is not actually Kisi.

- (56) /ⁿgant^hoβile/ ~ /nik^hant^hoβile/
 /ni-k^ha-mu-t^hoβ-ile/
 1SG.SP-PST2-1OP-hit-ANT
 ‘I hit him’ (today)

6.1.4 Stem-final consonantal processes

6.1.4.1 Frication

In Kisi the agent nominalising suffix /-i/ causes frication of stem-final /p^h, t^h/¹² as shown in the examples in (57). There are currently no examples of /k^h/ frication in the database.

- (57) a. /ṇdesi/ /mu-det^h-i/ 1-lie-NMLZ ‘liar’
 b. /m^woγofi/ /mu-joyop^h-i/ 1-be.afraid-NMLZ ‘coward’

This frication does not occur upon the addition of any other degree-1 vowel suffixes such as the anterior suffix /-ile/.

- (58) a. /t^hulot^hile/ /t^hu-lot^h-ile/ 1PL.SP-go-ANT ‘we have gone’
 b. /t^hujep^hile/ /t^hu-jep^h-ile/ 1PL.SP-avoid-ANT ‘we have avoided’

The derivational suffix /-u/ also causes frication of preceding consonants. The only examples currently are /l/-final stems.

- (59) a. /βuβalafu/ /βu-βalal-u/ 14-shine-NMLZ ‘whiteness’
 b. /ndema:fu/ /mu-lemal-u/ 1-be.crippled-NMLZ ‘cripple’
 c. /madi^mbufu/ /ma-di^mbul-u/ 6-stir.sediment-NMLZ ‘dirty water’

6.1.4.2 Imbrication

Imbrication usually only occurs with extended verb stems, not with roots. Upon addition of the anterior suffix /-ile/ to verb stems allowing imbrication, the /l/ of the anterior elides and the vowel of the

¹² The change of the root-final consonant in the word /k^huloβa/ ‘to fish’ to make /ṇdofi/ ‘fisherman’ may give rise to the belief that /β/ is a root-final consonant which is affected by the nominalising suffix /-i/. However, the change in the consonant from the verb to the noun is a result of both words having been inherited from Proto-Bantu. *lób became /loβ/ in Kisi, and *dóbì became /lofi/ by a process of spirantisation caused by the high front vowel.

- (65)
- | | | | | |
|----|---|--|------------------|-----------------|
| a. | /t ^h ut ^h a:me/ | /t ^h u-t ^h a:m-ile/ | 1PL.SP-sit-ANT | ‘we have sat’ |
| b. | /t ^h ubi:t ^h e/ | /t ^h u-bit ^h -ile/ | 1PL.SP-go-ANT | ‘we have gone’ |
| c. | /t ^h uk ^h i:t ^h e/ | /t ^h u-k ^h it ^h -ile/ | 1PL.SP-do-ANT | ‘we have done’ |
| d. | /t ^h upu ^w ele/ | /t ^h u-pu-ile/ | 1PL.SP-drink-ANT | ‘we have drunk’ |
| e. | /t ^h ume:pe/ | /t ^h u-map-ile/ | 1PL.SP-know-ANT | ‘we have known’ |

The verbs in (65) behave irregularly in different ways from each other. The root /-t^ham-/ ‘sit’ does not alter on the addition of /-ile/ and so this appears to be a case of elision of the /il/ of the anterior rather than imbrication. The roots /-bit^h-/ ‘go’, /-k^hit^h-/ ‘do’ and /-man-/ ‘know’ allow imbrication into the root itself. The resulting juxtaposition of the root vowel and anterior /i/ resolves itself as juxtaposition and vowel-raising in the case of /-bit^h-/ and /-k^hit^h-/ or coalescence in the case of /-man-/. Finally, the root /-ju-/ does not undergo imbrication but the /i/ of the anterior unexpectedly becomes /e/.

In another instance of irregular behaviour of the anterior suffix /-ile/, it can be seen in the past and anterior forms of the verb /k^huǰa/ 'to be' that the interaction of /-ile/ with the root /ǰ/ forms a long vowel /e:/.

- (66) a. /a_he:le/ /a-ɣ-ile/ 1SP-be-ANT 'he is'
 b. /βa:je:le/ /βa-a-j-ile/ 2SP-PST2-be-ANT 'they were'

6.1.4.3 Causative extension interaction with stem-final consonants

Except for imbrication of the anterior suffix /-ile/ into verb stems containing suffixes, the only other predictable consonantal process resulting from the interaction of suffixes occurs when the causative suffix /-isi/ is affixed following either the separative suffix /-ul/ or the extensive suffix /-al/. The result of these combinations /-ul-isi/ and /-al-isi/ is that in both cases the middle syllable /li/ elides and /-usi/ or /-asi/ remains. There is currently evidence of one exception to this process, /k^hu^{rw}a'li'sja/ 'to dress'.

- | | | | | |
|------|----|---|---|----------------------|
| (67) | a. | /k ^h use ^ˀ ⁿgus ⁱ a/ | /k ^h u-se ^ˀ ⁿgul-isi-a/
INF-be.thanked-CAUS-FV | ‘to thank’ |
| | b. | /k ^h usiyas ⁱ a/ | /k ^h u-siyal-isi-a/
INF-remain-CAUS-FV | ‘to leave remaining’ |
| | c. | /k ^h ulamas ⁱ a/ | /k ^h u-lamal-isi-a/
INF-be.hurt-CAUS-FV | ‘to hurt’ |
| | d. | /k ^h ubak ^h as ⁱ a/ | /k ^h u-bak ^h al-isi-a/
INF-apply-CAUS-FV | ‘to smear something’ |
| | e. | /k ^h uf ^w aˀlis ⁱ a/ | /k ^h u-f ^w aˀl-isi-a/
INF-wear-CAUS-FV | ‘to dress’ |

This elision of the /li/ syllable of the combined suffixes /-Vl-isi/ does not occur in the combination of applicative /-il/ and causative /-isi/. If it did occur, then the combination would not be distinguishable from the simple causative /-isi/.

- (68) /k^hudrⁿdilisi^ja/ /k^hu-drⁿd-il-isi-a/ ‘to make someone close’
 INF-close-APPL-CAUS-FV

There are also some interactions of suffixes with stem and root-final consonants which are less regular than imbrication or the elision of /l/ from /-ul/ and /-al/ suffixes. In (69) it can be seen that /-usi/ may sometimes act as the transitive equivalent of /-uk^h/ instead of the expected /-ul/, perhaps as the result of the contraction of /-uk^h/ and /-isi/.

- (69) a. /k^husanuk^ha/ ‘to turn’ (intrans) /k^husanus^ja/ ‘to turn’ (trans)
 b. /k^huhoβok^ha/ ‘to be happy’ /k^huhoβos^ja/ ‘to amuse’

Secondly, the /l/-elision described as occurring between certain extensions and the causative extension, and exemplified in (67), may even occur with some select few verbs where the /l/ which elides is apparently part of the root, at least synchronically. The extended version has become lexicalised, sometimes with unpredictable meanings, as shown by the second example in (70).

- (70) a. /k^huγus^ja/ /k^hu-γul-isi-a/ INF-buy-CAUS-FV ‘to sell’
 b. /k^hulu^was^ja/ /k^hu-l^wal-isi-a/ INF-be.ill-CAUS-FV ‘to nurse’

Similar to this and also to the elision of suffixal /k^h/ shown in (69), there are some examples in the database of the elision of (synchronically) root-final consonant /k^h/.

- (71) a. /k^huβus^ja/ /k^hu-βu:k^h-isi-a/ INF-leave-CAUS-FV ‘to subtract’
 b. /k^husi^jus^ja/ /k^hu-s^juk^h-isi-a/ INF-be.resurrected-CAUS-FV ‘to revive’

There are also some /γ/-final verb stems where the interaction of the stem-final consonant and the causative suffix results in /s^ja/ rather than /γis^ja/ word-finally. This does not happen to all /γ/-final stems.

- (72) a. /k^huγas^ja/ /k^hu-γay-isi-a/ INF-be.lost-CAUS-FV ‘to lose’
 b. /k^huγis^ja/ /k^hu-γiγ-isi-a/ INF-imitate-CAUS-FV ‘imitate’¹⁵
 c. /k^hut^heγes^ja/ /k^hu-t^heγ-isi-a/ INF-trap-CAUS-FV ‘to cause to trap’

These verbs listed in (70) and (71) behave unexpectedly upon the attachment of the anterior /-ile/. In this situation the combination results in word-final /sis^je/ rather than word-final /si:le/ or even /Ci:s^je/, where C is the elided root consonant.

- (73) a. /t^huβu:sis^je/ /t^hu-βu:k^h-isi-ile/ 1PL.SP-leave-CAUS-ANT ‘we have removed’
 b. /t^huγusis^je/ /t^hu-γul-isi-ile/ 1PL.SP-buy-CAUS-ANT ‘we have sold’

The forms ^x/t^huγulisi:le/ and ^x/t^huγuli:s^je/ are unacceptable alternatives for /t^huγusis^je/.

Similar to this unexpected behaviour of the anterior in forming /sis^je/ with disyllabic stems ending in /s^j/, disyllabic /f^j/-final stems plus the anterior result in a word ending /fis^je/.

- (74) a. /t^huse:fis^je/ /t^hu-se:f^j-ile/ 1PL.SP-comfort-ANT ‘we have comforted’
 b. /t^hun^ja^jfis^je/ /t^hu-n^ja^jf^j-ile/ 1PL.SP-decorate-ANT ‘we have decorated’

Although it is currently not known whether the root truly is /f^j/-final or if this /f^j/ is a result of some consonantal process involving extensions, it can be seen that the same process occurs for these stems as it does with CVs^j-shaped verbs upon the addition of the anterior, so it is possible the source of their behaviour is the same.

In (75) we see examples of a potential origin of /f^j/-final verbs, that is, /^mb/-final verbs plus a causative. This is quite an unexpected origin since the consonant affected is a prenasalised consonant.

- (75) a. /k^huγuf^ja/ ‘to chase’ /k^huγu^mba/ ‘to run away’
 b. /k^huni^ja^jf^ja/ ‘to decorate’ /k^huni^ja^mba/ ‘to be pleasing’

¹⁵ It was hard to elicit the distinction between /k^huγis^ja/ and /k^huγiγa/ which are both translated as ‘to imitate’ in the database. The unelided form of the causative is also acceptable, /k^huγiγis^ja/, again with a very similar meaning, ‘to impersonate; imitate.’

6.2 Vocalic processes

6.2.1 Vowel alternations

6.2.1.1 Rightward vowel harmony

Vowel height harmony in Kisi is a rightward process working from the verb root into extensions and from nouns into possessive clitics. Front vowels in the following derivational suffixes harmonise for height with front or back vowels in the root: the applicative /-il/, the impositive and neuter /-ik^h/, and the causative /-isi/. The fact that these extensions are underlyingly of first degree height is unusual, given that the first two of these are reconstructed in Proto-Bantu as having second degree height vowels *-id- and *-ik- (Bastin et al. 2003). Table 6.1 shows which front vowels may be found in extensions following vowels of different height in the root.

Table 6.1. Front vowel harmony in suffixes

Stem vowel	Suffix vowel	Height
i, u, a	i	1st degree
ɪ, ʊ	ɪ	2nd degree
e, o	e	3rd degree

Examples of this harmony¹⁶ in practice are as follows:

Table 6.2. Vowel harmony in front vowel extensions

Root vowel	[i, u, a]	[ɪ, ʊ]	[e, o]
Applicative /-il/	k ^h ujiβila 'to capsize'	k ^h ujimila 'to stand for'	k ^h uselela 'to descend'
	k ^h unuɲilila 'to smell nice'	k ^h uhɔ:βila 'to hope for'	k ^h uhɔβok ^h ela 'to smile'
	k ^h umapila 'to learn'	-	-
Impositive or neuter /-ik ^h /	k ^h ugidik ^h a 'to be spilled'	k ^h ulimik ^h a 'to be easily farmable'	k ^h ut ^h eyek ^h a 'to be easily trapped'
	k ^h ufu ⁿ dik ^h a 'to ripen'	k ^h ujomik ^h a 'to dry'	k ^h uβonek ^h a 'to be visible'
	k ^h uf ^w a ^t ik ^h a 'to dress'	-	-
Causative /-isi/	k ^h ujiβis ^j a 'to sink'	k ^h up ^h ɪlɪk ^h is ^j a 'to listen'	k ^h useles ^j a 'to lower'
	k ^h ufup ^h is ^j a 'to shorten'	k ^h uhɔ:βis ^j a 'to promise'	k ^h uβones ^j a 'to show'
	k ^h udadis ^j a 'to annoy'	-	-

¹⁶ Vowels of first degree height following /i, u, a/ in a root are not cases of vowel harmony since the vowels are remaining in their underlying form.

The passive suffix /-iβ^w/,¹⁷ the anterior /-ile/ and the nominaliser /-i/ do not harmonise with any vowels of the root, as shown by the examples in (76).

- (76) a. /k^hulimiβ^wa/ /k^hu-lim-iβ^w-a/ INF-cultivate-PASS-FV ‘to be cultivated’
 b. /k^hut^heyiβ^wa/ /k^hu-t^hey-iβ^w-a/ INF-trap-PASS-FV ‘to be trapped’
 c. /k^hut^hoβiβ^wa/ /k^hu-t^hoβ-iβ^w-a/ INF-hit-PASS-FV ‘to be hit’
 d. /k^huk^ho^hgiβ^wa/ /k^hu-k^ho^hg-iβ^w-a/ INF-tied-PASS-FV ‘to be tied’
- (77) a. /ɱfu^wimi/ /mu-f^wim-i/ 1-hunt-AG ‘hunter’
 b. /ɱhek^hesi/ /mu-hek^h-isi-i/ 1-laugh-CAUS-AG ‘funny person’
 c. /βulo^hgi/ /βu-lo^hg-i/ 14-follow.laws-NMLZ ‘lawfulness’
- (78) a. /t^huhr^hɲile/ /t^hu-hr^hɲ-ile/ 1PL.SP-slaughter-ANT ‘we have slaughtered’
 b. /t^hugegile/ /t^hu-geg-ile/ 1PL.SP-marry-ANT ‘we have married’
 c. /t^hujo^hɲile/ /t^hu-jo^hɲ-ile/ 1PL.SP-suckle-ANT ‘we have suckled’
 d. /t^hulot^hile/ /t^hu-lot^h-ile/ 1PL.SP-go-ANT ‘we have gone’

In contrast to the vowel harmony seen affecting front vowels in extensions regardless of the front or back quality of the root vowel, the suffixes containing back vowels exhibit different behaviour. These suffixes, separative /-uk^h/ (intransitive) and /-ul/ (transitive), and nominaliser /-u/, only harmonise for height with back vowels /u, o/ in the verb root. When the root vowel is a front vowel, /u/ or /a/, the extension vowel remains unchanged.

Table 6.3. Back vowel harmony in suffixes

Stem vowel	Suffix vowel
i, ɪ, e, a, u	u
u	u
o	o

Table 6.4 shows examples of this back vowel harmony. In many of these examples, there is no basic form of the verb to compare the extended form with.

Table 6.4. Asymmetric vowel harmony in back vowel extensions

Root vowel	Separative (intrans.) -uk	Separative (trans.) -ul	Nominaliser -u
i	k ^h ulimuk ^h a ‘to visit late at night’	k ^h udi ^h mbula ‘to stir’	liliyu ‘insult’
ɪ	k ^h uk ^h ɪlɪβuk ^h a ‘to return’	k ^h ulimula ‘to harvest’	k ^h ilɪlu ‘mourning’
e	k ^h uhe ^h ɲduk ^h a ‘to boil over’	k ^h upet ^h e:lula ‘to enlarge’	k ^h ije:gu ‘story’
a	k ^h usanuk ^h a ‘to turn’	k ^h ubajula ‘to cut open’	lijaβu ‘cassava’
o	k ^h uhobok ^h a ‘to be happy; to loosen’	k ^h uholomola ‘to take out’	lilobok ^h o ‘crossing’

¹⁷ Also /-iy^w/, see 9.5.5.

Root vowel	Separative (intrans.) -uk	Separative (trans.) -ul	Nominaliser -u
ʊ	k ^h up ^h ʊ ^ŋ gok ^h a 'to reduce'	k ^h up ^h ʊ ^ŋ gola 'to reduce'	
u	k ^h up ^h ufuk ^h a 'to burst'	k ^h ugubuk ^h ula 'to uncover'	

This asymmetrical vowel harmony also applies to the 2SG possessive clitic which attaches to certain familial nouns.

- (79) a. /ɳdalaβu/ /mu-dala = βu/ 1-wife = POSS.2SG 'your (SG) wife'
b. /ɳdʊ^mbuβu/ /mu-lʊ^mbu = βu/ 1-sister = POSS.2SG 'your (SG) sister'
c. /ɳdʊ^ŋgoβo/ /mu-lo^ŋgo = βu/ 1-relative = POSS.2SG 'your (SG) relative'

Extension vowels harmonise with the vowel immediately to their left in the word. Thus, if a separative suffix containing /u/ intervenes between a root containing [e, ɪ] and a front vowel suffix, CeC-uC-iC or CiC-uC-iC, the front vowel of the suffix -iC will not harmonise with the front vowel of the root, but remains at first degree height since the vowel it can harmonise with is the one immediately to its left.

- (80) a. /k^hulimulik^ha/ /k^hu-lim-ul-ik^h-a/ 'to be harvested'
INF-cultivate-SEP-NEUT-FV
b. /k^hut^heyulik^ha/ /k^hu-t^hey-ul-ik^h-a/ 'to be able to be released'
INF-trap-SEP-NEUT-FV

Likewise, back vowels in the second suffix will not harmonise with a back vowel in the root if a front vowel intervenes.

- (81) a. /k^hiβo^mbelu/ /k^hi-βo^mb-il-u/ 'tool'
7-work-APPL-NMLZ
b. /ⁿjoβelu/ /N-joβ-il-u/ 'speech'
9-speak-APPL-NMLZ

This is also the case for the vowel /a/ in an extension close to the root, followed by another extension containing any other vowel. Since /a/ does not cause vowel harmony the vowel in the extension to its right will remain unaffected, no matter what vowel is in the root.

- (82) a. /k^hulek^hanila/ /k^hu-lek^h-an-il-a/ 'to be separate'
INF-leave-RECP-APPL-FV
b. /k^huβʊ^ŋganik^ha/ /k^hu-βʊ^ŋgan-ik^h-a/ 'to be gathered'
INF-gather-IMPOS-FV

6.2.1.2 Idiosyncratic rightward vowel harmony

There is one case that has been found so far of vowel harmony working from a prefix into a root. This occurs with the root /^ŋgi/, which underlyingly contains a degree 1 vowel. This root takes the demonstrative series of prefixes which have vowels of degree 2, /ɪ, ʊ/, or degree 4, /a/. Following the prefix vowels /ʊ, a/ there is no change in the vowel of the root however after /ɪ/ height harmony alters the root to /^ŋgi/. Table 6.5 shows an example of this for each type of prefix vowel.

Table 6.5. Idiosyncratic vowel harmony in /^ɳqi/ ‘other’

class 1	ju ^ŋ gi
class 2	βa ^ŋ gi
class 4	ji ^ŋ gi

6.2.1.3 Anticipatory vowel copying

Instead of vowel harmony, another kind of vocalic process is at work in some Kisi prefixes. This copying affects the front vowel /i/ in certain prefixes and occurs when these prefixes are followed by prefixes containing the vowels /u/ or /a/. Tense prefix vowels do not appear to copy the vowel of an object prefix which follows; only relative and subject prefixes are affected by this vowel copying. While verbs pronounced with these alternations from the original prefix vowels are considered to be better Kisi than the verbs with unaltered prefix vowels, the latter pronunciations are still understood.

The 1SG prefix /ni-/ is one of those prefixes affected. The examples in (83) show /ni-/ affected by /u/ to its right when followed by the /i-k^hu-/ transitive progressive prefixes, or by the /k^hu-/ 2SG object prefix. The examples in (84) show /ni-/ affected by /a/ to its right in the /k^ha-/ alternative transitive progressive prefix and /la-/, the future prefix.

- | | | | | |
|------|----|-----------------------------|-----------------------------------|---|
| (83) | a. | /nuk ^h unsu:ma/ | /ni-i-k ^h u-mu-su:m-a/ | 'I am begging him' |
| | | | 1SG.SP-PROG-INF-1OP-beg-FV | |
| | b. | /nuk ^h usu:me/ | /ni-k ^h u-su:m-e/ | 'let me beg you' |
| | | | 1SG.SP-2SG.OP-beg-SUBJ | |
| | c. | /nuk ^h usu:mile/ | /ni-k ^h u-su:m-ile/ | 'I have begged you' |
| | | | 1SG.SP-2GS.OP-beg-ANT | |
| (84) | a. | /nak ^h ansu:ma/ | /ni-k ^h a-mu-su:m-a/ | 'I am begging him' (also: 'I begged him') |
| | | | 1SG.SP-PTR-1OP-beg-FV | |
| | b. | /nalansu:ma/ | /ni-la-mu-su:m-a/ | 'I will beg him' |
| | | | 1SG.SP-FUT-1OP-beg-FV | |

The copying of a prefix vowel /i/ to become /u/ occurs prior to elision of the /u/ of the class 1 object /mu-/, as can be seen from the example in (85). Indeed, it seems that /ni/ is not accepted in some of these forms, for example the form ^x/nindole/ ‘let me see him’ is considered to be Manda not Kisi, and only /nundole/ is accepted.

- (85) /nunɡanile/ /ni-mu-gan-ile/ 'I love him'
1SG.SP-1OP-love-ANT

It is not all Ci- shaped prefixes which undergo these alternations, in fact only 1sg /ni-/ does. For example, /lik^hat^hulola/ or /lik^hut^hulola/, which both mean ‘it (cl.5) is looking at us’, do not have either ^x/luk^hut^hulola/ or ^x/lak^hat^hulola/ as acceptable alternatives.

The vowel of the class 2 prefix /βa-/ does not copy following vowels, since its vowel is /a/ rather than /i/.

- (86) /βak^h_{usu:}me/ /βα-k^hu-su:m-e/ ‘let them beg you’
 2SP-2SG.OP-beg-SUBJ

x/βuk^h_{usu:}me/

The prefix vowel is affected however when followed by the combined transitive progressive tense prefix /i-k^hu-/ which causes elision of the prefix vowel /a/, replacing it with /i/, which appears to then make it a candidate for copying.

- | | | | | | |
|------|----|-------------|-----------------|-------------------------|-----------------------|
| (92) | a. | /a:joβile/ | /a-a-joβ-ile/ | 1SP-PST2-say-ANT | 'he said' |
| | b. | /βa:joβile/ | /βa-a-joβ-ile/ | 2SP-PST2-say-ANT | 'they said' |
| (93) | a. | /ni:lolaɣe/ | /ni-i-lol-aɣ-e/ | 1SG.SP-REFL-see-IPFV-FV | 'I should see myself' |
| | b. | /ni:lja/ | /ni-i-li-a/ | 1SG.SP-PROG-eat-FV | 'I am eating' |

The example in (93b) is the exception rather than the rule for progressive /i-/ attaching to a subject prefix. Length is only preserved when the verbal stem is monosyllabic, like /li/ 'eat'. When the stem is polysyllabic one of the /i-/ elides and the vowel resulting from the juxtaposition of (C)a- or Ci- subjects and the progressive is short.

6.2.2.2 Juxtaposition and glide formation

Another result of vowels meeting at morpheme boundaries is vowel juxtaposition and glide formation. This occurs when the vowels /u, i/ meet dissimilar vowels at a morpheme boundary, forming u^wV and i^vV respectively.

- | | | | | | |
|------|----|---|--------------------------------------|------------|---------------|
| (94) | a. | /mu ^w ot ^h o/ | /mu-ot ^h o/ | 3-fire | 'fire' |
| | b. | /mu ^w uja/ | /mu-ujə/ | 3-breath | 'breath' |
| | c. | /βu ^w ak ^h a/ | /βu-ak ^h a/ | 14-empty | 'emptiness' |
| | d. | /lu ^w ɪ ^m bu/ | /lu-ɪ ^m bu/ | 11-song | 'song' |
| | e. | /lu ^w iji/ | /lu-iji/ | 11-door | 'door' |
| (95) | a. | /k ^h i ^v eni/ | /k ^h i-eni/ | 7-forehead | 'forehead' |
| | b. | /k ^h i ^v ak ^h a/ | /k ^h i-ak ^h a/ | 7-handle | 'handle' |
| | c. | /li ^v osi/ | /li-osi/ | 5-smoke | 'smoke' |
| | d. | /li ^v ulu/ | /li-ulu/ | 5-abscess | 'big abscess' |
| | e. | /fi ^v u ^m ba/ | /fi-u ^m ba/ | 8-room | 'rooms' |

When neither vowel concerned occurs in PU syllable position, speed of pronunciation normally results in Cu^wV and Ci^vV becoming contracted to C^wV and C^vV respectively. In (96) and (97), examples of such glide formation occurring when prefixes meet vowel-initial stems and V-shaped TAM or reflexive prefixes, are shown.

- | | | | | | |
|------|----|---|---|-----------------------|-------------------------|
| (96) | a. | /m ^w o ^v yofi/ | /mu-o ^v yofi/ | 1-coward | 'coward' |
| | b. | /m ^w a ^v ga:sa/ | /mu-a ^v ga:sa/ | 3-light | 'light' |
| | c. | /k ^h o ^v lolo/ | /k ^h i-ololo/ | 7-domesticated.animal | 'domesticated animal' |
| | d. | /m ⁱ ɪgɪɪ/ | /mi-igɪɪ/ | 4-shadow | 'shadows' |
| (97) | a. | /t ^{hw} a ^t h ^h elek ^h aya/ | /t ^h u-a-t ^h elek ^h -aɣ-a/
1PL.SP-PST2-cook-IPFV-FV | | 'we were cooking' |
| | b. | /li ^v ɪ ^v andumile/ | /li-li-a-mu-lum-ile/
5REL-5SP-PST2-1OP-bite-ANT | | 'the dog which bit him' |
| | c. | /t ^{hw} i ^t h ^h elek ^h a/ | /t ^h u-i-t ^h elek ^h -a/
1PL.SP-PROG-see-FV | | 'we are cooking' |
| | d. | /m ^w i ^v βona/ | /mu-i-βon-a/
2PL.SP-PROG-see-FV | | 'you (PL) are seeing' |
| | e. | /t ^{hw} i ^v βone/ | /t ^h u-i-βon-e/
1PL.SP-REFL-see-SUBJ | | 'let's see ourselves' |

In an unusual case of juxtaposition, the future tense morpheme /la-/ followed by the reflexive object marker /i-/ results in /laⁱ-/; the /a/ of /la-/ does not assimilate or elide.

- (98) /nila^jit^hoβa/ /ni-la-i-t^hoβ-a/ 1SG.SP-FUT-REFL-hit-FV ‘I will hit myself’

This juxtaposition of the reflexive does not occur following the other Ca- TAM prefixes: itive, near past, transitive progressive or narrative /k^ha-/ morphemes. In these cases /k^ha-/ plus /i-/ reflexive object prefix results in assimilation and elision /k^{hi}-/.

The combination of some prefixes does not result in glide formation as expected. The initial vowel of the combined transitive progressive prefix /i-kʰu-/ does not cause the /u/ of preceding prefixes to desyllabify to a glide but rather this /u/ of the preceding prefix elides in such contexts. Also an exception, the 1SG subject prefix /ni-/ and the class 4 and 9 prefixes /ji-/ meeting the far past prefix /a-/ result in elision of /i/ instead of desyllabification. Examples of this will be seen in 6.2.2.4 on elision.

6.2.2.3 Assimilation and long vowel formation

When a prefix (C)a- attaches to a vowel-initial stem or V- prefix, the /a/ assimilates to that following vowel, resulting in a long vowel. The resulting vowel is long even if the verb stem is polysyllabic. This assimilation does not occur for future /la-/ followed by reflexive /i-/, which was mentioned in 6.2.2.2.

- | | | | | | |
|-------|----|--|--|--------------|----------------------------|
| (99) | a. | /mi:hu/ | /ma-ihu/ | 6-eye | ‘eyes’ |
| | b. | /βi:ʝuk ^h ulu/ | /βa-ijuk ^h ulu/ | 2-grandchild | ‘grandchildren’ |
| | c. | /mɔ:lu/ | /ma-ulu/ | 6-abscess | ‘large abscesses’ |
| | d. | /k ^h o:t ^h o/ | /k ^h a-ot ^h o/ | 12-fire | ‘little fire’ |
| | e. | /βe:ne/ | /βa-ene/ | 2PP-self | ‘they’ |
| (100) | a. | /i:βone/ | /a-i-βon-e/ | | ‘he should see himself’ |
| | | | 1SP-REFL-see-SUBJ | | |
| | b. | /i:k ^h ɪlɪβus ^j aye/ | /a-i-k ^h ɪlɪβuk ^h -isi-ay-e/ | | ‘he should return himself’ |
| | | | 1SP-REFL-return-CAUS-IPFV-SUBJ | | |

Exceptions to this assimilation and long vowel formation occur when (C)a- subject prefixes are attached to the combined transitive progressive prefix /i-k^hu-/ and when /k^ha-/ prefixes (itive, near past, transitive progressive or narrative) attach to the reflexive prefix /i-/.¹⁸ The result of all these interactions is elision of one vowel leaving a single short /i-/ vowel. Whether it is the /a/ which elides pre-assimilation or an /i-/ which elides post-assimilation is not relevant, but both options could be claimed with equal validity.

Another instance of assimilation and long vowel formation unexpectedly occurs when the 1SG subject prefix /ni-/ and class 4 and 9 subject prefixes /ji-/ attach to the /a-/ far past prefix. The usual behaviour of Ci- prefixes meeting far past /a-/ is juxtaposition and glide formation, C'a-, yet these prefixes are exceptional perhaps because /j/ is already palatal and cannot be palatalised and for some reason /nʲ/ is not favoured in prefixes, even though it occurs stem-internally in verbs. In the case of these prefixes the /i/ of the subject prefix assimilates to the /a/ and a long vowel is formed.

- (101) a. /na:joβile/ /ni-a-joβ-ile/ 1SG.SP-PST2-say-ANT ‘I said’ (far past)
b. /ja:ju^mbile/ /ji-a-ju^mb-ile/ 9SP-PST2-run.away-ANT ‘it ran away’ (far past)

¹⁸ It is not clear why the combination 1SP-REFL- creates a long vowel when it occurs on a verb with a subjunctive final vowel, but creates a short vowel when it occurs on the same verbal base with an anterior suffix. For example, /i:ʔone/ /a-i-ʔon-e/ /1SP-REFL-see-SUBJ/ 'he should see himself', but /iʔu^wene/ /a-i-ʔon-ile/ /1SP-REFL-see-ANT/ 'he has seen himself'. It is possible that the anterior form is short because of the existence of a contrasting form, the far past, /i:ʔu^wene/ /a-a-i-ʔon-ile/ /1SP-PST,-REFL-see-ANT/ 'he saw himself'.

In fact, the /i-/ of the class 4 and 9 possessive prefixes, both /ji-/, always assimilates on meeting a dissimilar vowel at a morpheme boundary. The result is a long vowel of the same quality as the stem-initial vowel.

- | | | | | | |
|-------|----|----------------------|------------------------|--------------|-----------------|
| (102) | a. | /jo:ha/ | /ji-oha/ | 4PP-all | ‘all’ (cl.4) |
| | b. | /ja ^ɪ gu/ | /ji-a ^ɪ gu/ | 4PP-POSS.1SG | ‘my’ (cl.4) |
| | c. | /je:ne/ | /ji-ene/ | 9PP-self | ‘itself’ (cl.9) |

6.2.2.4 Elision

As mentioned in the previous sections, elision occurs in specific circumstances, generally as the behaviour of vowels in certain prefixes, which are exceptions to the other types of behaviour mentioned in 6.2.2.1 to 6.2.2.3. This section brings together those exceptions which were mentioned in these previous sections.

The first example of elision occurs when Cu- prefixes meet the combined transitive progressive prefix /i-k^hu-/. Here, the /i-/ of the transitive progressive prefix elides. There is no compensatory lengthening involved.

- | | | | | |
|-------|----|--|---|----------------------------|
| (103) | a. | /t ^h uk ^h unsu:ma/ | /t ^h u-i-k ^h u-mu-su:m-a/ | ‘we are begging him’ |
| | | | 1PL.SP-PROG-INF-1OP-beg-FV | |
| | b. | /muk ^h unsu:ma/ | /mu-i-k ^h u-mu-su:m-a/ | ‘you (PL) are begging him’ |
| | | | 2PL.SP-PROG-INF-1OP-beg-FV | |

Elision also takes place when Ci- and (C)a- subject prefixes are attached to the progressive /i-/ or transitive progressive /i-k^hu-/. The resulting /i/ is short as seen in (104), unless the resulting verb is disyllabic in which case length is preserved, as seen in (105).

- | | | | | |
|-------|----|---------------------------|----------------------------------|--------------------------------------|
| (104) | a. | /ik ^h unsu:ma/ | /a-i-k ^h u-mu-su:m-a/ | ‘he is begging him’ |
| | | | 1SP-PROG-INF-1OP-beg-FV | |
| | b. | /lik ^h undola/ | /li-i-k ^h u-mu-lol-a/ | ‘it (cl.5) is looking at/seeing him’ |
| | | | 5SP-PROG-INF-1OP-see-FV | |
| | c. | /nisu:ma/ | /ni-i-su:m-a/ | ‘I am begging’ |
| | | | 1SG.SP-PROG-beg-FV | |
| | d. | /isu:ma/ | /a-i-su:m-a/ | ‘he is begging’ |
| | | | 1SP-PROG-beg-FV | |
| (105) | a. | /yi:l ^h a/ | /ya-i-li-a/ | ‘they (cl.6) are eating’ |
| | | | 6SP-PROG-eat-FV | |
| | b. | /ni:l ^h a/ | /ni-i-li-a/ | ‘I am eating’ |
| | | | 1SG.SP-PROG-eat-FV | |

Finally, elision of a vowel occurs when the causative extension is followed by another front vowel extension -iC.

- | | | | |
|-------|--|---|-----------|
| (106) | /k ^h ulamasib ^w a/ | /k ^h u-lamal-isi-iβ ^w -a/ | ‘be hurt’ |
| | | INF-hurt-CAUS-PASS-FV | |

6.2.2.5 Summary

Table 6.6 summarises the previous five sections regarding vowel interaction.

Table 6.6. Summary of vowel hiatus resolution

Juxtaposition CV:			
Nouns:	CV- prefix attaches to V-initial nouns	→	CV:
Verbs:	Ca-/Ci- SP is followed by i- REFL prefix	→	Ci:
	Ca- SP is followed by a- PST2 prefix.	→	Ca:
	Monosyllabic verb stem: CV-i-vb-a (V ≠ u)	→	Ci:-vb-a
Juxtaposition and glide formation Cu^wV/Ci^jV (C^wV/C^jV)			
Nouns:	Cu- prefix attaching to V-initial stem (V ≠ u)	→	C ^w V/ Cu ^w V
	Ci- prefix attaching to V-initial stem (V ≠ i)	→	C ^j V/ Ci ^j V
Verbs:	la- FUT prefix is followed by i- REFL prefix→	la ⁱ i	
	(CV-)Cu-i-vb-fv (i- = REFL prefix/PROG prefix)	→	(CV-)C ^w i-vb-fv
	Cu- prefix followed by a- (PST2) or ak ^h a- (NAR)	→	C ^w a(k ^h a)-
	Ci- prefix followed by a- (PST2) or ak ^h a- (NAR)	→	C ^j a(k ^h a)-
Assimilation and long vowel formation CV:			
Nouns:	Ca- prefix attaches to V-initial nouns (V ≠ a)	→	CV:
Verbs:	Ca- prefix followed by V- prefix	→	CV:
	ni- SP (1SG.SP) plus a- PST2 prefix	→	na:-
	ji- SP (4SP/9SP) plus a- PST2 prefix	→	ja:-
Elision (and compensatory lengthening) CV(·)			
Nouns:	no instances		
Modifiers:	ji- prefix attaching to V-initial stems (V ≠ i)	→	jV·
Verbs:	(CV-)Cu-ik ^h u-CV-vb-a	→	(CV-)Cuk ^h u-CV-vb-a
	(CV-)CV*-ik ^h u-CV-vb-a (V* ≠ u)	→	(CV-)Cik ^h u-CV-vb-a
	CV-i-vb-a, polysyllabic stem, (V ≠ u)	→	CV-i-vb-a
	CAUS -isi followed by extension -iC	→	-isiC

6.3 Syllabic processes

6.3.1 Consonant and vowel metathesis

The itive, transitive progressive and past morphemes, all having the shape /k^ha-/ in Kisi, behave in the same way when preceded by a V-shaped prefix, that is, either class 1 subject /a-/ or 2SG subject /u-/. The result is that the vowel of the subject prefix may swap with the /k^h/ of the /k^ha-/ prefix. While this swapping is possible, it is not obligatory in Kisi. The same forms may be pronounced with /uk^ha-/ and /ak^ha-/ instead of /k^hwa-/ and /k^ha-/. Note that /k^ha-/ resulting from /a-/ metathesizing with /k^h/ of /k^ha-/, does not have a long vowel. As such, it could be argued that instead the subject prefix is deleted, and no metathesis has taken place (see (107) d-f). This explanation would not account for how the 2SG subject prefix and /k^ha-/ become /k^hwa-/ however (see (107) a-c).

- (107) a. /k^hwaⁿsu:ma/ ~ /uk^haⁿsu:ma/
 /u-k^ha-mu-su:m-a/
 2SG.SP-PTR-1OP-beg-FV
 ‘you are begging him’
 b. /k^hwaⁿdek^hi:le/ ~ /uk^haⁿdek^hi:le/
 /u-k^ha-ni-lek^h-il-ile/
 2SG.SP-PST1-1SG.OP-leave-APPL-ANT
 ‘you left to me’ (near past)

- c. /k^{hw}a^th^oβe/ ~ /uk^ha^th^oβe/
 /u-k^ha-t^hoβ-e/
 2SG.SP-ITV-hit-SUBJ
 ‘go and hit’
- d. /k^hansu:ma/ ~ /ak^hansu:ma/
 /a-k^ha-mu-su:m-a/
 1SP-PTR-1OP-beg-FV
 ‘he is begging him’ (also: ‘he begged him’)
- e. /k^hat^hoβa/ ~ /ak^hat^hoβa/
 /a-k^ha-t^hoβ-a/
 1SP-NAR-hit-FV
 ‘he hit’
- f. /k^hat^hoβe/ ~ /ak^hat^hoβe/
 /a-k^ha-t^hoβ-e/
 2SG.SP-ITV-hit-SUBJ
 ‘he should go and hit’

6.3.2 Syllable elision

The combination of the present tense and infinitive prefixes (the combined transitive progressive) /i-k^hu-/ followed by a 2SG object /k^hu-/ undergoes syllable elision to become /i-k^hu-/. It is not certain why this is the case. In the examples in (108), the bracketed final step of vowel copying is optional as both forms are acceptable.

- (108) a. /ni-i-k^hu-k^hu-su:m-a/ → /nik^huk^husu:ma/ → /nik^husu:ma/
 (→ /nuk^husu:ma/)
 1SG.SP-PROG-INF-2SG.OP-beg-FV
 ‘I am begging you’
- b. /βa-i-k^hu-k^hu-su:m-a/ → /βik^huk^husu:ma/ → /βik^husu:ma/
 (→ /βuk^husu:ma/)
 2SP-PROG-INF-2SG.OP-beg-FV
 ‘they are begging you’

It is unclear whether it is the /k^hu-/ of the transitive progressive tense prefix that elides or the object prefix.

References

- Bastin, Yvonne, André Coupez, Evariste Mumba, and Thilo C. Schadeberg, eds. 2003. *Bantu Lexical Reconstructions*. Vol. 2. Tervuren: Royal Museum for Central Africa. Accessed July 24, 2018. http://www.africamuseum.be/en/research/discover/human_sciences/culture_society/blr.
- Gray, Hazel. 2017. Dialect survey among the Kisi people. SIL International. Ms.
- Guthrie, Malcolm. 1948. *The classification of the Bantu languages*. London: Oxford University Press. ufdc.ufl.edu/UF00072644/00001/81x.
- Guthrie, Malcolm. 1967–1971. *Comparative Bantu*. Farnborough: Gregg International.
- Hyman, Larry M. 2003. Segmental phonology. In Derek Nurse and Gérard Philippson (eds.), *The Bantu languages*, 42–58. London: Routledge.
- Johnston, [Sir] Harry H. 1899. *British Central Africa: An attempt to give some account of a portion of the territories under British influence north of the Zambezi*. Second edition. London: Methuen & Co.
- Lewis, M. Paul, Gary F. Simons, and Charles D. Fennig, eds. 2013. *Ethnologue: Languages of the world*. Seventeenth edition. Dallas, Texas: SIL International. Accessed May 24, 2013. ethnologue.com/17/language/eng.
- Liddle, David, Katherine Liddle, Annemarie Burke, and Louise Nagler. 1999. *Sociolinguistic survey of the Kisi people of Tanzania*. SIL International.
- Lindau, Mona. 1984. Phonetic differences in glottalic consonants. *Journal of Phonetics* 12:147–55.
- Maho, Jouni F. 1999. A comparative study of Bantu noun classes. *Orientalia et Gothoburgensia* 13.
- Maho, Jouni F. 2009. New updated Guthrie lists. Accessed July 24, 2018. www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwilz_XhlbjcAhXSOn0KHRUXD24QFjAAegQIARAC&url=https%3A%2F%2Fbrill.com%2Ffileasset%2Fdownloads_products%2F35125_Bantu-New-updated-Guthrie-List.pdf&usg=AOvVaw3QklASjgZxPML6XzX1cSjr.
- Meinhof, Carl. 1932 [repr. 1984]. *Introduction to the phonology of the Bantu languages: Being the English version of "Grundriß einer Lautlehre der Bantu-sprachen."* Revised, enlarged and translated from the second edition [1910] in German by N.J. van Warmelo in collaboration with the author and Dr. Alice Werner. Berlin: Dietrich Reimer Verlag.
- Ngonyani, Deogratias S. 2011. A grammar of Kikisi. Ms.
- Nurse, Derek, and Gérard Philippson. 1975. The Tanzanian language survey (file name: Kisi). Accessed July 24, 2018. <http://www.cbold.ish-lyon.cnrs.fr/Dico.asp?Langue=TLS&Type=Text>.
- Nurse, Derek, and Gérard Philippson. 1980. The Bantu languages of East Africa: A lexicostatistical survey. In Edgar Polomé and Charles P. Hill (eds.), *Language in Tanzania*, 26–67. Oxford University Press.
- Nurse, Derek. 1988. The diachronic background to the language communities of Southwestern Tanzania. *Sprache und Geschichte in Afrika* 9:15–116.
- Olson, Kenneth. 2001. The phonology and morphology of Mono. PhD dissertation, University of Chicago. Ms.
- Schadeberg, Thilo C. 2003a. Derivation. In Derek Nurse and Gérard Philippson (eds.), *The Bantu Languages*, 71–86. London: Routledge.
- Schadeberg, Thilo C. 2003b. Historical linguistics. In Derek Nurse and Gérard Philippson (eds.), *The Bantu languages*, 143–154. London: Routledge.

Welters, William Everett. 1973. *African language structures*. Berkeley: University of California Press.

Wilson, Gerald. 1951. The Nyakyusa of south-western Tanganyika. In Elizabeth Colson and Max Gluckman (eds.), *Seven tribes of British Central Africa*, 253–291. London: Oxford University Press for the Rhodes-Livingstone Institute.